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ETHEKWINI MUNICIPALITY | CENTRAL DENSIFICATION AND IMPLEMENTATION PLAN | SUMMARY REPORT

INTRODUCTION
1.1 INTRODUCTION

Aurecon was appointed by the Development Planning, Environmental and Management Unit within the Development Planning Department and the Strategic Spatial Planning Branch of eThekwini Municipality to undertake the preparation of a Central Densification and Implementation Plan. The section below outlines the overarching goals and objectives of the project.

PROJECT OBJECTIVES

The key objective and required outputs from the assignment is clearly stated in the Terms of Reference. The key objective as per the Terms of Reference is to develop a comprehensive densification framework for the corridors and adjacent suburbs identified in the central region. The densification framework will:

- Identify site specific density target areas
- Explore appropriate development parameters to encourage higher density development and respond to the local context e.g. development controls, bulk, parking, rates incentives, etc.
- Prepare 3 priority density target areas each for both the suburbs and backyard areas that will:
  - Identify and delineate density priority areas;
  - Develop a densification strategy and land release strategy for density target areas;
  - Develop a framework to facilitate where targeted regulatory changes would be required;
- Assess social infrastructure capacity.
- Simplify and stream-line the development application provides (particularly in priority density areas as per SPLUMA requirements).
- Setup a monitoring and evaluation system to focus on ensuring the implementation of the City Density Strategy by the Municipality and to comply with ICDG requirements/COGTA densification guidelines.

- Determine the densification alternatives (infill, intensification and urban renewal) appropriate in the priority areas).
- Provide clear design guidelines to ensure sustainable densification in priority areas.
- Provide a robust analysis and to propose innovative but practical responses and set of instruments (zoning, parking, design) at a level of detail to advance implementation.
- Identify priority projects for public sector interventions that demonstrate the high quality living environments in higher density housing typologies.
- Investigate appropriate incentives models for rebates to encourage higher density development in line with City Incentive Strategy.
- Review the developer contribution levies to support density goals.
- Address waste management in the area identified for densification.

PURPOSE OF THE PROJECT

It is critical for a project of this importance to confirm the overall project methodology and deliverables based on the Terms of Reference. The Inception Report is therefore used to clarify and establish project protocols and in turn to ensure the following:

- Alignment between the eThekwini Municipality Project Team and the Service Provider Team as it relates to the overall project objectives and deliverables as well as confirming the communication structures
- Adherence to, and interpretation of the TOR and agreed to between the client, beneficiaries and the service providers
- Confirmation and finalization of critical stakeholders that form part of the project methodology;
- Confirmation of the project governance and reporting structures
- Confirmation of the project deliverables, meeting schedule, programme and timeframe
- The creation of a road map for the project
- Clarification of any changes and agreements that were reached after the initial signing of the contract between the client (eThekwini Municipality), and service providers (Aurecon South Africa (Pty) Ltd)
- Confirmation of the budget and payment schedule
APPROACH AND METHODOLOGY
Figure 1-1 gives and overview of the approach and methodology followed in the execution of the project. The project approach followed five main phase that included:

• Phase 0: Inception
• Phase 1: Status Quo
• Phase 2: Development Framework
• Phase 3: Implementation Framework, and
• Phase 4: Finalisation of report

The contents of this document covers Phases 1 to 3. Phases 0 and 4 were more administrative and nature and did not cover research, analysis or the creation of information.

Due to the nature of this assignment it was required in some instances to move beyond the stated approach. This was due to the fact that the study area was complex and included various IPTN routes and stations, unlike single route studies that have been undertaken by the municipalities in previous work. A shift of focus also took place during the study, requiring the team to broaden the parameters of the study to investigate the larger region in stead of focussing only on densification related to the IPTN network and system but also areas beyond these.

STRUCTURE OF THE DOCUMENT
This report gives an overview of the work completed. It attempts to summarise the process in a logical way in order to present the reader with a narrative of the process.

• Chapter 1: Introduction
• Chapter 2: Aspects of densification
• Chapter 3: Benchmarking Transit Oriented Development
• Chapter 4: The densification framework
• Chapter 5: Station typologies and pilot site assessment
• Chapter 6: Implementation Framework

The project also contains business plans for the resulting pilot sites that were identified as part of this document. These business plans are separate documents and not included here.
FIG 1-1: PROJECT APPROACH AND METHODOLOGY
STUDY AREA

The study area is in general terms called the Central SDP and is depicted in the adjacent figure. It focuses on the connections between Pinetown, Bridge City, the Central Business District and Ulazi.

Previous work on densification has been completed in the area and include the Southern Public Transit Network Corridor and the Central Local Area Plan. These areas are shown in figure 2-2. These areas will be discounted from the study and instead proposals and recommendations will focus on the areas west of these regions.
FIG 1–3: AREAS EXCLUDED FROM STUDY
ASPECTS OF DENSIFICATION
2.1 WHAT IS DENSIFICATION AND WHY IS IT IMPORTANT

The following sections deal with the rationale for densification and compaction. Not all factors are equally important in the case of the central region but it still sketches and informs the policy making process.

**DEFINITION**

It is important to define densification to ensure that there is no confusion. For the purpose of this document densification is defined as:

The increased use of space both horizontally and vertically within existing areas/properties and new developments accompanied by an increased number of units and/or population thresholds.

Densification is a means of creating an improved, more sustainable environment that promotes public transport and improves the vitality of urban precincts. It is also a relative indicator of the intensity of development.

**RATIONALE FOR DENSIFICATION**

Densification can contribute to the creation of good quality, efficient and sustainable urban environments in a number of different ways. These methods are discussed in the following section with specific focus on:

- Reducing the consumption of valuable or non-renewable resources.
- The development of a viable public transport system.
- Ensuring that the town or city is more equitable in terms of access to opportunities.
- Creating an environment that promotes economic opportunities and supports sustainable service delivery.
- Improving the choice of housing types and housing patterns.

**REDUCING THE CONSUMPTION OF VALUABLE/ NONRENEWABLE RESOURCES**

The promotion of a more compact and densified urban environment reduces the consumption of valuable resources such as agricultural land, areas of mineral potential, aquifer recharge areas and valuable biodiversity areas. It also reduces the consumption of non-renewable resources by lessening car dependency.

**SUPPORTING THE DEVELOPMENT OF A VIABLE PUBLIC TRANSPORT SYSTEM**

The implementation of densification strategies still contributes to pedestrians being in closer proximity to facilities and amenities they require. Higher densities, accompanied by increased population thresholds and mixed use development, support the efficient functioning and viable provision of public transport services and the pedestrianisation of the urban environment.

**MAKING THE TOWN MORE EQUITABLE**

Higher densities in appropriate locations, especially those close to urban opportunities (services, facilities and jobs) and public transport help rationalise the housing pattern in towns and cities and improves access to amenities and facilities. This helps to reduce travel distances and times and the costs associated therewith.

**FACILITATING ECONOMIC OPPORTUNITIES AND SUPPORTS SERVICE PROVISION**

Higher densities, accompanied by increased population thresholds, create sufficient consumers to generate the development of economic opportunities, social facilities and services, and enable the cost-effective provision and optimal use of infrastructure. This is particularly the case where there is excess service capacity or where increased thresholds are required to provide services and infrastructure.

**IMPROVING HOUSING PATTERNS AND CHOICE OF HOUSING TYPE**

A mix of residential densities ensures diversification and choice of housing types and tenure options.

**CONTRIBUTING TO URBAN PLACE-MAKING AND IMPROVES SAFETY**

Appropriately designed and located higher densities (in terms of form, scale, height and orientation) can provide an opportunity for place-making and the making of attractive and safe urban environments, particularly those in proximity to public spaces (both natural and built).

Higher densities are not a guarantee of quality urban environments, appropriate built form or good urban design. However, the extremes of either very high or low densities often result in negative urban environments. Appropriate regulations, local development policies and urban design frameworks can be used to help prevent negative built environments.
WHAT DENSIFICATION IS NOT

DENSIFICATION DOES NOT IMPLY THAT ‘ONE SIZE FITS ALL’

Not everyone wants to live in suburbia, or alternatively, in high-rise flats. The intention should be to ensure that a range of opportunities, life styles and choices exist for people in all areas of towns and cities and all income groups, but within compatible forms of higher-density development and without impacting negatively on the urban environment.

DENSIFICATION DOES NOT IMPLY HIGH-RISE BUILDINGS

Higher densities can be achieved through 3-5 storey buildings. Although high-rise flats are acceptable in suitable locations where there is high-rise character (or suitable potential) such as in a town centre, isolated high-rise buildings, are not to be encouraged as this is detrimental to the area character and density. High-rise flats can exacerbate social problems in poorer areas, especially if the buildings are of a poor design and quality, and where there is no proper relationship with surrounding open spaces and facilities.

Low-rise densification can also be effectively achieved in residential areas through second dwellings, group housing (town house) schemes, subdivisions, and erf consolidations with redevelopment at higher densities.

DENSIFICATION BY ITSELF IS NOT THE CAUSE OF POOR QUALITY LIVING ENVIRONMENTS OR OVERCROWDING

There is a concern that higher densities mean unattractive high-rise buildings surrounded by poorly articulated spaces. It is, however, evident that higher densities can be accommodated in a variety of built forms. This can result in differing urban qualities, which are largely a function of form, scale and height rather than the extent of densification or higher thresholds. Overcrowding occurs in free standing and multi-storey housing. Sensitive densification can take place in all areas, sometimes to a greater or lesser extent.

DENSIFICATION WILL NOT RESULT IN A MASS OF APPLICATIONS REDUCING ERF SIZES AND THE LOSS OF AREA CHARACTER

Although the perception exists that allowing densification will bring a mass of applications, reality does not bear this out. The densification of cities and towns has historically taken place incrementally. There are many residential areas where a diversity of residential erf sizes and housing types (single-storey houses, flats and town houses) continue to exist and be compatible. Furthermore, densification does not imply an inevitable reduction to the smallest erf size in an area.

MEASURES OF DENSIFICATION

Although there is no agreed upon measure of what constitutes high, medium and low density, a range of measures are used to calculate and compare built form and population densities. Some of the commonly used measures are dwelling unit density (gross/nett), population density, and gross base density. Table 1 below describes these measures in more detail.
• Dwelling unit density
  Number of dwelling units per hectare (du/ha).

• Population density
  Number of people per hectare (usually calculated by multiplying the number of units by an appropriate average household size).

• Building density
  Ratio of total floor area of buildings to the corresponding site (FAR).

• Gross du/ha
  The number of dwelling units per hectare of land calculated in a designated area on the basis of land used for residential purposes and other land uses such as industry, commerce, education, transport and parks. Excluded are land-extensive land uses such as agricultural land and nature areas/reserves/parks.

• Net du/ha
  The number of dwelling units per hectare of land calculated on the basis of land used for residential purposes including the garden and off-street parking, if any.

• Gross base density
  The average number of dwelling units per hectare across large town district areas or the town as a whole, excluding land-extensive uses such as agricultural and rural land and large nature areas/reserves/parks.

**MEANS OF ACHIEVING DENSIFICATION**

Densification can take place in the developed areas of the study area, on vacant infill sites within the developed areas and on green field sites that are within the region’s planned growth direction. The general process of densification takes place in a number of ways and is supported by a range of zoning and land use regulations.

The following figures were adapted from the 2009 Cape Town Densification Strategy and give generic means or ways of achieving densification.

**ADDITIONAL DWELLING UNIT**

Construction of attached/detached second dwellings including the changing of non-residential buildings, or parts of buildings, to residential buildings (e.g. garages).

**SUBDIVISION**

Subdivision of land and redevelopment at higher densities.

**CONSOLIDATION AND REDEVELOPMENT 1**

Block consolidation of erven with redevelopment at higher densities.
THE FACTORS THAT AFFECT DENSIFICATION AND THEIR IMPLICATIONS FOR STRATEGY

The major factors constraining and enabling densification and impacting on the form of densification (location, design and quality) include:

- policy, legislation and regulations
- economic and market forces
- social and lifestyle considerations
- form and nature of the built environment
- technological issues

These factors are discussed in detail later in the document and are crucial informants to the preparation of a density strategy (especially the supporting mechanisms).

CONSOLIDATION AND REDEVELOPMENT 2

Consolidation with redevelopment at higher densities including the demolition and integration of existing structures.

HIGHER DENSITY INFILL ON UNDERUTILISED LAND

Higher density infill on vacant and under-utilised land throughout the built area of the City.

INCREASED LAND USE RIGHTS

Increasing the existing bulk rights through the extension of the building or adding one of floors to accommodate an increased number of units.

LARGE SCALE PRECINCT DEVELOPMENT

Consolidation of sites within a street block to create a single larger parcel for redevelopment into multi-storey units.
2.2 ETHEKWINI MUNICIPALITY’S APPROACH TO DENSIFICATION

This section deals with the framework, plan and strategy that inform the development of density guidelines and subsequent criteria to determine the areas where densification can be applied, based on the policy environment of the municipality.

THE ETHEKWINI SPATIAL DEVELOPMENT FRAMEWORK

There is a strong vision for the Central District to densify around corridors and nodes and within appropriate residential capacity. Furthermore, environmental protection must be adhered to, while the economic growth and development of the business and industry sectors must be capitalised on.

DENSIFICATION AND THE SDF

Densification forms part of the SDF’s Spatial Development Strategy, along with infill and urban renewal. The different methods for achieving densification can occur through:

- Infill development on vacant or underutilized parcels of land at higher densities. A range of infill processes may include transfer of development rights, land swaps, land consolidation, public housing projects and so forth;
- New development on vacant or under-utilized land at higher densities;
- Cluster development on large parcels of land through a consolidation process;
- Conversion of existing building (sometimes vacant/derelict) to other uses;
- Subdivision of large pieces of land to encourage higher densities;
- Allowing additional units to be developed on a single piece of land; and
- Redevelopment of poorly functional areas to encourage and facilitate infill.

Furthermore, the SDF specifies that land use strategies which support the development and performance of an effective and sustainable transport system are focused around the major IRPTN corridors and include stimulating higher employment and residential densities within these corridors in particular, as well as the promotion of residential densification within the core urban area in general.

ELEMENTS OF THE SDF

According to the SDF (p.184) of eThekwini, the following key spatial elements are evident in the Central District:

- Densification corridors;
- Economic investment node;
- Urban investment nodes;
- Future densification areas;
- Industry;
- Future industry;
- Residential;
- Environment.

FIG 2-1: ETHEKWINI SDF
CENTRAL SPATIAL DEVELOPMENT PLAN
The vision for spatial development of the Central Spatial Region (CSR) has been formulated in accordance with the strategic role this region serves in the wider context of the metro and has been underpinned by its inherent characteristics and capacities to support development: A world class logistics, industrial and financial services region with optimized residential development.

The spatial intent of the CSR is as follows:

- Mix of residential type and quality
- World class and integrated
- Logistics hub
- High levels of connectivity and convenience
- Events and tourism hub
- Commercial and industrial hub
- Public transport hub

DENSIFICATION AND THE SDP
Densification forms part of the key structuring elements of the SDP, along with infill. Densification of established, well located areas (including areas around nodes and along corridors) will promote more efficient use of existing infrastructure and help to create thresholds for public transport. These areas represent important opportunities in that they offer the potential not only for residential densification but also for diversification into mixed land uses and activity corridor development.

Densification along public transport corridors, such as the South Public Transport Corridor, and within specific precincts, such as Warwick and the Inner City, is encouraged to obtain a compact city structure.

ELEMENTS OF THE CENTRAL SDP
Prominent spatial features of the SDP include:

- Future densification areas;
- Densification corridors;
- DMOS areas;
- Existing industry;
- IRPTN routes;
- Metropolitan node;
- Existing residential; and
- Mixed use.

FIG 2-2: CENTRAL SDP MAP
ETHEKWINI DENSITY STRATEGY

According to the Densification Strategy (p.3), the EM is seeking to shift the growth trajectory of the city in a more efficient, equitable and/or sustainable direction. It plans to do this through the development of a specific strategy for the direction and management of one of the most important characteristics that influences the quality and performance of, and the efficiency and sustainability of human settlements i.e. urban and rural settlement density.

More specifically it has sought to develop a strategy that will:

- Identify and consolidate ideas, concepts and definitions relating to density in the EM into a widely accepted policy statement and also a management framework for density within the EM;
- Begin to align key planning and development stakeholders in the public and private sector around these ideas, concepts and definitions and the manner in which it can be effectively implemented;
- Understand the contextual and management dynamics that underpin density targets, patterns and trends in the EM context;
- Identify an approach to practical and realistic implementation interventions and tools that can be inserted into the existing (and proposed new) policy, operational and urban management environment of the Municipality so as to unlock impediments to achieving density targets and/or the creation of quality living environments;
- Identify typical areas within the city that are suitable for densification and the appropriate mix of interventions and tools for achieving targets in these areas.

The density target areas should indicate:

- where higher residential density development should be actively promoted i.e. town centres; in proximity to major transport facilities;
- where residential density should be managed i.e. residential suburbs; and
- where residential density should be actively discouraged i.e. rural areas.

- Density strategy guidelines

WITHIN AND IN PROXIMITY TO METROPOLITAN AND SUB-METROPOLITAN NODES

At the intersection/convergence of city-scale development, connector and activity routes including public transport interchanges – good access on the broader scale. May form an expanded part of an activity route but requires the inclusion of a public transport interchange.

Characterised by major concentrations of commercial/business development, higher-order services, facilities and institutions, mixed-land uses and higher densities (including higher density zones). Pedestrian-orientated within the identified centre area with interrupted and slow movement flows.

- Examples: Durban, Pinetown, Umlazi, Bridge City

- Target conditions: Generally within and abutting the defined node or central business district area. Particularly in the vicinity of public transport routes, interchanges and stations, near social facilities and public open space precincts and where there is a diverse concentrated mix of land uses, activities and services.

Level 1 Node: Within 5km
Level 2 Node: Within 2km

- Density guidelines: Net Density of 80-250du/ha (160-1,000P/ha)

WITHIN AND IN PROXIMITY TO LOCAL AREA AND NEIGHBOURHOOD NODES

Clustering of activities in a local area/neighbourhood, or as part of an activity street, with good access (including public transport).

Comprises of a range of land uses and services such as shops, restaurants, offices, banks, post office, community centre, municipal offices, hospitals, clinics, institutions, station, bus/taxi stops, garages, parking areas and/or public spaces/facilities. Includes higher-density zones. Largely focussed on a range of linked buildings, land uses and spaces.

- Examples: Tongaat, Hillcrest, Verulam, Umhlanga Ridge Musgrave, Westville, Broadway, Clermont, Chatsworth, Mpumalanga, Bridge City, Kwa-Mashu

- Target condition: Generally within and abutting the defined node, especially the multifunctional part of the node. Particularly in the vicinity of public transport routes, interchanges and stations, next to social
facilities and public open space precincts and where there is a diverse and concentrated mix of land uses, activities and services.

- Level 3 & 4 Nodes: Within 800m
- Level 5 Node: Within 400m

WITHIN AND IN PROXIMITY TO DEVELOPMENT SPINES

Major city-wide or district movement routes (class 2 or 3 roads) including line-haul public transport or IRPTN along which there may be interrupted flows at traffic lights and intersections. Express ways (at grade) with fast-moving traffic sections may form part of the development route.

Generally, very limited direct access but with development and commercial/business complexes linked to parallel and connecting side roads (feeder systems).

Could include short stretches of activity route type development, mixed land uses and higher-density areas.

- Examples: MR577, Umhlanga Rocks Drive, R102 (North Coast Road), M13
- Target conditions: Within 800m of points of direct access, transport intersections and interchanges, places of intense mixed-use and nodal activity (activity route character) and next to or part of commercial complexes. Level 3 & 4 Nodes: Within 800m
- Density guidelines: Net Density of 80-150du/ha (160-1,000P/ha)

WITHIN AND IN PROXIMITY TO ACTIVITY SPINES

Significant and/or metro-wide to district activity route directly linked to development including centres/nodes, mixed land uses, commercial/business developments and light industry, institutions, social facilities (including recreation) transport interchanges and higher-density development (including higher density areas).

Intermittent movement patterns incorporating public transport (including commuter rail). Direct access en route with interrupted movement flows, especially at bus-taxi stops and at traffic lights and intersections. Pedestrian-orientated in sections.

- Examples: Brickfield Road, Sparks Road
- Target conditions: Generally near the activity route but particularly near public transport interchanges and stations, mixed-use areas and concentrated activity – business/commercial nodes and at public institutions and facilities including open space.

In the residential areas that are within 2km proximity to major public transport facilities and within 400-800m, of all existing and proposed rail stations and sub-metropolitan bus or taxi ranks.

- Density guidelines: Net Density of 80-150du/ha (320-600p/ha)

METROPOLITAN

Broad guidelines applicable to the metropolitan area. These must be interpreted in terms of appropriate levels of planning and should not be considered a blanket density control.

- Target conditions: All locations where permitted in terms of existing rights or an application for rezoning/consent/departure/sub-division, Second dwellings and other forms of development acceptable if no negative impact on the character of the area and existing rights.

- Density guidelines: Urban: Net Density of 40-80 du/ha
- Suburban: Net Density of 15-40 du/ha
- Rural: Net Density of 1-15 du/ha

- Interface with UDL and environmentally sensitive areas:
  Within 400m proximity to the Urban Development Line – must take cognisance of local context.

Net Density of 5-15 du/ha
RESIDENTIAL DENSIFICATION PRINCIPLES

There are certain principles that should be adhered to for locating higher density residential settlements according to the Density Strategy. These include the following:

- Land is within the specified distance of one of the following:
  - 2km of CBD/Metropolitan Node (Level 1 and 2 Social Facility Node)
  - 800m of existing/emerging sub-regional node (Level 3 and 4 Social Facility Node)
  - 800m of high quality open space
  - 800m of tertiary institution
  - 800m of regional hospital
- Land is within close proximity to all of the following elements:
  - 400m of existing or future IRPTN route
  - 400m of existing or proposed useable open space
  - 400m of existing or proposed employment zone
- Land has no risk of significant inundation from any of the following:
  - Riverine flooding (1:100 floodline)
  - Storm surge flooding
  - Localised flooding / stormwater drainable issues
  - Geotechnically unstable
- Land not identified as high value ecological land
  - D’Moss – Upper Catchment Areas should be avoided
  - Other Critically ecological land e.g. wetland, grasslands
- Land not identified as good agricultural land
- Land not contaminated
- Land not steeper than 1:3
- Land not identified for power generation
- Land can be serviced by ALL the following infrastructure networks (existing or proposed):
  - Water supply
  - Sewerage (including acceptable alternate systems)
  - Roads
  - Stormwater
- Land is within 400m of existing or planned social and community facilities, including education (Levels 1-4 Social Facility Node)
- Land is not affected by major infrastructure corridors or high impact activities:
  - High voltage transmission lines
  - Airport safety/noise zones
  - Major Hazardous Installations (MHI)
**DENSITY CONSIDERATIONS**

The following considerations for densifications further address the factors informing the Densification Framework for the Central District.

<table>
<thead>
<tr>
<th>Level of densification</th>
<th>Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium to high levels of densification</td>
<td>• Access to public transport system (existing or planned)</td>
</tr>
<tr>
<td></td>
<td>Medium to high levels of densification should be aligned with existing/proposed public transport routes. This is essential for housing development targeted at lower-income earners, who are unable to afford the costs of private transport. It should not be an overriding consideration for middle and upper-income townhouse/group housing developments, as the residents are likely to make greater use of private transport.</td>
</tr>
<tr>
<td></td>
<td>• Land use integration</td>
</tr>
<tr>
<td></td>
<td>Preferably medium to high levels of densification should be located near places of employment, social services and community facilities.</td>
</tr>
<tr>
<td></td>
<td>• Access and proximity to public open spaces</td>
</tr>
<tr>
<td></td>
<td>Medium to high-density development should have access to urban open spaces (such as squares and promenades), recreational green spaces (parks and sports fields) and/or natural open space (nature reserves, beaches) to provide physical and psychological relief from higher-density living environments.</td>
</tr>
<tr>
<td>All forms of densification</td>
<td>• Infrastructural capacity</td>
</tr>
<tr>
<td></td>
<td>Densification should not be supported where water, wastewater and stormwater capacity are reaching points of absolute constraint, and the cost implications of rectifying the situation are too high for the private sector, or are not provided for in the City’s capital budget.</td>
</tr>
</tbody>
</table>
DEVELOPMENT IN PROXIMITY TO NODES
The eThekwini densification strategy specifically targets important nodes in the area and identifies their sphere of influence. The plan targets densification in and around the following nodal typologies:

- Within and in proximity to metropolitan and sub-metropolitan nodes
- Within and in proximity to local area and neighbourhood nodes

2.3 ETHEKWINI MUNICIPALITY’S VISION FOR DENSIFICATION
This section makes an attempt to visualise the vision of eThekwini’s Densification strategy. It highlights important aspects derived from the plan that spatially forms the vision for densification. This vision is refined in subsequent sections in order refine the approach and more accurately identify areas of densification and various densification options.

FIG 2–3: ETHEKWINI NODES AND SPHERE OF IMPACT
Transportation and movement infrastructure also plays an important role in guiding densification. The plan refers specifically to the following main approaches in order to densify:

- Within and in proximity to development spines
- Within and in proximity to activity spines

Public transit routes and stations such as the IPTN, Rail, Bus and Taxi system also plays an important role to which extent and where densification may take place.
ECOLOGICAL VALUABLE LAND
Land that holds high ecological value should be protected at all times. The D’MOSS information guides us in this regard.
A VISION FOR DENSIFICATION
Combining all the previously discussed factors gives a clear vision and spatial framework that can guide the municipality’s densification ambitions. The extent to which these areas can densify should still be tested and will be done in the following sections. Another question one should ask is to what extent the municipality has the capacity to densify. This does not refer to the availability of land that is well situated within the densification vision, but rather does the municipality have the growth dynamics required in the right areas in order to effect its vision. This becomes a question of land demand versus supply and is explored in the benchmarking section of the report.
2.4 DENSIFICATION POTENTIAL

The aim of this section is to identify areas within the eThekwini Central planning area that are most suitable for densification. For this analysis, a GIS based multi-criteria analysis process was used, through which several criteria that enable or hinder possibilities for densification are identified were considered based on the criteria set out in the previous section.

DENSIFICATION POTENTIAL MODEL

The main goal of the model is to identify strategic areas within the eThekwini Central SDP which have potential to be densified. The suitability model has been illustrated in Figure 1. The final index comprised of five main criteria (sub-indexes), each of which is made up of several criteria and sub-indexes. Each of the criteria has a weighting out of 100 which shows its influence on the final model.

DESCRIBING THE CRITERIA

The model is based on five main criteria, namely: Environmental and Physical Constraints, Policy Influence, Urban Character, Movement & Access and Land Availability. Each of the criteria have a weighting that when added up equals 100.
POLICY INFLUENCE

The policy influence index considers the possible influences that the municipality’s current policies regarding densification will have on future densification within the area. This index has a weighting of 20% to the final index and is comprised of five criteria. The criteria are:

- Areas within housing projects
- Areas within economic investment node
- Spatial Development Framework
- Density target areas from the eThekwini Densification Strategy
- Central SDP Pilot Areas

FIG 2–8: POLICY INFLUENCE INDEX
The movement and access influence index considers the influence that public transport and the existing road network will have on densification. Here, better access to facilities and public transportation is regarded as having a larger impact on the potential for densification to develop in an area.

This index has the largest weighting, 40%, to the final index as it is seen as being the largest factor that influences densification. This index is the most complex and is comprised of four sub-indexes, each with their own criteria. The subindexes with their criteria are:

- **Public Transport Influence (50%)**
  - IRTPN stops/station and lines, including feeder routes,
  - Intermodal transfer zones,
  - CPTR stops/station and lines, (Bus, Rail, Taxi)

- **Access to Facilities (10)**
  - Education and Health facilities

- **Walkability Index (10)**
  - Connected node ratio,
  - Average distance between intersections,
  - Cyclomatic number, Intersection density

- **Roads Interceptory Influence (30)**
  - High order intersections,
  - Medium order intersections,
  - Low order intersections

![FIG 2–9: MOVEMENT AND ACCESS INFLUENCE INDEX](image)
URBAN CHARACTER INFLUENCE

The urban character index attempts to capture some of the social economic qualities within the area which contribute to or would benefit favourably from densification. This index has a weighting of 20% to the final index and is comprised of four criteria. The criteria are:

- Location of informal settlements
- Current Development Application
- Trends
- Household income
- Proximity to social housing
The aim of the land availability influence index is to identify land that had the potential to be developed. This can be through greenfields development, potential for subdivisions and informal settlement upgrading. The index also ranks the land according to land ownership with state and municipal land scoring higher in the index. This index has a weighting of 15% to the final index and is comprised of four criteria. The criteria for this index are:

- Potential for subdivision (based on the Town Planning Scheme)
- Strategic Land Ownership (Municipal and State land)
- Informal Settlements Land Ownership
ENVIRONMENTAL AND PHYSICAL CONSTRAINTS

This index takes into consideration the constraints to development, such as the D’MOSS environmental plan as well as other physical and policy constraints. Although this index has the lowest influence, 5%, it has some of the largest impacts on the final index. This is because anything regarded as nondevelopable/negotiable (i.e. slopes of more than 33%) becomes a restricted area in the model and automatically gets a score of 0 (i.e. not developable). The criteria for this index are:

- Slope
- D’MOSS environmental plan
- Servitudes
- Cemeteries
- Urban Edge

Constraints Index
FINAL SUITABILITY

The final suitability was indexed into a rating from 0 to 20, where 0 is land that cannot be developed on and 20 being the areas where all the criteria are met and thus most suitable for densification. Various criteria were used in the model. This resulted in almost 70 different input sets of data being used for the final suitability analysis. The results of which can be seen on the next map.

FIG 2–13: CONSOLIDATED DENSIFICATION POTENTIAL INFLUENCE INDEX
CHAPTER 3

BENCHMARKING TRANSIT ORIENTED DEVELOPMENT
A TRANSIT ORIENTED APPROACH: BENCHMARKING

The aim of this section is to identify areas within the eThekwini Central planning area that are most suitable for densification. For this analysis, a GIS based multi-criteria analysis process was used, through which several criteria that enable or hinder possibilities for densification are identified based on the criteria set out in the previous section.

INTRODUCTION

By 2030, 60% of the world’s population will live in cities, up from 50% today. More than two billion people are likely to enter the middle class, with the majority of them living in cities in emerging countries, especially in Asia and Africa where nearly 90% of the population is subject to rural to urban migration and income shift. Municipalities such as eThekwini have to change and adapt rapidly to successfully meet these challenges.

To deal with this unprecedented demographic & economic shift, many world cities are looking at various sustainable growth models for integrated urban mobility-heavy mass rail (MTR), light rail transit (LRT) and bus rapid transit (BRT). Transit Oriented Development (TOD) based on integrated urban planning & mobility can deliver comprehensive city growth and social benefits in addition to the provision of new sustainable transport infrastructure.

For Governments and City Authorities in rapidly developing countries Bus Rapid Transit (BRT) together with TOD offers a highly effective, relatively rapid and cost effective means of providing public transport and integrated development to many people. Despite these advantages, the actual number of successfully implemented BRT systems (especially in developing countries) is relatively limited.

In looking for relevant “best practice” we have therefore also considered TOD related to other modes of transit (like LRT and MRT).

The eThekwini Municipality through the ITPN project wishes to apply Transit Oriented growth approaches to its Bus Rapid Transit (BRT) network.

DEFINITION

TRANSIT ORIENTED DEVELOPMENT (TOD)

Transit-oriented development (TOD) brings higher density, more compact, mixed-use development within easy walking distance of rapid public transit. TOD features vibrant streetscapes, pedestrian-oriented built forms, and land use characteristics that make it convenient and safe to walk, cycle, and use public transport. (Institute for Transportation & Development Policy, USA)

WHAT ISN’T TOD

In general terms, uses, such as warehousing, logistics, surface-parking, low-rise / lower density development and housing are not compatible with the TOD approach. It is also recognised that certain city specific characteristics and conditions will require exceptions and adjustments in the TOD approach.

ASSESSING BENCHMARKS

Successful TOD precedents around the world have been assessed, both in developing and developed countries irrespective of the mode of transit system used. The lessons and outcome of the assessment primarily focuses on two core aspects: firstly institutional capacity and arrangements and secondly development and planning principles.

The institutional capacity assessment captures best practice governance models, implementation, financing of transits and land value capture mechanisms. It also analyses the challenges encountered TOD system-wide application. The planning and development assessment captures and highlights specific planning approaches and mix-use integration across scales. It also illustrates that TOD principles are not universal, needs and does vary from city to city, setting to setting, with different mixes of land use; different levels of population, employment, and civic activity; and different scales of development. This is important because it re-enforces the need to have specific TOD approaches tailored to the unique characteristics of the central region in the eThekwini Municipality.
TOP 5 BENCHMARKS
The key benchmark studies renowned for their TOD qualities and successes that will be studied:

1. Curitiba, Brazil
2. Singapore
3. Hong Kong, SAR China
4. London, UK
5. Johannesburg, SA

FIG 3–1: BENCHMARK STUDY LOCATIONS

- Institutional Capacity
- Transport Planning
- Urban Planning
- Infrastructure Planning
3.2 INTERNATIONAL BEST PRACTICE IN TOD

A wide range of TOD benchmarks from developing and developed counties have been researched. This has enabled the identification of best practice trends in driving successful TOD approaches and the selection of TOD ideas that are most relevant to the eThekwini Central Densification Strategy.

SELECTION CRITERIA

Many factors influence and shape a successful TOD growth model, such as strong political and planning effort, the wider city vision and growth objectives, successful financing and implementation of transit model and comprehensive land use and transit integration to outline a few.

While selecting the most relevant benchmarks a variety of topics influencing the TOD were considered. Unfortunately, there is not a single city delivering every aspect of TOD in the most successful manner. Some exceed in institutional capacity, some in urban planning or transport network delivery, some in combination of few factors.

In making the assessment the balance between what might be ideal and what is appropriate in the eThekwini setting was considered. The examples from the developing countries similar to eThekwini have been included wherever possible. Places such as Bogota, Curitiba, Mexico City and Ahmedabad arguably have overcome similar challenges of the implementation, financing and governance of their respective BRT corridors as the municipality. Other cities such as Surabaya, Kigali and Quito are either at the tendering stage of implementing transit corridors or have limited information and data available that could be assessed.

A total number of 22 cities, districts and places were researched, both from developing and developed countries worldwide, with a final selection focusing on 5 key benchmarks and further 9 topical examples (exceeding in transport, governance, infrastructure delivery or planning fields). The list also includes some institutional failures, as a way of illustrating what actions to avoid.

The three key factors led to the key 5 benchmarks:

- Selecting cities leading in innovation in TOD by improving urban development and/or capturing land value uplift for public benefit
- Selecting cities in less developed economies that have progressed TOD
- Selecting cities which had achievements in TOD at multiple fields, such as planning, land value uplift, governance etc.

KEY TOPICS OF RESEARCH

1. Overall success rates in achieving Transit Oriented Development
2. Mechanisms and models used in the implementation and operation of TOD and network itself
3. Lead institution responsible for planning, delivery and post delivery phases
4. Policies and planning regulatory tools used during and after the implementation stage
5. Primary transport and land-side investments Where information was available:
6. Cash-flow models
7. Financing sources and debt instruments
8. Public sector contributions and fiscal transfers
9. Private sector contributions

WE HAVE DELIBERATELY SELECTED BENCHMARKS FROM BOTH “DEVELOPING” AND “DEVELOPED” CITIES. IT IS IMPORTANT TO REMEMBER THAT “DEVELOPED” CITIES HAVE NOT ALWAYS BEEN DEVELOPED AND HAVE GONE THROUGH PERIODS OF TRANSITION AND CHANGE. WHILST IT SOME OF THE BENCHMARK CITIES THAT WE HAVE INCLUDED MAY SEEM VERY DIFFERENT FROM ETHEKWINI TODAY WE KNOW FROM OUR EXPERIENCE AND KNOWLEDGE THAT CITIES CAN AND DO CHANGE, GROW AND DEVELOP OVERTIME. CITIES LIKE SINGAPORE, HONG KONG AND CURITIBA HAVE TRANSFORMED THEMSELVES OVER A RELATIVELY SHORT SPACE OF TIME. WE BELIEVE THAT ETHEKWINI CAN ACHIEVE MANY OF THE APPROACHES SHOWN IN THE DEVELOPED BENCHMARKS, AND CAN ITSELF BECOME A BENCHMARK FOR GREAT AND HIGHLY SUCCESSFUL INTEGRATED TOD PLANNING.
3.3 CURITIBA, BRAZIL

Vision and political commitment to foster strong public transport, social inclusion and to maximise land values by applying a compact and linear intensification model along BRT transit corridor.

OVERVIEW

Successful Regeneration Despite Budgetary Constraints The example of Curitiba proves that low budgets are not a barrier to successful regeneration. Since the 1970s, Curitiba has integrated public transportation planning into the overall city plan, promoting the trinary system, which sought to integrate mass transit, access roads, and dense land uses together. Unable to afford a light rail system, the city gave priority to buses, allowing them to move faster and be more efficient. The bus system has been transformed into a mass Bus Rapid Transit (BRT) with features such as fast and large buses, exclusive priority lanes, free transfers between routes, pre-board fare collection, enclosed and elevated stations, information displays and traffic signal priority.

Urban growth was structured along key urban transport axes radiating out from the centre, with regular stops and nodes. These corridors were zoned to accommodate high density residential and commercial development, serviced by a more affordable, yet innovative and distinctive bus transit network. BRT was a fast and simple way to “retro-fit” to existing urban infrastructure and quick way to make a positive impact. The new bus system helped shift public perceptions of the city and resulted in increased ridership utilisation figures, while reaching out to previously unserviced parts of the city. It operates a flat “social” fare structure for all bus types and routes, enabling poorer and more remotely located workers to get to work for the same cost as wealthier downtown residents.
<table>
<thead>
<tr>
<th>Key Statistics</th>
<th>Curitiba</th>
<th>eThekwini Central</th>
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</thead>
<tbody>
<tr>
<td>Population</td>
<td>1,879,355</td>
<td>969,942</td>
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<td>Area</td>
<td>431 km²</td>
<td>369 km²</td>
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<td>Density</td>
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<td>System Length</td>
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<td>Stations</td>
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<tr>
<td>Modal share</td>
<td>28%</td>
<td>21%</td>
</tr>
<tr>
<td>Private Vehicles</td>
<td>26%</td>
<td>17%</td>
</tr>
<tr>
<td>Public Transport</td>
<td>46%</td>
<td>61%</td>
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</tbody>
</table>
CURITIBA’S SUCCESS FACTORS

- Innovative initiatives and strategies were put in place regardless of budgetary constraints.
- Right to Build, tax relief and other innovative incentives. FAR bonuses for provision of extra open space within the plot, property tax % reduction when planting local species, land-swap and property right swap, are among many initiatives implemented to aid regeneration and development within the corridor and the city.
- Successful BRT Mas Transit model used as one of the tools to shape the city. BRT was used as a lens to focus number of parallel initiatives to improve in the quality of life within the city.
- Structural Axis focused urban density and investment along the BRT corridors. To maximise return on investment and overall accessibility levels, the core of density was focused along BRT routes. Variety of incentives were put in place to encourage investment and density along those corridors. Curitiba’s Success Factors
- Independent, technical body leading planning and implementation of the TOD strategies along the corridor and the wider city. Research and Urban Planning of Curitiba (IPPUC), provided consistency in strategy implementation amid turnover in city administrations.
- BRT & Bus Network supported economic transformation of the city. Despite aspirational TOD density and land use recommendations, Curitiba took on board economic and employment profile of the city. BRT connectivity was applied across the city, also to some of the low density employment hubs. This supported economic growth and responded to the employment profile of the city.
- Environmental policies achieved affordable way to mitigate flooding issues. Parks were created in flood-prone areas reducing expenditure by 80% comparing to engineering measures.
3.4 SINGAPORE

A transit-oriented city model, that is accessible to all through a strong network of public transport routes and high-density development built around transport interchanges, key nodes and transit corridors. Singapore enjoys over 5.3 million trips daily!

OVERVIEW

Providing quality public transport choices has been one of the main strategies implemented in Singapore since the 1971 Concept Plan, making it a thriving city and international business hub characterised by a high standard of living. Today Singapore offers to its citizens and tourists fast connections through a highly penetrative integrated public transport system. About 5.3 million trips are made on a daily basis via public transport network and at least half of its population uses it daily.

The Mass Rapid Transit (MRT), provides speed and efficiency, especially during peak hours. The MRT is public owned, while bus and taxis are privately owned; bus services are run under the license of the Singapore government. This integrated multi-modal system has a common fare-payment mode, information platform, real-time information for transport users, motorists and cyclists. The network works without duplication of services. Integrated transfer and interchange facilities are provided, aiming to make interchange stations lifestyle hubs.

The current policy in Singapore is to service growth through partially self-sufficient towns and districts to reduce the strain on the CBD. The urban planning policy relies on effective public transport to link each new community to each other and to the city centre. 20 town centers, all served by MRT, are mixed-use and connected by the extensive pedestrian-cycling network. High-density housing, retail shops, community facilities and open spaces are typically found in all hubs. The public ownership of land is critical to the plan implementation. This empowered the state to take land for public purposes, including the development of new towns.
KEY STATISTICS

Population

Singapore: 5,535,000
eThekwini Central: 969,942

Area

Singapore: 641 km²
eThekwini Central: 369 km²

Density

Singapore: 7,681 p/km²
eThekwini Central: 2,628 p/km²

System Length

Singapore: 264.8 km
eThekwini Central: 176.7 km

Stations

Singapore: 102
eThekwini Central: 106

Daily Demand

Singapore: Not Available
eThekwini Central: 2,755,000

Peak Frequency

Singapore: Not Available
eThekwini Central: 43"

Modal share

NMT: 22%
Private Vehicles: 29%
Public Transport: 48%

22%
29%
48%
21%
17%
61%
SINGAPORE’S SUCCESS FACTORS

• Perseverance and long term planning (50-year strategy) Infrastructure, public transport and development, implemented as a long-term strategic objectives based on the overall planning, efficiency, competition, clustering and cost benefit analysis, which includes economic & social development objectives.

• Focused, dense development along transport nodes Planed new residential centralities to coincide with the improvement and extension of the public transport system, promoting high floor area ratios at nodes.

• Policies and approaches targeted to reduce private car ownership Determine approaches to generate high transit ridership to reduce private vehicle Singapore’s Success Factors numbers, reduce congestion and improve average journey times.

• Support of diversification of economy through provision of varied commercial centres Create centralities with mixed-use and commercial content to take pressure off traditional central areas and diversify the economy, all supported by public transport.

• Improve quality of life with smart open space strategy policies Consider storm-water drainage as potential park and green space systems, and as conduits for road and utility infrastructure. Combining access, services and communications routes while retaining flood attenuation capacity.

• Private sector involvement Encourage the role and involvement of the private sector, as it often sets the standard of efficiency and benchmarking of quality and competitiveness.
OVERVIEW
Being a highly compact city land area, Hong Kong’s spatial development pattern is underpinned by the planning concept of clustering the bulk of development around mass transit railway stations to create compact growth and facilitate fast mass movement of people in an environmentally friendly way.

Hong Kong has a highly developed public transport system with buses, trams, trains a metro network and numerous ferry services. Over 90% of daily journeys (11 million) are by public transport.

Hong Kong has managed to decentralised from historic central business areas to new territories. A sizeable proportion of living quarters and commercial/office floor space are within 500m - walkable catchment of transit stations. Carefully planned open spaces and parks are integrated with the transit stations, further offered a vast majority of population to live within 400m of district parks/public open spaces and within 3km of country parks and green spaces.

The Mass Transit Rail Corporation (MRTC) Hong Kong’s underground and railway networks are owned by MTRC. In 2000, the publicly owned company was privatised and in 2007 merged with Kowloon–Canton Railway Corporation (KCRC). Capitalised at HK$222,629 million (US$ 28,600 million) in 2016; is currently 75% owned by the Hong Kong Government and now employs over 27,000 staff globally. MRTC has positioned itself as the largest provider of light-rail, tramway, and metro transportation in Hong Kong.
**KEY STATISTICS**

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<td>Area</td>
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<td>Density</td>
<td>6,544 p/km²</td>
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<td>10%</td>
<td>54%</td>
</tr>
<tr>
<td>21%</td>
<td></td>
<td>17%</td>
<td>61%</td>
</tr>
</tbody>
</table>
HOG KONG’S SUCCESS FACTORS

• Innovative implementation and financing model Hong Kong, adopted innovative and unconventional models of implementing and financing mass transit at city scale, through its R+P model.

• Focused design model based on “3Ds” Hong Kong case also demonstrates how high density liveable communities could be created through capitalising on transit stations and focus on designing stations as places through 3Ds: Density, Diversity and Design.

• Continuous review of the typologies and approaches The constant evolution and effort in planning TOD is also evident. In the last decade, MTR has evolved from developing stand-alone station and adjacent development to more comprehensive models and produced specific station typologies that promote TOD growth.

• Healthy lifestyle supported by planning and TOD policies Special policies, station focused public realm design encouraging walking and cycling.
3.6 LONDON, UK

Sophisticated public transport system; inventive delivery models for complex, large, inner-city regeneration schemes.

OVERVIEW

London has a resident population of around 8.7 million within the city limits and a wider catchment area extending into the South-East region, home to another 8.7 million. London is the administrative centre of the UK with a strong diverse employment base dominated by financial services and media and tech companies.

London is managed under two tiers of local government. The Mayor for London is a directly elected leader of the City who leads an Assembly of 25 elected representatives. The Mayor’s office through the Greater London Authority (GLA) takes responsibility for strategic matters in the city including strategic planning and transport. The Mayor’s office becomes involved where there are plans for developments that cross the boundaries of the smaller local authorities within the capital.

The second tier of local government is made up of 33 boroughs. These are governed by elected councillors. The boroughs include “The City of Westminster” and “The City of London” the two neighbouring political and trading centres from which London grew. The boroughs are responsible for a range of public services including, education, local social services.

Public transport within London is run by Transport for London (TfL) and falls under the ultimate responsibility for the Mayor for London. In 2015-16, TfL had a budget of £11.5 billion, 40% of which come from fares. The rest comes from government funding (23%), borrowing (20%), other income (9%) and Crossrail funding (8%). TfL has responsibility for London’s network of principal road routes, for various rail networks including the London Underground, London Overground, Docklands Light Railway and TfL Rail, London’s trams, buses and taxis, cycling provision, and river services. The underlying services are provided by a mixture of wholly owned subsidiary companies (principally London Underground), by private sector franchisees (the remaining rail services, trams and most buses) and by licensees (some buses, taxis and river services). TfL is also responsible, jointly with the national Department for Transport (DfT), for commissioning the construction of the new Crossrail line, and will be responsible for franchising its operation once completed.
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tr>
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<td>Density</td>
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<tr>
<td>System Length</td>
<td>402km</td>
<td>264.8km</td>
</tr>
<tr>
<td>Stations</td>
<td>270</td>
<td>106</td>
</tr>
<tr>
<td>Daily Demand</td>
<td>Not Available</td>
<td>4,800,000</td>
</tr>
<tr>
<td>Peak Frequency</td>
<td>Not Available</td>
<td>106&quot;</td>
</tr>
<tr>
<td>Modal share</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>NMT</td>
<td>37%</td>
<td>17%</td>
</tr>
<tr>
<td>Private Vehicles</td>
<td>41%</td>
<td>61%</td>
</tr>
<tr>
<td>Public Transport</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LONDON’S SUCCESS FACTORS
Kings Cross Development - a good benchmark for complex TOD regeneration scheme:

- Creation of effective JV, uniting variety of land owners under one delivery vehicle. In 2008, Argent, London & Continental Railways and DHL formed a joint partnership: Kings Cross Central Limited Partnership. The importance of partnership and the early and ongoing involvement of a wide range of stakeholders was crucial not only to the successful delivery of the project, but also in building support and creating a sense of ownership in the wider community.

- Use of public realm as regenerative tool. People’s perception of King’s Cross is greatly influenced by their experience of the public realm. High-quality spaces that capitalise on the site’s heritage and setting, create added value for the entire site. Pedestrian connectivity to the transport hub lies at the core of the scheme.

- High density and varied land use. The fundamental principle of TOD has been exquisitely delivered in this scheme.
OVERVIEW

The city of Johannesburg is embarking on a new spatial vision for the city in line with its growth and development Strategy 2040, based on corridor Transit-Oriented Development. Through this approach, it is envisaged that the growth of the future city will be guided toward well-planned transport arterials, a vision to be guided by the current focus on the “Corridors of Freedom”, with a focus on mixed-use development, higher density residential accommodation, supported by office buildings, retail development and opportunities for leisure and recreation.

The “Corridors of Freedom” will transform entrenched settlement patterns, which have shunted the majority of residents to the outskirts of the city, away from economic opportunities and access to jobs. The aim is to create a compact city, which is energy efficient, provides residents with universal access, promotes social cohesion and creates a vibrant urban environment. The Corridors of Freedom will usher a new era of access to opportunity and a choice for residents to work and play within the same space without the inconvenience and high costs of travelling over long distances every day.

The National Household Travel Survey (2003) found that the average travel time between home and work for commuters making use of public transport is 59 minutes. More than 1.3 million South Africans spend more than two hours a day travelling to and from their places of residence. Currently 16.4% of Gauteng residents spend more than 20% of their monthly income on transport. The “Corridors of Freedom” are designed to reverse these trends. Medium and high density housing will be encouraged next to the transport arteries and around the transport hubs – linking home and work. Travel time will be significantly reduced because of shorter distances and more effective public transport.
<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Area</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg</td>
<td>4,434,827</td>
<td>335 km²</td>
<td>2,900 p/km²</td>
</tr>
<tr>
<td>eThekwini Central</td>
<td>969,942</td>
<td>369 km²</td>
<td>2,628 p/km²</td>
</tr>
</tbody>
</table>

| System Length     | 59km       | 264.8km |
| Stations          | 48         | 106     |
| Daily Demand      | 90,000     | Not Available |
| Peak Frequency    | Not Available | Not Available |
| Modal share       | 31%        | 21%     | 37%       | 61%       
| NMT                | 32%        | 17%     |
| Private Vehicles  | 37%        |         |
| Public Transport  | 61%        |         |
JOHANNESBURG’S SUCCESS FACTORS
Overall, there is much to be learned from the first few years of the programme that can improve the CoJ’s TOD initiatives going forward: better engagement and participation, clearer plans, better marketing and overall communication within and outside the CoJ, and careful consideration of the limits of built environment interventions. Here are some initiatives which already stand out:

- Capturing entrepreneurial spirit to stimulate economic growth. Across the Corridors it is clear that there is significant youthful energy directed towards micro-businesses, with many residents starting new enterprises. Louis Botha Avenue, Marlboro South and Park Station are already showing signs of being complex multi-use sites that attract people from all over South Africa and the continent.
- Appointed ‘Point people’ for specific nodes
Johannesburg Development Agency (JDA) dedicated expert individuals to specific nodes and corridors, which continues to be an excellent practice.
3.8 FINDING AN APPROPRIATE MODEL FOR ETHEKWINI

The following section assess the Central Region through the analysis of gross densities. It attempts to use international precedents to find an appropriate model for densification based on various scenarios.

INTERNATIONAL BENCHMARKS

Most of the samples in eThekwini have very low densities showing that there is room for densification without losing spatial qualities as the international precedents. However, there are areas such as Kwadebeka, which would benefit from a different approach not suggesting light interventions that would consolidate the current living conditions.

A diversification and consolidation of densities may be required from the redefinition of the residential typologies mix (single family, townhouse, mix use – mid-rise apartment buildings with the consideration of live and workspaces so the current social and economic dynamics can be enhanced.

CURITIBA: 294 PEOPLE/HA

MALMO: 110 PEOPLE/HA

SINGAPORE: 207 PEOPLE/HA

BARCELONA: 357 PEOPLE/HA
## The South African Experience

<table>
<thead>
<tr>
<th>City of Tshwane</th>
<th>City of Cape Town</th>
<th>City of Johannesburg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Densities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Gross base density = 25du/ha</td>
<td>- No definition of Low – High density</td>
<td>- Low density = 20du/ha</td>
</tr>
<tr>
<td>- Concentration Zones: High Density (BRT, Rail Stations)</td>
<td>- Gross base density = 25du/ha</td>
<td>- Medium density = 20-80 du/ha</td>
</tr>
<tr>
<td>- Transit Promotion Zones 200du/ha plus (BRT, Rail Stations)</td>
<td>- Public Transport routes = 75-175 du/ha</td>
<td>- High density = +80 du/ha</td>
</tr>
<tr>
<td>- Linear Zones: Development = 80 ha.</td>
<td>- Activity routes = 100-375 du/ha</td>
<td>- Gross base density =10 du/ha</td>
</tr>
<tr>
<td>- Suburban Densification Zones = 25/ha</td>
<td>- Nodes = 75 – 375 du/ha</td>
<td>- Mobility Routes = 30 – 70 du/ha</td>
</tr>
<tr>
<td>- Low density zones 10/ha</td>
<td>- Affordable housing areas (focused public investment areas) = 80-300 du/ha</td>
<td>- Public Transport routes = 20-90 du/ha</td>
</tr>
<tr>
<td>- Affordable housing areas (focused on Transit Promotion Zones) 60-300 du/ha</td>
<td></td>
<td>- Nodes = 15 – 100+ du/ha</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Subsidised Housing = 40-300 du/ha</td>
</tr>
</tbody>
</table>

### Location where densities are supported

<table>
<thead>
<tr>
<th>City of Tshwane</th>
<th>City of Cape Town</th>
<th>City of Johannesburg</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public transport routes</strong></td>
<td><strong>Areas adjacent development routes, activity routes/streets, rail-especially close to employment and Mixed-use areas, social facilities/institutions, public open spaces and amenity areas.</strong></td>
<td><strong>Public transport routes</strong></td>
</tr>
<tr>
<td><strong>Concentration Zones / nodes</strong></td>
<td><strong>Infill sites preferably close to economic opportunities, social amenities and BRT routes.</strong></td>
<td><strong>Nodes</strong></td>
</tr>
<tr>
<td><strong>Linear Zones</strong></td>
<td><strong>Greenfields sites adjacent existing urban development.</strong></td>
<td><strong>Marginalized Areas</strong></td>
</tr>
<tr>
<td><strong>Areas adjacent development routes, activity routes/streets, rail- Especially close to employment and mixed-use areas, social facilities/institutions, public open spaces and amenity areas.</strong></td>
<td></td>
<td><strong>Private investment areas</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Public investment areas</strong></td>
</tr>
</tbody>
</table>
OVERVIEW OF REGIONAL DENSITIES

Most of the samples in the study area have very low densities in the targeted nodes and along the identified corridors showing that there is room for densification without losing spatial qualities as the international precedents. However, there are areas such as Bonela, Cato Manor and Kwadebeka that are much higher than the proposed densities for these types of areas, which would benefit from a different approach not suggesting light interventions that would consolidate the current living conditions.

A diversification and consolidation of densities may require from the redefinition of the residential typologies mix (single family, townhouse, mix use – mid-rise apartment buildings with the consideration of live and workspaces so the current social and economic dynamics can be enhanced.

The map shows an analysis of the current density conditions of the study area.

From the figure, it is clear that current densities do not follow the proposed IPTN system, of proposed nodes and corridors, in the area of the Central Planning Region that is the focus of this study. The highest concentration of people are located in the CBD area and along the Southern Corridor and in the poorer and informal areas.

FIG 3–2: ETHEKWINI POPULATION DENSITY ANALYSIS INDEX
OVERVIEW OF LOCAL DENSITIES
This section reviews some of the most prominent local nodal and residential neighborhood area in the eThekwini municipality in order to assess the typical densities in these areas. This give a good base for comparison in order to access the extent to which some of these areas are able to density based on the benchmark studies and what is also locally possible and appropriate.

**DURBAN CBD**
- Durban CBD: 116.94 People/Ha
- 5km Level 1 Node: 31.65 People/Ha

**PINETOWN / NEW GERMANY**
- Pinetown CBD: 18.81 People/Ha
- 2km Level 2 Node: 13.70 People/Ha

**UMLAZI**
- Umlazi CBD: 69.75 People/Ha
- 2km Level 2 Node: 108.88 People/Ha
**CHATSWORTH CENTRAL**

- Chatsworth Node: 43.60 People/Ha
- 800m Level 3&4 Node: 37.00 People/Ha

**UMHLANGA RIDGE**

- Umhlanga Ridge Node: 13.20 People/Ha
- 800m Level 3&4 Node: 16.07 People/Ha

**KLOOF**

- Kloof: 5.76 People/Ha

**WESTVILLE CENTRAL**

- Westville Node: 8.90 People/Ha
- 800m Level 3&4 Node: 9.17 People/Ha

**BONELA**

- Bonela: 53.90 People/Ha

**KWADABEKA**

- Kwadebeka: 53.22 People/Ha
CAPACITY SCENARIOS
The following theoretical study presents 3 types of spatial qualities and densities for the buffer area within 1km from the IPTN trunk routes. The values, based on the international emblematic precedents, are orientative. The objectives and capacities of the IPTN development areas, and their influence for the rest of the city, will require consensus among the key stakeholders.

STUDY REFERENCE – CURITIBA

Density at central transect (300m): 350 pph.
Density at side plots (500m): 150 pph
Density at adjacent plots (rest): 50 pph
Initial findings: Maximum capacity within 1km buffer: 3.2 Mil

FIG 3-3: DENSITY CAPACITY SCENARIO 1
Continuous density: 350 pph.
Initial findings: Maximum capacity within 1km buffer: 6.9 Mil
Density at main centres (800m radius): 350 pph
Density at secondary centres (400m): 150 pph
Density at adjacent plots (rest): 50 pph
Initial findings: Maximum capacity within 1km buffer: 1.6 Mil

FIG 3-5: DENSITY CAPACITY SCENARIO 3
Very high: 450 pph.
High: 350 pph
Medium to high: 220 pph
Medium: 150 pph
Low: 50 pph

Initial findings: Maximum capacity within 1km buffer: 5.5 Mil
FINDINGS AND CONCLUSIONS

Based on the results it is apparent the central region has the capacity to densify extensively. The problem is the current and expected future growth dynamics of the population and if these factors can allow for this extent of densification.

In reality the amount of people proposed to be accommodated by the various scenarios is not realistic and in the last case, based on the actual proposed densification framework, will take over 400 years to realise.

Non the less a more conservative approach should allow the municipality to achieve their densification ambitions and direct the future growth of the municipality and the central region in a more sustainable manner.

### TABLE 3-1: DENSITY CAPACITY SCENARIO OVERVIEW

<table>
<thead>
<tr>
<th>Densification Element</th>
<th>Area</th>
<th>Pop 2011</th>
<th>Density 2011</th>
<th>People @ 450 pph</th>
<th>People @ 350 pph</th>
<th>People @ 220 pph</th>
<th>People @ 150 pph</th>
<th>People @ 50 pph</th>
</tr>
</thead>
<tbody>
<tr>
<td>1km Trunk Buffer</td>
<td>19,842</td>
<td>614,119</td>
<td>30.95</td>
<td>8,928,761</td>
<td>6,944,592</td>
<td>4,365,172</td>
<td>2,976,254</td>
<td>992,085</td>
</tr>
<tr>
<td>500m Trunk Buffer</td>
<td>11,490</td>
<td>349,051</td>
<td>30.38</td>
<td>5,170,469</td>
<td>4,021,476</td>
<td>2,527,785</td>
<td>1,723,490</td>
<td>574,497</td>
</tr>
<tr>
<td>300m Trunk Buffer</td>
<td>7,397</td>
<td>215,757</td>
<td>29.17</td>
<td>3,328,673</td>
<td>2,588,968</td>
<td>1,627,351</td>
<td>1,109,558</td>
<td>369,853</td>
</tr>
<tr>
<td>400m Station Buffer</td>
<td>2,619</td>
<td>75,275</td>
<td>28.75</td>
<td>1,178,411</td>
<td>916,542</td>
<td>576,112</td>
<td>392,804</td>
<td>130,935</td>
</tr>
<tr>
<td>800m Primary Station Buffer</td>
<td>792</td>
<td>19,739</td>
<td>25</td>
<td>356,288</td>
<td>277,113</td>
<td>174,185</td>
<td>118,763</td>
<td>39,588</td>
</tr>
<tr>
<td>Central Regions</td>
<td>39,611</td>
<td>1,137,135</td>
<td>29</td>
<td>17,825,031</td>
<td>13,863,913</td>
<td>8,714,460</td>
<td>5,941,677</td>
<td>1,980,559</td>
</tr>
<tr>
<td>Very High</td>
<td>734</td>
<td>59,904</td>
<td>82</td>
<td>330,175</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>1,360</td>
<td>69,109</td>
<td>51</td>
<td></td>
<td>475,853.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium to High</td>
<td>6,379</td>
<td>358,359</td>
<td>56</td>
<td></td>
<td></td>
<td>1,403,441</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>20,459</td>
<td>869,450</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td>3,068,841</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>5,431</td>
<td>125,915</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>271,560</td>
</tr>
</tbody>
</table>
THE DENSIFICATION FRAMEWORK
4.1 DENSIFICATION PRINCIPLES

The following section assess the Central Region through the analysis of gross densities. It attempts to use international precedents to find an appropriate model for densification based on various scenarios.

INTRODUCTION
This section brings together the overall principles for TOD and BRT focused densification and redefining them to be context specific for the eThekwini Central Region. It considers the results and information that was produced in previous parts of the project such as the detailed status quo analysis and stakeholder inputs. The result is a summary of key objectives that will drive decision making and the planning process.

The principles relevant to the central densification plan are:

1. Integrated and Managed Land Use and Transport Planning
2. Promote mixed transit oriented uses adjacent to BRT stations
3. Create a range of densities and opportunities
4. Quality, efficient, functional network with a hierarchy
5. Provide improved access, walkability and sustainable transport
6. Quality place making and vibrant communities
7. Viability and appropriateness to context

PRINCIPLE 1: INTEGRATED AND MANAGED LAND USE AND TRANSPORT PLANNING

Ensure the scale and nature of all development within TOD areas reflect the existing and planned transport characteristics. The local governing authorities must plan and facilitate the areas around transit provision to take advantage of the investment made in the BRT and feeder routes, to benefit the maximum number of people and extend the area of opportunity into the urban hinterland.

Conversely, transport projects must only proceed when they have been assessed for their land use potential to ensure projects can recoup their outlay and become viable in the shortest time. This applies to all modes of transport, by rail and road.

GENERAL GUIDELINES

Planning Integration
• Ensure the scale and nature of all development within TOD areas reflect the existing and planned transport characteristics.
• Ensure Land- use and development to be adaptable or redeveloped over time, vary uses and or increase density according to the BRT implementation time frames and city growth.
• Ensure continuity and adaptability according to the different phases and plan implementation.
• Ensure TOD planning as an opportunity to guarantee universal access to basic services and infrastructure.
• Ensure development fits within basic service capacity

Process
• Ensure a coordinated planning effort with the involvement of the Government and municipalities, the development industry and stakeholders.
• Ensure local governing authority engages early with the community to facilitating the areas around transit provision and take advantage of the investment made in the IPTN and feeder routes.
• Ensure this benefit the maximum number of people and extend the area of opportunity into the urban hinterland.
• Consider that the outcome of TOD new land-use will take time to deliver and mature.
To facilitate the success of IPTN routes and foster consistently high ridership it is important to encourage the development of appropriate land uses in the areas surrounding the station areas. This leads the strategy towards denser development which can make the best of the transit systems enhanced access to a wider population catchment. Key TOD-uses include:

- **Mixed use developments incorporating a range of uses on different levels, including urban retail, combined with hotels, offices and residential accommodation**
- **Dense commercial offices (such as call centres) and other office activity**
- **High density education establishments**
- **Multi-storey residential towers and apartments**
- **Hotels**

For outlying stations it is important to include facilities that draw cars off city centre roads, using park and ride facilities combined with other complimentary uses such as retail mall developments.

In prioritising space for TOD-favourable uses, so other uses characterised as having more limited density of occupation should be reviewed. This relates to low density employment and residential typologies such as larger single family dwellings in plots, low density office space such as business parks, logistical storage, automated industry and auto-related retail uses such as retail parks. Plans for these uses should be directed towards the city’s outer highway or expressway junctions, rather than city centre locations. This will direct pollutive and heavy transport to the periphery, while the larger single family homes should be directed to less accessible territory. Planning applications for such uses should be refused and discouraged in favour of more intensified operations that relate directly to transit accessibility. Promoting TOD uses along the key IPTN corridors will see the city’s central approaches evolve from industrial and shanty development to a more structured mix of managed commercial space integrated with offices and apartments.

**GENERAL GUIDELINES**

**Mix Uses**
- Focus on encouraging Mix Uses development providing integration and variety.

**Stations Typology and Diversity**
- Promote or encourage predominant existing Land use, this might be already defining the character of the station.
- Encourage the development of appropriate land use in the areas surrounding the stations areas, Land Uses supporting transit.
- Promote appropriate rang according to the station Hierarchy/ Typology (Centres, district, neighbourhood, gateway)

**Proximity to other Uses**
- Encourage the development or endure of exiting social amenities or attractions.
- Evaluating the location and catchment area of existing social amenities near the site could increase the catchment area of the station or encourage the promotion of other complementary land uses.
**PRINCIPLE 3: CREATE A RANGE OF DENSITIES AND OPPORTUNITIES**

It is important to diversify built form across the network to provide local identity and a choice of opportunities for investors, buyers and tenants to occupy. Mono-cultural developments tend to saturate the markets they operate within, and fail to satisfy the market’s diverse needs. By varying typologies and densities according to station proximity, land availability and other factors. This will deliver development faster, through a broader range of contractors and services and will be absorbed faster by a wider cross section of sectors.

Station areas are an opportunity to accommodate a range of forms, including town houses, midrise office and residential apartment blocks, with integrated active retail and community frontages to animate the ground level.

**GENERAL GUIDELINES**

**Density Range**
- Densify within Radius appropriate for station walking distance.
- Stations are opportunity to accommodate a range of forms, including town homes and provide local identity
- Vary Typologies and density according to station proximity.
- Increase density at stations tapering down to neighbourhood areas
- Low density typologies should be direct towards the city’s periphery.

**Density Appropriateness / Land Efficiency**
- Appropriate for scale and particular TOD areas.
- Low density typologies should be direct towards the city’s periphery.

**Density Diversity**
- Diversify build form across the network to provide local identity and a choice of opportunities for investors, buyers and tenants to occupy and/ or develop.

**PRINCIPLE 4: QUALITY, EFFICIENT, FUNCTIONAL NETWORK WITH A HIERARCHY**

Transport route systems work most effectively when organised as a coordinated network, integrated with the modes they intersect with. This enhanced and integrated transport network will efficiently convey residents and visitors to each emerging node and centre of activity distributed across the city, accommodating the evolving needs of the economy and the population as the city grows.

It is crucial to ensure the key hubs (major interchanges, port, airport, CBD and district centre nodes) are well organised and have the capacity to deal with the anticipated flows that will support the city’s growth in the decades ahead. This implies the need for carefully coordinated planning of any infrastructure improvement initiatives and the need for a clear plan that cuts across the different disciplines and authorities to achieve the strategic aims for the benefit of the city.
PRINCIPLE 5: PROVIDE IMPROVED ACCESS, WALKABILITY AND SUSTAINABLE TRANSPORT

Stations do not work in isolation and require visitors to access the entrances by foot. As such it is important to ensure station environments are easily accessible to pedestrians and that the street network, as well as street crossings facilitate walking. This extends to other sustainable transport modes such as cycling and electric mobility.

Typically this involves the creation of ample, well-lit concourse and plaza spaces around station entrances, comfortable friendly and accessible road and street crossings; cycle parking and electric vehicle charging facilities. These factors are best assembled through a place-making approach to transit station design.

GENERAL GUIDELINES

Capacity

- Ensure the key hubs (major interchanges, port, airport, CBD and district centre nodes) are well organised.
- Ensure key hubs have the capacity to deal with the anticipated flows that will support the city’s growth in the decades ahead.
- Decrease need for commuting trips by creating places to live and work
- Provide efficient connection in intermodal stations. Integrate the network with the nodes they intersect with.

Accessibility and Connectivity

- Connect the existing and planned roads and rail networks as well as pedestrian and cycle route networks in an efficient way according to their accessibility and capacity.

Projects Coordination

- Coordinated planning of any infrastructure improvement initiatives and the need for a clear plan that cuts across the different disciplines and authorities to achieve the strategic aims for the benefit of the city.

Walkability

- Ensure station environments are easily accessible to pedestrians. Promote walkable, attractive and vibrant streetscapes and pedestrian environments.
- Ensure street network, as well as street crossing facilitate walking.

Cycling

- Ensure station environments are easily accessible to sustainable transport such as cycling and electric mobility

Safety

- Promote vibrant day and night activities around station areas to ensure pedestrian safety.

Parking

- Discourage car-driven uses and low density in areas inside the range of BRT.
- Control the amount of parking and encourage uses that support walking
PRINCIPLE 6: QUALITY PLACE MAKING AND VIBRANT COMMUNITIES

High quality places are those that feature an attractive streetscape/public realm, with vibrant frontages and a mix of uses that encourage day and night time activity. Centres of communities will gravitate towards the busiest places which are usually the best connected with the wider city. It is likely that the commercial activities associated with communities adjacent to BRT stations will start to focus more on the station locations.

It is also important to ensure the city’s residential neighbourhoods connect with the enhanced transport network to directly benefit from the BRT. This will be through some of the smaller stations of lesser importance, but which can all play a valuable part in leveraging access to prosperity and hence to improved living standards along the corridors.

GENERAL GUIDELINES

Identity
- Promote identity and uniqueness, enrich character of area. Activate streets and open spaces as destination Points. Promote where necessary a strong sense of the host community and character.

Interactive
- Promote attractive streetscape/public realm, with vibrant frontages and a mix of uses that encourage with day and night activities.
- Ensure creation of interactive and attractive streetscapes with activities, land uses, squares and public spaces for people interaction.

Street Oriented
- Buildings should front onto street level and have street oriented uses at street level.

PRINCIPLE 7: VIABILITY AND APPROPRIATENESS TO CONTEXT

TOD projects have enhanced commercial appeal as they attract footfall and commercial exchange, with good access to a widened catchment. However, any development must be profiled within the scope of what the market can offer, which imposes limits and constraints on outlays in order to maintain a viable level of return against capital risk.

GENERAL GUIDELINES

Available develople land
- Ensure planning takes into account land with potential to be developed along the stations areas
- Ensure that planning takes into account hazard land constraints and ongoing or on planning projects.

Land value
- Development must be profiled within the scope of what the market can offer.
- Ensure an affordable scale of the development, sustainable and liveable for its residents.
4.2 DENSIFICATION FRAMEWORK AND GUIDELINES

The framework gives guidance in terms of densification locations, densification parameters such as density (du/ha), building density (appropriate FAR), building heights, preferred type of densification, typical land use mix and appropriate typologies.

INTRODUCTION

Using the densification potential index, a framework was established for densification. The framework gives guidance in terms of densification locations, densification parameters such as density (du/ha), building density (appropriate FAR), building heights, preferred type of densification, typical land use mix and appropriate typologies. This was derived from specific densification zones that was identified. These zones include the following areas:

- Very High Density Areas
- High Density Areas
- Medium to High Density Areas
- Medium Density Areas
- Low Density Areas

A general description and guidelines in terms of location, density, diversity and access & connectivity is also provided.

FIG 4–1: CENTRAL REGION DENSIFICATION FRAMEWORK
**DENSITY ZONE 1: VERY HIGH DENSITY**

Forming an entry point to the city’s key commercial area, this is a major commercial hub typology which seeks to maximise development density with a commercial focus. This tends to support dense high quality office and international hotel/apartment developments with ground floor retail. The proximity to BRT reduces the parking standard required for these areas as motorists are encouraged to travel via the public transit system. Density ratio values are more aspirational for these areas, typically around public transit stations. These ratios are up to 5 on new development parcels, and with a gross FAR for the wider area of around 2.

**LOCATION:**
- Primary urban centre
- City’s key commercial area

**DENSITY:**
- Mid to high rise buildings
- Destination for surrounding neighbourhoods
- Highest employment catchment
- Smaller programmed plazas and open space

**DIVERSITY:**
- Commercial as predominant land use
- Great diversity and mix of land uses with focus on dense high quality office and international hotel/apartment developments
- Retail on ground floor

**ACCESS & CONNECTIVITY:**
- Cross corridor connectivity to wider environment
- High frequency transit with large number of public transit nodes
- Permeable street pattern: strong pedestrian access to stations

**DENSITY ZONE 2: VERY HIGH DENSITY**

Locations marking the entry point to a city, or key interchange locations allowing road users to transfer to transit to access high density areas. These locations will become densely developed for commercial and leisure, cultural or educational purposes, including office, retail, tertiary education, and hospitality uses. Taller building clusters will be located here to maximise the opportunity of enhanced connectivity.
**LOCATION:**
- Typically located in areas marking entry to the city in a key interchange location
- Prominent locations around cluster of amenities
- A commercial / education / leisure node
- In outlying areas as key arrival points

**DENSITY:**
- Mid to high rise buildings
- Arrival and distribution area for larger catchment area
- High employment catchment
- Larger open space provision with programmed and non-programmed uses

**DIVERSITY:**
- Destination land uses characterised by leisure, sports, universities and hospitals
- Great diversity and mix of uses to maximise potential and user experience
- Highest provision of amenities

**ACCESS & CONNECTIVITY:**
- Interchange station containing large number of public and private transport modes to maximise efficiency
- High frequency transit

**DENSITY ZONE 3: MEDIUM TO HIGH DENSITY**

Located where potential exists to create a substantial consolidated urban district featuring higher density commercial uses mixed with higher density commercial uses mixed with retail frontages and residential apartments. These would need adequate space to achieve critical mass and economic self-sufficiency with staff drawn from the wider catchment, to create a free-standing hub which is distinct and separate from the existing city centre.

**LOCATION:**
- Stations with areas with emerging centres of regional significance

**DENSITY:**
- Mixed to high development density
- Mix between apartment blocks typology with larger coverage and some commercial buildings
- Residential and employment catchment area
- Average ration of designated open space. Mainly district and local parks

**DIVERSITY:**
- Residential apartments and commercial with retail frontages as predominant uses
- Great diversity of land uses
- Multi-purpose destinations with high provision of amenities

**ACCESS & CONNECTIVITY:**
- High multi-modal accessibility
- Medium to high frequency transit. Distinctive peak hours to be considered
- Permeable street pattern for pedestrian use
- High level of bike use
DENSITY ZONE 4: MEDIUM DENSITY

Typically, a place for mid-scale employment. This can be in areas designated for suburban areas and areas planned for light industrial purposes.

LOCATION:
- Located in suburban areas previously planned for light industrial purposes

DENSITY:
- Medium density development
- Mid-scale employment generator
- High ratio of non-programmed open space

DIVERSITY:
- Residential is not necessarily the primary use
- Support neighbouring centres
- Adaptive reuse opportunities

ACCESS & CONNECTIVITY:
- Medium to low number of public transport nodes
- Moderate transit use, greater along high capacity transit corridors and peak hour commuting time
- Close to main roads for vehicular access.

DENSITY ZONE 5: LOW DENSITY

These are residential areas supporting the needs of the existing and future (densified) community. These areas incorporate new / mid-rise apartments and townhouses as plot consolidation will allow, and a mix of uses can be accommodated around station areas.
**LOCATION:**
- Suburban areas

**DENSIY:**
- Low rise medium density housing and town houses.
- Moderate density
- Moderate employment generator
- Residential catchment area

**DIVERSITY:**
- Community driven, residential as primary use

**ACCESS & CONNECTIVITY:**
- Average number of public transit nodes
- Permeable streets for pedestrian and bike use

**DENSIFICATION FRAMEWORK GUIDELINES**

The next two tables provide guidance in terms of development controls and land use and typology features. The purpose of the tables is to provide a tool kit to draw and define the development in the specific densification zones.

The densification framework development guidelines describes the different development guidelines per density zone, including the dwelling units per hectare, building density and height, preferred densification options, parking requirements, and transit system functions.

The densification framework land use guidelines gives direction in terms of typical land uses associated with the different densification zones as well as how these land uses typically manifests. Housing typology suggestions are also made along with suggestions in terms of functional employment generating uses associated with the densification zones.

Relevant housing and commercial typologies are also presented. Densification within the study area is likely to occur in a number of different ways. The physical response of densification is thus also likely to vary, depending on factors such as location, erf size, land value and development viability. These typologies, envisaged for the study area, takes into account existing structural conditions, existing precedent, and likely market responses.
<table>
<thead>
<tr>
<th>Density (du/ha)</th>
<th>Building Density (FAR Range)</th>
<th>Building Height</th>
<th>Preferred Densification Options</th>
<th>On-site Parking Requirements</th>
<th>Transit System Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very High Density Areas</strong></td>
<td>80</td>
<td>250</td>
<td>1.0 - 5.0</td>
<td>Mim 8 storeys</td>
<td>Large scale precinct development, Consolidation and redevelopment, High Density Infill on Underutilised land, Increased land use rights</td>
</tr>
<tr>
<td><strong>High Density Areas</strong></td>
<td>80</td>
<td>150</td>
<td>0.5 – 2.0</td>
<td>Up to 6 Storeys</td>
<td>Large scale precinct development, Consolidation and redevelopment, High Density Infill on Underutilised land, Increased land use rights</td>
</tr>
<tr>
<td><strong>Medium to High Density Areas</strong></td>
<td>40</td>
<td>80</td>
<td>0.3 – 1.5</td>
<td>Up to 4 Storeys</td>
<td>Consolidation and redevelopment, High Density Infill on Underutilised land, Increased land use rights, Subdivision</td>
</tr>
<tr>
<td><strong>Medium Density Areas</strong></td>
<td>15</td>
<td>40</td>
<td>0.2 – 0.5</td>
<td>Up to 3 Storeys</td>
<td>Additional Dwelling Unit, Increased land use rights, Subdivision</td>
</tr>
<tr>
<td><strong>Low Density Areas</strong></td>
<td>1</td>
<td>15</td>
<td>0.2 – 0.35</td>
<td>Up to 2 Storeys</td>
<td>Additional Dwelling Unit, Increased land use rights</td>
</tr>
</tbody>
</table>

**TABLE 4–1: DENSIFICATION FRAMEWORK DEVELOPMENT GUIDELINES**
<table>
<thead>
<tr>
<th>Typical Land Uses</th>
<th>Land Use Mix Range (Within 500m)</th>
<th>Housing Type</th>
<th>Functional / Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential (%)</td>
<td>Office (%)</td>
<td>Retail / Commercial (%)</td>
</tr>
<tr>
<td>Very High Density Areas</td>
<td>10 - 40</td>
<td>15 - 75</td>
<td>5 – 30</td>
</tr>
<tr>
<td>High Density Areas</td>
<td>30 - 50</td>
<td>0 - 55</td>
<td>5 - 65</td>
</tr>
<tr>
<td>Medium to High Density Areas</td>
<td>25 - 50</td>
<td>5 - 20</td>
<td>1 - 20</td>
</tr>
<tr>
<td>Medium Density Areas</td>
<td>60 - 90</td>
<td>2 - 5</td>
<td>5 - 15</td>
</tr>
<tr>
<td>Low Density Areas</td>
<td>60 - 90</td>
<td>2 - 5</td>
<td>5 - 15</td>
</tr>
</tbody>
</table>

**TABLE 4-2: DENSIFICATION FRAMEWORK LAND USE GUIDELINES**
FIG 4-2: CHATSWORTH SUB REGION DENSIFICATION FRAMEWORK
FIG 4-3: KWADEBEKA / CLERMONT SUB REGION DENSIFICATION FRAMEWORK
FIG 4–4: PINETOWN SUB REGION DENSIFICATION FRAMEWORK
FIG 4-5: QUEENSBURGH SUB REGION DENSIFICATION FRAMEWORK
FIG 4–6: SAVANNAH PARK DENSIFICATION FRAMEWORK
FIG 4-7: WESTVILLE SUB REGION DENSIFICATION FRAMEWORK
VERY HIGH DENSITY DEVELOPMENT TYPES

CREATIVE OFFICE OVER RETAIL

Description: Speculative product offering Class A or Class B office space for technical and professional services or streetfront retail.
Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 500 – 1,900 sq. m
Building Height: 1 – 5 Floors with 5m – 30m Total Height

OFFICE TOWER

Description: Prominent class A office tower featuring high profile iconic design; large open floorplates recommended.
Employment Density: 3.0 – 4.0 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 5.50
Building Size: 1,400 – 4,600 sq. m
Building Height: 3 – 20 Floors with 15m – 85m Total Height

OFFICE PARK

Description: Flagship or multi-tenant secured campus with landscape and recreational amenities; large open floorplates recommended.
Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 2.0 – 8.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 4,600 – 18,600 sq. m
Building Height: 2 – 8 Floors with 10m – 40m Total Height

CORPORATE HOTEL W/ CONFERENCE CENTER

Description: Full service hotel incorporating restaurants and other amenities, most notably, on-site meeting and conference facilities.
Employment Density: 0.5 – 1.5 Employees / 100 SM
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.00
Building Size: 2,800 – 10,000 sq. m
Building Height: 3 – 10 Floors with 15m – 38m Total Height

LARGE BLOCK APARTMENTS

Description: Building or complex containing multiple residential units, normally high rise with multiple stories in height and often including landscaped grounds. May also manifest with non-residential uses on the ground floor (vertical mixed Use building)
Typical facilities: High Rise Apartments
Unit size: 25 – 85 Square Meters
Site Area: 1,500 – 5,000 Square Meters
Nett Density: 80 – 300 DU/ha
HIGH DENSITY DEVELOPMENT TYPES

CREATIVE OFFICE OVER RETAIL

Description: Speculative product offering Class A or Class B office space for technical and professional services or streetfront retail.

Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 500 – 1,900 sq. m
Building Height: 1 – 5 Floors with 5m – 30m Total Height

OFFICE PARK

Description: Flagship or multi-tenant secured campus with landscape and recreational amenities; large open floorplates recommended.

Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 2.0 – 8.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 4,600 – 18,600 sq. m
Building Height: 2 – 8 Floors with 10m – 40m Total Height

CORPORATE HOTEL W/ CONFERENCE CENTER

Description: Full service hotel incorporating restaurant(s) and other amenities, most notably, on-site meeting and conference facilities.

Employment Density: 0.5 – 1.5 Employees / 100 SM
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.00
Building Size: 2,800 – 10,000 sq. m
Building Height: 3 – 10 Floors with 15m – 38m Total Height

LIFESTYLE CENTER

Description: Shopping center featuring upscale national chain and specialty stores with dining and entertainment in an outdoor setting.

Target Economic Sectors:

Employment Density: 4.0 – 6.0 Employees / 100 sq. m
Site Area: 5.0 – 14.0 Hectacres
FAR: 0.35 – 1.00
Building Size: 23,200 – 69,700 sq. m
Building Height: 1 – 2 Floors with 5m – 15m Total Height

MID-RISE MULTI-FAMILY

Description: Building or complex containing multiple residential units, normally 2 – 4 stories in height and often including landscaped grounds.

Typical facilities: 3 Storey Block apartments, 2 Storey Block Apartments
Unit size: 25 – 60 Square Meters
Site Area: 1,500 – 5,000 Square Meters
Nett Density: 80 – 300 DU/ha
MEDIUM TO HIGH DENSITY DEVELOPMENT TYPES

CREATIVE OFFICE OVER RETAIL

Description: Speculative product offering Class A or Class B office space for technical and professional services or streetfront retail.
Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 500 – 1,900 sq. m
Building Height: 1 – 5 Floors with 5m – 30m Total Height

OFFICE PARK

Description: Flagship or multi-tenant secured campus with landscape and recreational amenities; large open floorplates recommended.
Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 2.0 – 8.0 Hectacres
FAR: 0.50 – 1.50
Building Size: 4,600 – 18,600 sq. m
Building Height: 2 – 8 Floors with 10m – 40m Total Height

CLASS B OFFICE PADS

Description: Stand alone office building serving a single or multi-tenants; these may be build-to-suit or speculative.
Employment Density: 3.5 – 4.5 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.30 – 0.60
Building Size: 1,900 – 5,600 sq. m
Building Height: 1 – 3 Floors with 4m – 15m Total Height

LIFESTYLE CENTER

Description: Shopping center featuring upscale national chain and specialty stores with dining and entertainment in an outdoor setting.
Target Economic Sectors:
Employment Density: 4.0 – 6.0 Employees / 100 sq. m
Site Area: 5.0 – 14.0 Hectacres
FAR: 0.35 – 1.00
Building Size: 23,200 – 69,700 sq. m
Building Height: 1 – 2 Floors with 5m – 15m Total Height

TOURISM / ENTERTAINMENT HOTEL

Description: Hotel accommodating tourists visiting local attractions, normally family-oriented with a selection of activities and restaurants.
Employment Density: 5 – 1.5 Employees / 100 sq. m
Site Area: 1.0 – 2.0 Hectacres
FAR: 0.50 – 1.00
Building Size: 2,800 – 4,600 sq. m
Building Height: 3 – 10 Floors with 15m – 38m Total Height

WALK UPS

Description: 2 to 3 storey low rise multi family houses, nearly identical homes featuring shared walls; units are normally under separate ownership, although often including common areas under shared ownership.
Typical facilities: 2 to 3 storey walk ups, Cour Yard Houses (2 Storeys), Duplex Court Yard Houses
Unit size: 25 – 60 Square Meters
Site Area: 300 – 450 Square Meters
Nett Density: 20 – 80 DU/ha
**MEDIUM DENSITY DEVELOPMENT TYPES**

**CREATIVE OFFICE OVER RETAIL**

*Description:* Speculative product offering Class A or Class B office space for technical and professional services or streetfront retail.
*Employment Density:* 3.5 – 4.5 Employees / 100 sq. m
*Site Area:* 1.0 – 2.0 Hectacres
*FAR:* 0.50 – 1.50
*Building Size:* 500 – 1,900 sq. m
*Building Height:* 1 – 5 Floors with 5m – 30m Total Height

**COMMUNITY SHOPPING CENTER**

*Description:* Shopping center focused on general merchandise and convenience oriented offerings, normally anchored by a supermarket.
*Employment Density:* 4.0 – 6.0 Employees / 100 sq. m
*Site Area:* 2.0 – 4.0 Hectacres
*FAR:* 0.20 – 0.35
*Building Size:* 7,000 – 23,200 sq. m
*Building Height:* 1 Floor with 5m – 15m Total Height

**CLASS B OFFICE PADS**

*Description:* Stand alone office building serving a single or multi-tenants; these may be build-to-suit or speculative.
*Employment Density:* 3.5 – 4.5 Employees / 100 sq. m
*Site Area:* 1.0 – 2.0 Hectacres
*FAR:* 0.30 – 0.60
*Building Size:* 1,900 – 5,600 sq. m
*Building Height:* 1 – 3 Floors with 4m – 15m Total Height

**SINGLE AND MULTI-TENANT FLEX INDUSTRIAL**

*Description:* A flexible combination of functions, including office, R&D, high-tech processing, small scale distribution and showrooms.
*Employment Density:* 2.0 – 3.0 Employees / 100 sq. m
*Site Area:* 1.0 – 16.0 Hectacres
*FAR:* 0.30 – 0.45
*Building Size:* 900 – 9,300 sq. m
*Building Height:* 1 – 2 Floors with 5m – 10m Total Height

**TOWN HOUSE**

*Description:* Building or complex containing multiple residential units, normally 2 – 4 stories in height and often including landscaped grounds.
*Typical facilities:* Town house, Row house (1 - 2 Streys), Masonette, Court Yard Houses
*Unit size:* 80 – 120 Square Meters
*Site Area:* 200 – 450 Square Meters
*Nett Density:* 10 – 25 DU/ha
**LOW DENSITY DEVELOPMENT TYPES**

**SINGLE STAND RESIDENTIAL**

*Description:* Detached or semi-detached dwelling unit usually occupied by a single household or family, built on a lot providing surrounding yards.  
*Typical facilities:* Single dwelling, Second dwelling, Second dwelling (Garage conversion), Semi-Detached  
*Unit size:* 25 – 60 Square Meters  
*Site Area:* 100 – 500 Square Meters  
*Nett Density:* 5 – 15 DU/ha

**SINGLE TENANT LIGHT INDUSTRIAL**

*Description:* Build-to suit for a single tenant; fit for specialized design and manufacturing using equipment of technology based activities.  
*Employment Density:* 1.5 – 2.5 Employees / 100 sq. m  
*Site Area:* 1.0 – 8.0 Hectacres  
*FAR:* 0.40 – 0.50  
*Building Size:* 900 – 27,900 sq. m  
*Building Height:* 1 Floor with 5m – 10m Total Height

**SINGLE TENANT FLEX**

*Description:* A flexible combination of functions, including office, R&D, high-tech processing, small scale distribution and showrooms.  
*Employment Density:* 2.0 – 3.0 Employees / 100 sq. m  
*Site Area:* 1.0 – 16.0 Hectacres  
*FAR:* 0.30 – 0.45  
*Building Size:* 900 – 9,300 sq. m  
*Building Height:* 1 – 2 Floors with 5m – 10m Total Height
4.3 LAND USE FRAMEWORK

The framework gives guidance in terms of densification locations, densification parameters such as density (du/ha), building density (appropriate FAR), building heights, preferred type of densification, typical land use mix and appropriate typologies.

INTRODUCTION

The land use framework sets out to establish the most appropriate development strategy for affected areas. A ‘Land Use Framework’ (LUF) primarily identifies the range/type of zones appropriate to the study area and sub regions under consideration. The formulation of a Land Use Scheme (or Planning Scheme) will compile the requisite detail that comprises a Scheme document and map.

The LUF is, therefore, a precursor to the formulation of a Planning Scheme. As such it identifies, in broad terms, the nature of the intended zoning categories that will be determined for the scheme.

It does not directly address the details embodied in the written part of a Scheme, viz.

- The preparation of a schedule of General Definitions;
- A schedule of Land Use and Building Definitions;
- The preparation of a table of uses related to zones, i.e. the specific details of land uses (whether Free Entry, Consent Use, or Prohibited); or
- The development regulations pertaining to those zones.

Essentially, the LUF identifies the “intent” of the different zones that will be developed in the formulation of a Scheme.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Density (du/ha)</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very High Density Residential</strong></td>
<td>120 - 250</td>
<td>• Large Block,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Large Block (Ground Floor Retail),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Large Block (Alt)</td>
</tr>
<tr>
<td><strong>High Density Residential</strong></td>
<td>100 - 120</td>
<td>• 3 Storey Block</td>
</tr>
<tr>
<td><strong>Medium to High Density Residential</strong></td>
<td>80 - 100</td>
<td>• 2 Storey Block</td>
</tr>
<tr>
<td><strong>Medium Density Residential</strong></td>
<td>40 - 80</td>
<td>• Court Yard Houses (2 Storeys),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Duplex Court Yard Houses,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Town Houses,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Row Houses (3 Storeys)</td>
</tr>
<tr>
<td><strong>Medium to Low Density Residential</strong></td>
<td>15 - 40</td>
<td>• Maisonette, Row House (1 Storey),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Row House (2 Storey),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Court Yard Houses</td>
</tr>
<tr>
<td><strong>Low Density Residential</strong></td>
<td>1 - 15</td>
<td>• Single Dwelling, Second Dwelling,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Second Dwelling (Garage Conversion),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Semi Detached</td>
</tr>
</tbody>
</table>

TABLE 4-3: RESIDENTIAL DENSITY LAND USE FRAMEWORK CATEGORISATION
FIG 4-9: CHATSWORTH SUB REGION LAND USE FRAMEWORK
FIG 4–10: KWADEBEKA / CLERMONT SUB REGION LAND USE FRAMEWORK
FIG 4-11: PINETOWN SUB REGION LAND USE FRAMEWORK
FIG 4-12: QUEENSBURGH SUB REGION LAND USE FRAMEWORK
FIG 4–13: SAVANNAH PARK SUB REGION LAND USE FRAMEWORK
FIG 4-14: WESTVILLE SUB REGION LAND USE FRAMEWORK
CHAPTER 5

STATION TYPOLOGIES & PILOT SITE ASSESSMENT
5.1 STATION CLASSIFICATION

Defining station typologies provides a launching point for planning activity within all station areas. These plans set up expectations for station development and establish the vision for individual station areas.

INTRODUCTION

In

The “4 steps” below describe how to use the overall TOD framework and the TOD guidelines to encourage and direct TOD development along a BRT or other transit corridor. These steps are the recommended approach to be used by planning authorities, developers, investors and consultants to plan for TOD development and assess whether development proposals are compliant with the TOD guidelines.

LEGEND

Station Typologies

Central Business District
Gateway Centre
District Centre
Service Centre
Transit Neighbourhood

FIG 4–15: STATION TYPOLOGIES
5.2 STATION TYPOLOGY GUIDELINES

Defining station typologies provides a launching point for planning activity within all station areas. These plans set up expectations for station development and establish the vision for individual station areas.

GATEWAY CENTRE

The Gateway typically a terminal location marking entry to the city, or a key interchange location allowing road users to transfer to transit to access the centre. These are ideal locations for densely developed commercial, leisure, cultural or educational purposes including office, retail, university/college, hospitality and leisure uses.

These also offers an opportunity for creating building clusters that are dense and taller, as appropriate, to maximise the opportunity and offset public investment in transit. Gateway can be well-suited to destination type of uses or key interchanges allowing crowds to be intercepted and disperse effectively without affecting the rest of the city.

STATION INFLUENCE ZONE

Typically the influence area boundary stretches into 3 main zones from the station:

- The Inner Zone or the station core area should encourage area specific TOD compliant mix of uses. More taller buildings and higher densities should be promoted which could maximise on the enhanced connectivity of the station. Typically, the ground floor would consist of active retail or commercial uses overlooking the key streets and routes. Block structured within the inner zone to be more organised and should offer seamless connectivity to the blocks in other zones.
- The Middle zone should encourage the second tier of TOD compliant land uses identified for the Gateway typology such as a destination or a landmark which earmarks the arrival to the city (or key interchange) as experienced by BRT.
- Outside the 500m radius focus should be to strengthen the legibility and connectivity of the key feeder routes to the secondary and tertiary routes. Regenerative measures and interventions along these routes should be phased simultaneously with the development of the station core area in parallel.
- These zones of influence should be incorporated in all detailed Station Area action plans and the actual boundaries of the Station Core Area should be verified through a Station Area planning process.

TOD COMPATIBLE LAND USES

TOD compliant land uses

Promote a complimentary mix of uses and phasing to capitalise on the area’s prominence, such as:

- Significant hospitality, leisure and commercial development which could include conference/convention centres and event hosting facilities near the Gateway City Centre.
- Service based hotels, retail parks, sports arena and other compatible uses which can share P & R/Interchange facilities at the (Gateway City edge) Terminal stops.
- Accommodate commercial tenants including HQs and other leading employers, as well as SMEs and managed retail market stalls.
- Consider education and training/vocational or institutional uses where appropriate, including student accommodation, college and university teaching accommodation.
- Range of residential types ranging mid-rise walk-up apartments to small plot villas along the Gateway City Edge typology, and mid to high rise apartments, townhouses and serviced units near the Gateway City Centre typology.
- Residential apartments fronting the key routes and BRT line, where appropriate, should encourage active ground floor uses including local commercial and retail uses.
TOD COMPATIBLE LAND USES (CONT.)

Land Use Mix
Promote a balanced mix of uses that take full advantage of enhanced connectivity. Broad range of mix, as below

- Residential: 25 - 30%
- Office: 20 – 45%
- Commercial: 15 – 30%
- Other: 15 – 25%

Employment Focus:
Typically a tertiary sector or service sector based economic uses such as:

- Retail sales, entertainment, government (for Gateway City Centre)
- Professional services, real estate, franchising (for Gateway City Edge)

Community Facilities:
The Gateway typology anticipates a population circa 70,000 within 1km of the BRT station and should encourage a strong identity for the area with a busy, varied and vibrant atmosphere

- The communal facilities and places should be multifunctional in nature supporting wider variety of activities. For eg, a stadium can hold events other than sports related and should be accessible to all
- Public open spaces, community plazas and buildings should be designed to serve both the existing and transient community that visits occasionally for events and commuting purposes

DEVELOPMENT DENSITY & MASSING
The Gateway typology should focus and encourage delivering key Gateway element and support complimentary mix of uses to establish purpose and attract further investment interest.

FAR Range
Special incentives for TOD compliant land use mixes and not restricted to the range below:
Average FAR of 2.0 - 4.0 (& above)

Massing and Typology
Massing and building typology to respond to its setting, heritage features (if any), topography, vegetation and water or areas prone to flooding

- Compact and up to 90m in depth, mid to high rise closed blocks with podiums for parking (within Gateway City Centre)
- A Grid block pattern may be suitable (for Gateway City Centre)
- Transition to single-family outside the 1km
- Promote tall building typologies (up to 15 storeys) with on plot parking within courts, front or rear of the plot (suitable for Gateway City Edge)

Building Controls:
- Minimum parcel setback: 3-5 m
- Minimum plot coverage: 30%

CONNECTIVITY NETWORK

Public Transport Network
- Existing and planned transport systems should be integrated in the station design: both short range and long range connections (i.e. railway, interregional buses etc...)
- Plan for a future-proof hub able to accommodate also the demand of the future BRT phases.
- The switch from private modes and other forms of public transport need to be seamless.

Street network
- Given the heavy flows of PT passengers in the peak-hours the footway should be properly sized.
- Drop-off of passengers from personal vehicles or taxis should be accommodated. They should be signalized properly and time-regulated

Servicing
- Detour servicing traffic from the corridor to secondary roads. Where necessary, urban blocks can also be served directly from the main corridor via parallel service road.
- Loading and unloading should be limited to off-peak hours only in pedestrian and shared roads (usually early morning)
**PLACE MAKING / SOFT MOBILITY**

**Place-making**
- Promote distinctive buildings, open spaces or public realm features earmarking the entry to the city or a key interchange facility as experienced on arrival by BRT
- Promote taller buildings or cluster of buildings close to station maximising the opportunity of enhanced connectivity
- Retain and enhance existing buildings and community spaces of heritage importance and integrate with the new development
- Retain and integrate, where possible, existing green features, topography and water features with new development creating a distinct identity and place

**Soft Mobility**
- Provide adequate at grade controlled pedestrian crossings or pedestrian bridges to cross over the main transit corridors.
- Clear signage and enough space to allow pedestrian flows towards key residential, employment, cultural and administrative destinations.
- Include spaces that allow groups of people to congregate without blocking the paths of others.

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**PARKING**

- Provide Park & Ride facilities for commuters. (for Gateway-City Edge). This way parking demand should be balanced between the need to provide current vehicular access to the station and future development opportunities.
- Parking meters and demand-based parking fares: increase prices where the demand is higher in order to discourage the use of private vehicles (for Gateway-City Centre)
- Unbundle parking structure and land uses towards a shared parking strategy that will allow optimizing the parking efficiency by maximizing the occupancy of the available parking spaces throughout the day, exploiting the difference in the occupancy peaks depending on the land use. (for Gateway City Centre)
- Provide properly defined, signalized, time regulated Kiss&Ride areas for the drop-off and pick-up of passengers in proximity to the station.
- Restrict and calibrate on street parking in order to support a liveable but active human scale environment
DISTRICT CENTRE GUIDELINES
Located where potential exists to create a substantial consolidated urban district featuring higher density commercial uses mixed with retail frontages and residential apartments.

These would need adequate space to achieve critical mass and economic self-sufficiency with staff and custom drawn from the wider catchment, to create a free-standing hub which is distinct and separate from the existing city centre.

There are unlikely to be many district centres, perhaps one in the Pinetown / New Germany Central Business District.

STATION INFLUENCE ZONE
3 distinctive areas of influence from a transit station to define the appropriate level of density prescription:

- A general area of influence defined as 500m radius
- A wider area of influence as 1000m
- Identification of Station Core Area - A tailored boundary for this area will be defined subject to the type of district typology and suitable building block dimensions to ensure compatibility with neighbourhoods. The minimum building block is 80m.

These zones of influence should be incorporated in all detailed Station Area plans and the actual boundaries of the Station Core Area will need to be verified through a Station Area planning process.

Intersected Transit Stations
When multiple stations converge in the same area of influence, the strategy focus will be oriented towards the one that shows higher importance on the station hierarchy and special attention should be put in place:

- Create compact inter-modal facilities that minimize infrastructure and loss of redevelopment opportunities
- Develop an application of an Overlay Zone for multiple stop synergies
- Establish a land management strategy to capitalise opportunities for new development.

TOD COMPATIBLE LAND USES
TOD compliant land uses
Pre-existing or new dense -with vertical mix of urbanised uses and built forms, including:

- Multi-family residential (with provision of affordable housing), office towers, healthcare, hotel / hospitality use, civic uses
- Active ground level uses accommodating retail / F+B
- Community uses, such as educational or other amenities.
- Accommodate small/ medium commercial tenants including SMEs and managed retail market stalls
- Gated communities and defensive condominium developments are not appropriate in central areas

Land Use Mix
Will accommodate a commercially oriented mix of uses and activities while retaining residents to ensure out-of-hours activity.

- Residential: 40 - 60 %
- Office: 20 – 30%
- Retail: 10 – 20%
- Other: 10 – 20%

Employment Focus:
Commercial uses are typically service oriented, Secondary and Tertiary Sector Economy

- Government services
- Offices, small industries, retail & community
DEVELOPMENT DENSITY & MASSING

FAR Range

Average FAR of 2.0 - 3.0

- Station Core Area: 2.5 - 3
- 200 - 500m radius area: 2.0 and above
- 500m - 1km: 1.5 and above

Typical Building heights

- Min 5 storeys - max 10 storeys Massing and Typology
- Mid-rise perimeter blocks, some tall buildings and light podium developments. Amalgamated plots on larger parcels
- Grid block pattern
- Minimum Building Block of 80m
- Multi-family residential with corner stores
- Transition to single-family outside the 1km
- Promote tall building typologies (up to 10 storeys) with podiums (up to 2 storeys)
- Accommodate a range of residential typologies in order to promote the social inclusion and integrate different family sizes and incomes.

Building Controls:

- Minimum parcel setback: 0 m
- Minimum plot coverage: 35%

CONNECTIVITY NETWORK

Public Transport Network

- Create a city-scale transit hub, fostering multi-modality and integrating all public transport modes (BRT, regional buses, feeder lines, minibus taxis).
- Create a primary transit node, able to support the abundant attracted and generated person trips
- Include and regulate existing drop off and terminal facilities (long distance buses terminal, minibus taxi stations)

Street network

- Restrict heavy vehicles through-traffic to the main roads.
- Detour servicing traffic from the main corridor to the parallel local roads. Provide the access to loading bays for servicing from the backof-the-house, avoiding the interruption of the active fronts.
- Given the heavy flows of PT passengers in the peak-hours the footway should be properly sized. Currently many sidewalks can’t carry the footfall causing traffic disruption.
- Widening footways and decluttering the space to accommodate pedestrian flows.
- Avoid one-way streets to minimize search traffic and reduce travel times.

Servicing

- Identify specific loading areas and signalize them (markings, different paving). Off-peak hours only in pedestrian and shared roads.

PLACE MAKING / SOFT MOBILITY

- Provide city-wide indoor retail destination (Market) for allocating street vendors. The space to be related to an outdoor space for possible expansion. Facility to be located within walking distances from the station but on the secondary blocks in order to avoid congestions and have enough dimension.
- Clear signage and enough space to allow pedestrian flows towards key residential, employment, cultural and administrative destinations
- The destination character requires the provision of high-quality public spaces near the concourse to access taxi/feeder bus interchange.
- Encourage light infrastructure and low impact mobility solutions to adapt to specific necessities of the station context and envisaging the possibility of tailored solutions that will enhance the station vocation from a user accessibility standpoint.
- Create landmark space in vicinity of station, to handle expected visitor numbers, and at least 0.5Ha in area, edged with vibrant commercial frontages
- Provide spaces and pedestrian connections for large and small gatherings, formal and informal events.
PARKING

- Require all District centre developments to provide on-plot parking either surface, podium or underground
- Avoid access to parking facilities from the corridor but manage it via the parallel roads, to distribute the accessibility patterns of the area
- Parking meters and demand-based parking fares: increase prices where the demand is higher in order to discourage the use of private vehicles.
- Scattered off-road parking facilities strategically located outside the station core area to prevent the destination traffic to pass by the core.
- Encourage shared parking as a way of reducing both its physical supply and its cost. This strategy takes advantage of the mixed-use character of this type of station. Unbundling parking provision from the land use will optimize efficiency by maximizing the occupancy of the available parking spaces throughout the day, exploiting the multi-user effect.
- Restrict and calibrate on street parking in order to support a liveable but active human scale environment. On street parking provides a buffer between vehicles and sidewalks creating a safer place for pedestrians.
- Avoid access to parking facilities from the corridor but manage it via the parallel roads, to distribute the accessibility patterns of the area
**SERVICE CENTRE**
The Service Centre will host a range of employment and non-residential activity, in urban or suburban location planned for light commercial and industrial purposes.

Typically these can provide access to employment on land between transient communities.

They are planned to accommodate the needs of travelling workers and visitors where retail/entertainment uses are included. Traditional and existing Service Centres tend to feature lower densities, mono land use and be less well aligned to TOD principles as the employment uses tend to be lower density.

However, TOD Service Centre incorporate a degree of higher density and mix of uses to promote day and night uses such as civic facilities, call centres, offices and training facilities encouraging a vibrant and active hub around the station. These can be located within the various districts, and in areas featuring low ridership to boost station patronage and balance passenger flows.

**STATION INFLUENCE ZONE**
Typically the influence area boundary stretches into 3 main zones from the station.

- The core zone: 0-100m area, The Middle zone: 200-500m area, The Outer zone: 500-1000m area

- The Inner Zone or the station core area should encourage area specific TOD compliant mix of uses that focuses on delivering Service Centre key uses. More taller buildings and higher densities should be promoted which could maximise on the enhanced connectivity of the station. Typically, the ground floor would consist of active retail or commercial uses overlooking the key streets and routes. Block structured within the core zone to be more organised and should offer seamless connectivity network to the blocks in other zones.

- The Middle zone should encourage the second tier of TOD compliant land uses identified for the Service Centre typology such as a destination (Convention centre, Retail parks) which are complimentary to the predominant employment uses within the area.

- Outside the 500m radius focus should be to strengthen the legibility and connectivity of the key feeder routes. Regenerative measures and interventions along these routes should be phased simultaneously with the development of the station core area in parallel.

- These zones of influence should be incorporated in all detailed Station Area action plans and the actual boundaries of the Station Core Area should be verified through a Station Area planning process.

**TOD COMPATIBLE LAND USES**
TOD compliant land uses

Create an appropriate mix of uses and phasing to capitalise on the area’s prominence and connectivity, such as:

- Significant commercial development within a broad mix, including supporting retail/F&B, and residential, possibly including affordable homes, Live-work units and community facilities.

- Accommodate diverse units sizes and grades in range of unit typologies, be that for offices, employment or light industry activity.

- Accommodate commercial tenants and SME’s.

- Consider a destination land use such as a convention centre with associated short stay hotel and conference facility which could support the predominant employment uses.

- Consider education and training /vocational or institutional uses where appropriate, including student accommodation, college and university teaching accommodation.

- Consider range of residential types ranging mid-rise walk-up apartments to single livework units/studios within close proximity of light industrial and workshop areas.

- Residential apartments fronting the feeder routes and BRT line, where appropriate, should encourage active ground floor uses including local commercial and retail uses.
TOD COMPATIBLE LAND USES (CONT.)

Land Use Mix
Promote a balanced mix of uses that take full advantage of enhanced connectivity. Broad range of mix, as below

- Residential: 25 - 35%
- Office: 15 – 35%
- Commercial: 10 – 15%
- Other: 35 – 55%

Employment Focus:
Typically a service sector (Tertiary) based economic uses such as:
- Logistics, entertainment, waste disposal
- Professional services, real estate, franchising, government

Community Facilities:
The Service Centre typology anticipates a population circa 47,000 part of it more transient in nature, within 1km of the BRT station

- Public open spaces, community plazas and buildings should be designed to serve both the existing and transient community that visits occasionally for events and commuting purposes
- Healthcare and education hubs should be located along the primary feeder routes with on plot parking facilities that can be jointly shared by other uses

DEVELOPMENT DENSITY & MASSING

The Service Centre typology should focus and encourage delivering key commercial and non residential uses serving the transient communities

FAR Range
Special incentives for TOD compliant land use mixes and are not restricted to the range below:
Average FAR of 1.0 - 2.5 (& above)

Massing and Typology
Massing and building typology to respond to its setting, heritage features (if any), topography, vegetation and water or areas prone to flooding

- Compact and up to 80m in depth, mid rise closed blocks with podiums for parking within the core zone
- A grid block pattern may be suitable core and middle zone
- Transition to large block up to 150m light industrial/logistics and retail park with on plot parking

Building Controls:
- Minimum parcel setback: 2-5 m
- Minimum plot coverage: 25%

CONNECTIVITY NETWORK

Public Transport Network
- Since this type of “suburban” activities (i.e. retail parks, big employment centers and production areas) usually relies on car access, a particular focus should be put on the pedestrian to and from the BRT stations.
- The switch from private modes and other forms of public transport such as local minibus taxi services should be integrated seamlessly

Street network
- A transit-oriented street network would include service roads or public streets that run parallel to heavily-traveled, high-speed, multilane arterials, providing a safe location for bus stops and convenient pedestrian access to businesses
- The road network should be properly sized and designed to support major growth areas and the productivity of the employment centers

Servicing
- The heavy traffic should be re-routed away from the BRT corridor on a dedicated secondary network that gives access to the production areas without interfering with public transport and pedestrians.
- Manage servicing and curbside access with dedicated curb space in proximity of main local attractors, to reduce blockages of public transport, bike lanes and motor vehicle lanes.
PLACE MAKING / SOFT MOBILITY

Place-making

- Promote higher densities and mix of uses close to station such as convention areas, short stay hotels etc complimentary to the predominant service based uses adjacent to the station area
- Retain and enhance existing buildings and community spaces of heritage importance and integrate with the new development
- Retain and integrate, where possible, existing green features, topography and water features with new development creating a distinct identity and place

Soft Mobility

- Short distances that bookend a commute are crucial. Hence, the promotion of active transportation networks from the stations to the main attractors (employment centres) is of paramount importance.
- Provide high quality and wide pedestrian paths to allow seamless connection with key employment destinations and public facilities
- Use local transit stops such as feeder terminals and minibus taxi stops as mobility hubs, placing last mile connectivity stations within the sightlines of alighting passengers.

PARKING

- Set parking charges which encourage shortstay parking within an acceptable walking distance to ensure adequate accessibility (e.g. for shoppers) and discourage longstay parking (e.g. for commuters)
- Management of car parks to encourage sustainable travel and introduction of on demand parking bays (linked specifically to travel plan measures).
- Stations with new development may become a retail destination for nearby neighbourhoods. Therefore, short stay parking (e.g. for shoppers) should be provided to meet the required demand.
- Public and private destination parking facilities and drop off areas will be provided on plot, to ensure that retail and employment parking demand is satisfied compliant with the maximum parking requirements and citywide traffic management policies.
- Loading bays for heavy vehicles and related manoeuvring space should be provided on plot to avoid any disruption of traffic circulation.
TRANSIT NEIGHBOURHOOD
The most representative station area. Though it may have very different ridership, it is one of the most important and is called to uplift the living standards of the local residents.

STATION INFLUENCE ZONE
3 distinctive areas of influence from a transit station to define the appropriate level of density prescription

- The core zone: 0-100m area, The Middle zone: 200-500m area, The Outer zone: 500-1000m area
- Tailored designed station core area is subject to typological urban block which in this case has a reference dimension of 60-80m. This can vary depending on the maturity of the current conditions and the predefined urban fabric.
- The implementation of triary routes that support the adequate performance of the BRT trunk will also support the definition of the Station Core Area.

Intersected Transit Stations

- Transit neighbourhood stations may have a lower accessibility to alternative public transport options compared to other categories where multiple modes overlap. This hierarchical condition also applies to the distribution of community facilities and other uses. Transit Neighbourhood Station Areas may be considered in subsidy of other stations when allocating facilities, uses and transport connections.

TOD COMPATIBLE LAND USES
TOD compliant land uses

- Multi-family residential (with provision of affordable housing), offices, healthcare, civic uses
- Active ground level uses accommodating retail
- Community uses, such as educational or other amenities.
- Gated communities are not appropriate in central areas

Land Use Mix

Will accommodate a commercially oriented mix of uses and activities while retaining residents to ensure out-of-hours activity.

- Residential: 60 - 70 %
- Office: 5 – 10%
- Retail: 5 – 10%
- Other: 20 – 30%

Employment Focus:

- Showrooms and other professional services located along BRT trunk and main feeder routes
- Light industry easily accessible from BRT station
- Large retail units for local use
- Accommodate small/medium commercial tenants including SMEs and managed retail market stalls
- Promote Live-Work typologies with flexible GF spaces for family businesses.
DEVELOPMENT DENSITY & MASSING

**FAR Range**

Average FAR of 1.25 - 2.75

**Typical Building heights**

- Min 2 storeys - max 8 storeys

**Massing and Typology**

- Station Core area: mid-rise perimeter blocks, some landmark tall buildings and light podium developments. Amalgamated plots on larger parcels
- Grid block pattern to rationalize BRT corridor frontage
- Minimum Building Block of 60m
- Multi-family residential with corner stores
- Feeder routes with potential higher typologies and active frontages
- Promote medium height building typologies (up to 8 storeys) with podiums (up to 2 storeys)
- Accommodate a range of residential typologies in order to promote the social inclusion and integrate different family sizes and incomes.
- Station core area and feeder routes to to enhance development to maximise the more accessible plots with higher amount of residents.
- Fringe between new developed areas and existing constructions to incorporate utilities, accessible routes and active frontages so

DEVELOPMENT DENSITY & MASSING (CONT.)

**Building Controls:**

- Minimum parcel setback: 0 m
- Minimum plot coverage: 60 %

CONNECTIVITY NETWORK

**Public Transport Network**

- Prioritize first-last mile solutions to shorten trip length and seamlessly connect transit riders with intermodal facilities. This could be achieved by providing local public transit stops, drop off areas, bike racks, bike share and bikeways in close proximity to the station area.

**Street network**

- Given the residential vocation of the areas, the secondary road network will accommodate a local destination traffic, leaving the through traffic on the main arterial roads.
- Where the road network is informal and inadequate to carry the local traffic a new grid of secondary roads should be planned along with a rehabilitation of the existing major paths.
- Secondary roads should reflect the residential character with a compact right of way.
- Create low speed zones around residential clusters, schools and other public attractors
- Given the lower speed of the local traffic, segregated bike lanes are not required on the tertiary network

**Servicing**

- Heavy traffic should not be allowed on local residential roads and servicing should occur through light duty vehicles.
PLACE MAKING / SOFT MOBILITY
• Design streets as quality public spaces, as well as pathways for movement
• As these station areas will host a predominant residential land use function. The streets should be appropriate for residential living, with generous sidewalks, plantings, and furnishings.
• High levels of street connectivity, including use of pedestrian-only routes, should be provided to allow direct access for all residents to transit stops, local retail shops and main activity centres.

PARKING
• On-site provision should be accommodated on unrestrained sites.
• Ensure that a portion of the on-street parking is reserved for residents who own a parking-pass.
• Provide on-street parking as a buffer between vehicles and sidewalks, creating a safer place for pedestrians.
• Provide properly defined, signalized, time regulated Kiss&Ride areas for the drop-off and pick-up of passengers in proximity to the station.
### 5.3 STATION EVALUATION

This section evaluates the proposed IPTN stations to identify those that have the highest potential for densification based on a set of pre-determined criteria. The criteria takes into account the basic requirements of densifying around transportation facilities such as IPTN stations.

#### INTRODUCTION

The aspects to be investigated for each of the identified stations include:

- Context
- Catchment extent
- Accessibility
- Land Availability
- Housing opportunity
- Economic Activity
- Commuter comfort
- Intermodal potential
- Environment
- Development proposals
- Surrounding facilities

Each of these aspects are defined below. After the criteria for the evaluation has been established and defined the results of the evaluation are summarised in a table.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>The station context considers the relationship of the station with the neighboring precincts or node – is there an existing relationship with neighboring precincts or nodes, are there opportunities for relationships to be formed through specific planning mechanisms or are there no opportunities which exists to create a possible future relationship as a result of existing barriers.</td>
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<tr>
<td>Catchment</td>
<td>The catchment extent refers to the regional location of the identified station along the northern corridor and the local/ immediate neighbour or passenger it draws from.</td>
</tr>
</tbody>
</table>
| Accessibility   | The accessibility criteria consist of several components -  
  1. Road infrastructure and access to the station; 
  2. Pedestrian access to the station; 
  3. The ability for alternative modes such as tax’s and buses to access the station; 
  4. The visual access for passengers to locate a station from the neighbouring communities. |
| Land Availability| Land availability plays an important role in the identification of station precincts. The identification of vacant properties, possible urban renewal potential and informal settlement for potential upgrading are a key component. |
| Housing Opportunities | Does the station precinct offer opportunities for increased housing prospect in the form of infill/ densification or redevelopment? |
| Economic Activities | Does the station precinct present opportunities for increased Informal trading/ markets, retail service industry and or manufacturing industry? |
| Commuter Comfort | Do the station precincts provide safe and secure environments that contain basic facilities, which are easily accessible to the daily commuters? |
| Inter-modal potential | Is there a potential relationship that can be established between the station precinct and the proposed BRT line and precincts? Is there an opportunity to introduce taxi facilities within the station precinct |
| Environment     | Does the open space system impact on the ability of the station to development into its full potential, and are there topographical implications within the 1 kilometer radius of the station. |
| Development Proposals | Has the station had any previous development proposals or planning interventions within the last 5 – 10 years? |
| Surrounding Facilities | Evaluate the station precinct according to the nodes exposure to schools, health, education or institutional facilities to supplement activity and demand within the area. |

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**TABLE 6-1: STATION EVALUATION ASSESSMENT CRITERIA**
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<tr>
<th>Station ID</th>
<th>Context</th>
<th>Catchment</th>
<th>Access</th>
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**TABLE 6-2: STATION EVALUATION RESULTS**
INTRODUCTION
The aspects to be investigated for each of the identified stations include:

- Context
- Catchment extent
- Accessibility
- Land Availability
- Housing opportunity
- Economic Activity
- Commuter comfort
- Intermodal potential
- Environment
- Development proposals
- Surrounding facilities

Each of these aspects are defined below. After the criteria for the evaluation has been established and defined the results of the evaluation are summarised in a table.
5.4 EVALUATION OF POTENTIAL PILOT SITES

From the assessment of potential pilot sites, three of the sub-regions were identified as having potential to accommodate the pilot projects. These areas are also in line with the 3 areas identified by eThekwini as focus areas for potential pilot projects. These sub-regions are: Pinetown, Westville / Bonela and Chatsworth

PRIORITY SITE SELECTION
Once all the pilot sites were identified, in the appropriate areas, another assessment was completed to finalise the pilot sites. This section describes the final pilot site assessment results and gives an overview of the selected pilot sites and their development concepts. The concepts were aligned to the densification and land use frameworks in order to determine the most suitable development for each site.

The following table indicates the top scoring station sites for densification based on certain criteria that were applied. The results showed that Chatsworth, Pinetown and Westville/ Bonelo provide the most potential for potential densification pilot projects.

<table>
<thead>
<tr>
<th>Station ID</th>
<th>Sub Region</th>
<th>Context</th>
<th>Accessibility</th>
<th>Land Availability</th>
<th>Densification opportunity</th>
<th>Intensification Opportunity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>05T1</td>
<td>Chatsworth</td>
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<td>05T2</td>
<td>Chatsworth</td>
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<td>05T3</td>
<td>Chatsworth</td>
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<td>04T4</td>
<td>Queensburgh</td>
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<td>06T8</td>
<td>Westville</td>
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<td>07T5</td>
<td>Pinetown</td>
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<td>07T7</td>
<td>Pinetown</td>
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<td>Pinetown</td>
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<tr>
<td>Malvern Rail Station</td>
<td>Queensburgh</td>
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</tbody>
</table>

TABLE 6–3: POTENTIAL PILOT SITE ASSESSMENT
PINETOWN SUB REGION

The Pinetown sub region has a high potential for densification. Outside of the Durban Central Business District, it is the only area in the Central Regional that holds potential for very high density development. It also has available vacant stands that can accommodate high density residential and mix use development that can support the IPTN system.

POTENTIAL DENSIFICATION

Various sites hold the potential to increase its density through revised zonings. 4 major areas are identified as part of the development strategy. Most of these areas are single residential low density stands. Their proximity to major roads and public transport facilities make them ideal to accommodate high density residential uses. These areas include:

- From the south, east of the M1, an area has been identified in the Mariannhill Park neighbourhood.
- A substantial area east of the N1 in the suburb of Ashley.
- Immediately North of the Pinetown Central Business District.
- Stands South of Josiah Gumede road, along Stapleton Road.

As stated before, the area also has several vacant properties. These properties can accommodate new infill development and are located in the Pinetwon CBD. These properties are situated along Glenugie Road, Kings Road and Crompton Street.

WESTVILLE/ BONELA

The Westville Bonela Sub-Region’s potential for densification in relation to the public transport system is limited by physical factors such as slope. This area lends itself to the consolidation of stands and redevelopment of low density single stand residential units to medium density typologies.

POTENTIAL DENSIFICATION

Limited stands were available for intervention. After consultation with various eThekwini Departments, public consultation and ground truthing, a few vacant sites were identified in Bonela, along Candella Road. A small neighbourhood South of the N3 Highway and East of the Jan Smuts Highway was identified as an area with a high potential for redevelopment.

CHATSWORTH

Chatsworth in general is characterised by medium to high density residential with much of the land being occupied by residential uses and social uses such as education facilities. Slope, existing servitudes and other physical constraints made many vacant stands unsuitable for the selection of pilot projects. Accessibility to some sites also had an impact on their viability.

POTENTIAL DENSIFICATION

Sites that were indentified for new development include a small privately owned site next to the Chatsworth Retail Centre, two sites south of the Westcliff rail station currently being used as sporting field, and open space south of the Kharwastan Secondary School. These sites were reviewed and assessed during the public engagement sessions and with the eThekwini Housing Department. The site on the corner of Iris Avenue and Penguin Street adjacent to the Kharwastan Secondary School was indicated to be the most suitable.
5.5 SELECTED PILOT SITES

Based on the assessments in the previous section, workshops with municipal officials and public meetings, three sites have been identified as pilot site areas. This section will provide a short overview of each selected pilot site.

PINETOWN PILOT SITE DESCRIPTION

SITE CONTEXT
The Pinetown pilot site is located inland, east of the Durban CBD within the suburb of Pinetown. The suburb has a large mixture of land uses including residential, commercial and light industrial. On a high-level, the site sits on the southern boundary of a large residential area, bounded to the east by a light industrial precinct and to the south commercial land uses.

On a micro scale, the site is bounded on the north by General Residential 1 stands. To the east, the site is bounded by Crompton Street and further by Crompton Hospital and offices. The site is bounded by Sunnyside Lane Street to the south and beyond that is smaller erven consisting of public open space, offices and commercial. Land use activities to the west include residential and offices.

The site extends over 2ha, it is currently zoned as administration and is currently vacant. The site enjoys good accessibility and connectivity to a diversified urban environment.

FIG 6–2: PINETOWN PILOT SITE IN THE CONTEXT OF THE DENSIFICATION FRAMEWORK
## SITE DESCRIPTION

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Description</td>
<td>Erf 10323, Pinetown</td>
</tr>
<tr>
<td>Title Deed no.</td>
<td>T5203/1991</td>
</tr>
<tr>
<td>Ownership details</td>
<td>eThekwini Municipality</td>
</tr>
<tr>
<td>SG Diagram</td>
<td>SG 999/1990</td>
</tr>
<tr>
<td>Extent of property</td>
<td>2.6923ha</td>
</tr>
<tr>
<td>Current Zoning</td>
<td>Administration</td>
</tr>
<tr>
<td>Current Land Use</td>
<td>Vacant</td>
</tr>
</tbody>
</table>

**FIG 6–3: PINETOWN PILOT SITE**
BONELA PILOT SITE DESCRIPTION

CONTEXT

The Greater Westville local area is generally characterised by medium-high density residential. This section will provide an overview of these selected sites. Evident land uses in the area include social and educational facilities. The local residential market offers opportunity for bonded or affordable rental housing opportunities. This section of the report will provide an overview of the pilot site and the proposed development.

The Bonela site is located inland, west of the Durban CBD in Westville, a residential neighbourhood characterised by lower-middle income households.

The site is bounded to the north by high density residential, an educational facility and the N3 highway. To the east and south, the site is bounded by high density residential. Land use activity to the west of the site includes a public open space and residential.

FIG 6-4: BONELA (WESTVILLE) PILOT SITE IN THE CONTEXT OF THE DENSIFICATION FRAMEWORK
### SITE DESCRIPTION

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Description</td>
<td>Remainder of Erf 221, Bonela</td>
<td>Remainder of Erf 223, Bonela</td>
<td>Erf 224, Bonela</td>
<td>Erf 225, Bonela</td>
<td></td>
</tr>
<tr>
<td>Title Deed no.</td>
<td>T12803/2007</td>
<td>T30293/2000</td>
<td></td>
<td></td>
<td>T5147/2017</td>
</tr>
<tr>
<td>Ownership details</td>
<td>Eastvale INV CC</td>
<td>KZN Department of Housing</td>
<td>eThekwini Municipality</td>
<td>Mango Beach INV 10CC</td>
<td></td>
</tr>
<tr>
<td>Extent of property</td>
<td>1.1821ha</td>
<td>0.1631ha</td>
<td>0.2876ha</td>
<td>0.4015ha</td>
<td></td>
</tr>
<tr>
<td>Current Zoning</td>
<td>Special Shopping</td>
<td>Crèche</td>
<td>Petrol Service Station</td>
<td>Special Shopping</td>
<td></td>
</tr>
<tr>
<td>Current Land Use</td>
<td>Vacant</td>
<td>Vacant</td>
<td>Vacant</td>
<td>Vacant</td>
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</tr>
</tbody>
</table>

**FIG 6–5: BONELA PILOT SITE**
The Westcliffe site is located inland, southwest of the Durban CBD, in Westcliff, a residential neighbourhood characterised by lower-middle and middle-income households.

The site is bounded to the north by the M1 Highway and beyond that the eThekwini South Western Electricity Depot. The site is bounded by Florence Nightingale Drive to the east. Land use activity further to the east of the site includes residential and a school. Residential properties bound the site immediately to the south and thereafter Florence Nightingale Drive. Further south of Florence Nightingale Drive is a small commercial precinct with sites zoned for Shops and Business. Additional sports facilities are located along the western boundary of the site.
### SITE DESCRIPTION

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Description</td>
<td>Remainder of erf 106, Chatsworth</td>
</tr>
<tr>
<td>Title Deed no.</td>
<td></td>
</tr>
<tr>
<td>Ownership details</td>
<td>eThekwini Municipality</td>
</tr>
<tr>
<td>SG Diagram</td>
<td>SG 1574/1967</td>
</tr>
<tr>
<td>Extent of property</td>
<td>29.1764ha</td>
</tr>
<tr>
<td>Current Zoning</td>
<td>Public Open Space</td>
</tr>
<tr>
<td>Current Land Use</td>
<td>Sports Fields / Recreation</td>
</tr>
</tbody>
</table>

![FIG 6–7: CHATSWORTH PILOT SITE](image)
CHAPTER  6

IMPLEMENTATION FRAMEWORK
6.1 IMPLEMENTATION INFORMANTS

To implement densification strategies, it is necessary to have clarity on the roles and responsibilities of different stakeholders in such processes. Roles and responsibilities in the implementation of the densification in the Central District must be aligned with approaches adopted for eThekwini.

STAKEHOLDERS IN IMPLEMENTATION
A preliminary set of roles and responsibilities are, however, reflected in the table that follows.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>eThekwini</strong></td>
<td></td>
</tr>
<tr>
<td>Development Planning, Environment and Management</td>
<td>• Placing densification high on the strategic planning agenda. Providing guidance for the implementation of densification.</td>
</tr>
<tr>
<td>Land Use Management</td>
<td>• Support the development of land use management systems facilitating densification.</td>
</tr>
<tr>
<td>eThekwini Transport Authority</td>
<td>• Providing an integrated transport system that supports densification (and that will also benefit from densification).</td>
</tr>
<tr>
<td>Economic Development unit</td>
<td>• Facilitate strategic investments in key nodes.</td>
</tr>
<tr>
<td>Treasury/ Real Estate</td>
<td>• Budgeting for land acquisition and related capital spending.</td>
</tr>
<tr>
<td></td>
<td>• Developing and managing incentives.</td>
</tr>
<tr>
<td></td>
<td>• Acquiring land for densification initiatives.</td>
</tr>
<tr>
<td>Housing</td>
<td>• Supporting and actively participating in all residential densification processes, specifically in areas where housing subsidies can be accessed from government.</td>
</tr>
<tr>
<td>Line Function Departments</td>
<td>• Ensuring appropriate infrastructure capacity in city networks to accommodate the proposed densification.</td>
</tr>
</tbody>
</table>

**Other government institutions**

| PRASA                         | • Providing adequate rail services.                                             |
|                              | • Maintaining and upgrading stations as required.                               |

**Government Departments**

| Provision of appropriate facilities with capacity to deal with increased densities. |

**Community / Private Sector**

| Local Landowners               | • Support densification processes.                                              |
| Community                      | • Support densification processes.                                              |
| Developers                     | • Support densification processes.                                              |
Considering the different types of areas, the roles and responsibilities of stakeholders and specifically the implementation of the incentive scheme, it is evident that implementing densification will require that institutional capacity is identified or established to manage the process. The following table explores these incentives and institutional mechanisms.

<table>
<thead>
<tr>
<th>eThekwini Incentives</th>
<th>Inclusionary Housing Incentives</th>
<th>Housing Subsidies as Incentives</th>
<th>Additional Housing Grants / Funding Mechanisms</th>
<th>Environmental Incentives / Subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax Increment Financing (TIF)</td>
<td>Tax credit schemes</td>
<td>Finance Linked Individual Subsidy</td>
<td>Social Housing Regulatory Authority (SHRA) Restructuring Capital Grant</td>
<td>The Eskom Demand Side Management (DSM) fund</td>
</tr>
<tr>
<td>Planning Gain</td>
<td>Fee-up of state land</td>
<td>Consolidation Subsidy</td>
<td>Restructuring Capital Grant (RCG) Quantum</td>
<td>The Tradable Renewable Energy Certificate (TREC) system</td>
</tr>
<tr>
<td>Fast Tracking of land Development Applications and Waiver of Development Application and Building Plan Fee</td>
<td>Town planning compliant component incentives</td>
<td>People’s Housing Process Establishment Grants</td>
<td>The National Housing Finance Corporation (NHFC)</td>
<td>Discretionary additional subsidy</td>
</tr>
<tr>
<td>Special Rating Districts</td>
<td>Density bonuses / allowances</td>
<td>Rural Subsidy</td>
<td></td>
<td>Green housing bonds (home loans)</td>
</tr>
<tr>
<td>Land Packaging and banking for targeted developments (E.g.: Affordable Housing)</td>
<td>Use right incentives</td>
<td>Project Linked Subsidy</td>
<td></td>
<td>Tax or rates rebates</td>
</tr>
<tr>
<td>Extension of the UDZ Initiative</td>
<td>Provision of bulk and link infrastructure</td>
<td>New: Finance Linked Individual Subsidy Programme (FLISP)</td>
<td></td>
<td>Renewable Energy Finance and Subsidy Office (REFSO)</td>
</tr>
<tr>
<td>A wide range of government subsidies</td>
<td></td>
<td></td>
<td></td>
<td>The Clean Development Mechanism (CDM)</td>
</tr>
</tbody>
</table>
**HOUSING DELIVERY**

This section discusses the funding and subsidies available for the different types of housing projects and typologies. The city should create a housing development agency, or fund which has as its mandate and objective to provide facilitation funding and technical support to potential developers in the sub-regions and special urban upgrade areas. Examples of agencies providing this support at national level, include the National Housing Development Agency (HDA).

<table>
<thead>
<tr>
<th>Funding &amp; Subsidy</th>
<th>Locality of project &amp; Typology</th>
<th>Typical typology</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Private Equity &amp; developer finance. Private Equity &amp; developer finance.</td>
<td>• Estate or Lifestyle Developments</td>
<td>• Densities: 40 - 60 DU/ ha (net)</td>
</tr>
<tr>
<td>• Bank Bonds and Personal Deposits.</td>
<td>• Mixed Use developments</td>
<td></td>
</tr>
<tr>
<td>• Leverage 2nd property.</td>
<td>• Exclusive Townhouse or large single property</td>
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</tr>
<tr>
<td></td>
<td>• Close to Social Amenities - Schools, Malls &amp; parks</td>
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<tr>
<td></td>
<td>• Average size - 250 m² 3 bedroom units</td>
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### Funding & Subsidy

- GPF low interest Loans and Equity
- NHFC Debt Funding
- Institutional Funding (PIC, DBSA etc)
- Gearing of Donor Funding
- Limited Government subsidy for mix social housing schemes.

### Locality of project & Typology

- Inner City/Urban - Housing Schemes
- Conversion of Office & Industrial Buildings
- Private developer or social housing institution
- Includes townhouses, row housing, multi-storey
- Walk-ups etc - average size 65 m² 1 bed.
- Densities: 120 - 200 DU/ ha (net)

### Typical typology

- Includes townhouses, row housing, multi-storey
- Walk-ups etc - average size 65 m² 1 bed.
- Densities: 120 - 200 DU/ ha (net)

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### Funding & Subsidy

- Potential for donor funding etc.
- Government Subsidised Schemes
- Accredited project is a project in which Government makes a contribution.
- Social housing primarily covers the rental tenure option and excludes ownership.

### Locality of project & Typology

- Designated restructuring zones
- Within these areas, the Capital Grant will apply
- Take the form of medium density multi-unit
- Complexes - institutional management apply.
- Includes townhouses, row housing, multi-storey
- Walk-ups etc - average size 40 m² 1 bed.
- Densities: 120-180 DU/ ha (net)
HOUSING DEVELOPMENT PROCESS

Housing will be targeted at all ranges of developers and developments, i.e. small individual second dwellings to larger housing development projects. Each development type will require different guidelines, while the following will provide a generic listing of factors that should be considered by the city in support of developers in achieving the desired objective. The key steps in the development process is highlighted below:

1. Land identification, acquisition and transfer;
2. Concept development;
3. Project feasibility;
4. Project funding and procurement;
5. Project development and implementation;
6. Sales – Rental or 3rd party ownership;
7. Building facilities management;
8. Project life cycle and recapitalisation.

The city should look to provide facilitation assistance to developers along the full length of the development process, thus maximising the success rate of housing densification planning and implementation, and also in providing the key guideline in meeting the city's own development objectives.

LAND IDENTIFICATION, ACQUISITION AND TRANSFER

There are numerous key development land areas that have been identified for development purposes. The city could identify, rezone, demarcate or acquire the land, to ensure the development proposed is affected. The key solution would be to encourage developers to develop projects on the desired development basis, i.e. to meet housing densifications suitable to the proposed affordable or social housing densification objectives.

CONCEPT DEVELOPMENT

The development concept is a key aspect of the project plans, and should highlight the proposed development in the context of the broader development area, and the overall development framework. This is an early stage plan, that will assist the developer to gain development support for the proposed scheme, and will assist the city and precinct planners to align the proposed plan with the overall objectives of the development framework.

PROJECT FEASIBILITY

The project feasibility could be enhanced if the developer is aided in the form of grant funding, technical assistance or project guidance. The city could provide this facilitation support in the form of key technical, legal and financial advice, that would feed into a project due diligence or feasibility study. This will provide further assurance to the potential funders that projects are viable and worth funding.

PROJECT FUNDING AND PROCUREMENT

Social & Affordable housing developments are unattractive to developers, as the financial yields in these projects, as a property development, is much lower than other asset classes, i.e. industrial, commercial property, etc. For housing projects to attract sufficient capital investments, technical support and development expertise, there is a requirement for financial support by government institutions in the form of the following:

- Low or no interest loans;
- Assistance with equity or quasi equity contributions (co-fund funders equity requirements);
- Affordable land;
- Grants and subsidies;
- Urban development tax incentives;
- Reduced bulk requirements and limited or no bulk contributions;
- Relaxation of town planning zoning, to increase development type;
- Upgraded service and public infrastructure;
- Intensive urban management or certainty through development precincts.

PROJECT DEVELOPMENT AND IMPLEMENTATION

The developers should implement projects once approved for funding and town planning. Developers often require technical support at this stage, with key skills like town planning, heritage, project management, project costing and contracting assistance with construction and service providers. The city should provide project technical assistance for all projects recognised and approved into the broader development scheme. This could be provided through a panel of subcontracted professional services, or through professional fee subsidies provided to these schemes.

SALES – RENTAL OR 3RD PARTY OWNERSHIP

The key step in the success of a housing development is the developers’ ability to obtain tenants or buyers into schemes. This process could be facilitated by the city, in that a credit worthy customer database could be developed for the project. The key factor however to attracting customers to an area is through the broader
provision of services in the form of transport, social and public infrastructure. The city should ensure that the need of the communities are serviced by providing an adequate mix of these services.

**BUILDING FACILITIES MANAGEMENT**
Most developer lack the expertise or the interest in providing long term management services to development projects. This key service is essential to the long term sustainability of the development, as it ensures that tenants maintain or pay for common services, that the buildings are maintained and that the community aspect of the housing group is protected, i.e. safety, security and communal co-operation. This aspect has lead to the failure of many housing projects.

Key to this element is ongoing and focused housing supervision. The developer should demonstrate their ability to service housing projects on an ongoing basis, or to provide assurance that the project will be sustained into the future, through owners maintenance levies or adequate allowance for maintenance in rental schemes.

**PROJECT LIFE CYCLE AND RECAPITALISATION.**
The project should have a life cycle plan, where consideration is given to the recapitalisation of the project after a period of time, i.e. 10 years, 15 years and 20 years. This will ensure that projects can be recapitalised into broader schemes, or sold onto bigger developers for recapitalisation. This will ensure the long term sustainability of the development area. The city could incentivise developers to improve buildings at regular intervals during the life of the development.

**URBAN MANAGEMENT**
Urban Management relates to the Municipality’s responsibility for the day-to-day operations of the city, although effective Urban Management also requires the involvement of the private sector, and of neighborhood or community organisations. The South African Cities Network SACN (2009) suggests that the functions of urban management in relation to the private sector include:

- Demarcating and regulating private spaces and ensuring that these spaces are clearly defined and demarcated;
- Service private spaces with connections to essential public services and utilities, such as water and electricity, maintain these services, and ensure that payment is made for such services.

Failure of the above has implications for property values and the ability of land and building assets to fulfill their potential value.

In terms of public spaces, the SACN suggests three primary functions of effective Urban Management:

- Regulate public spaces and maintain their public nature/utility;
- Improve, enhance and maintain public spaces and infrastructure, including public spaces, sidewalks, roads and parks;
- Govern public spaces through government, private and community inputs.

Failure to carry out these functions could result in public spaces becoming increasingly dysfunctional and alienating, with spaces becoming contested, or dormant.

Pernegger (2008) has suggested concept of Urban Management that sees a bottom level as consisting of simple, but highly visible, management functions, such as cleaning of stormwater channels, fixing potholes and removing litter.

The second level is about policing and crime prevention, whilst the highest levels are concerned with place marketing the managed area to outsiders. The shift from the lower levels (Getting the Basics Right) to the higher levels (Offering a Premium Service) requires not only increased budgetary allowances, but also a more integrated and focussed approach to service delivery, which itself is a challenge given the multiplicity of operators and service providers involved.

The success of the Central Region Densification Plan will be measured to a large extent by the success or failure of urban management in these areas over time. Creating the built form and infrastructure provides the canvas for urban living – where it is essential that day-today management ensures that these mixed-use, higher density, vibrant areas function well.

**DEVELOPMENT FACILITATION**
International experience has shown that successful Transit Oriented Development initiatives do not merely happen as a result of changes to development rights or investment in a public transport system. They require continual marketing and facilitation, very often processes that do not normally fall part of the City’s activities in development projects.
There must be a support structure in place through which public stakeholders can interact with the city and access information and support that may include:

- Guidance on development opportunities
- Guidance on favourable funding options and agencies
- Advice on sustainability options
- Targeted development initiatives
- Progress on implementation

The primary objective of the development facilitation function is to ensure that the integrity and intent of the plan remains intact throughout the implementation process and that the envisaged outcomes are achieved.

INCENTIVES FOR DENSIFICATION

The process of densification can be advanced through the provision of incentives. There are various incentives to be used by the municipality. These incentive should also focus on attracting users and residents to focus areas as the potential reduction in transport cost may not be motivation enough for these users to pay a premium and relocate.

Three aspects are relevant. They include:

- Incentives for densification (Direct and indirect)
- Disincentives to investment, and
- Incentives for attracting users / residents

INCENTIVES FOR DENSIFICATION

Direct incentives include:

- Special rating areas in terms of rating policy
- Additional development rights (zoning)
- Relaxation on requirements (e.g. parking, building lines etc.)
- Fast tracking of development applications
- Transfer of Development Rights
- Making land available

Indirect incentives may include:

- An upgraded public environment
- Improved transport systems
- Improved stations

DISINCENTIVES TO INVESTMENT

Densification can be facilitated by applying disincentives to investment in other areas. This can include:

- A moratorium on new rights
- Suspending infrastructure provision in areas on the periphery

ATTRACTION USERS / RESIDENTS

Attracting new users and residents can either be a direct result of the provision of reasonably priced housing in densification targeted areas or as a result of indirect incentives that may include an upgraded public environment, and improved transport system, and improved commuter stations and amenities.

MONITORING AND REVIEW

The densification strategy needs monitoring and review parameters to assess and measure the process of densification. This relies on institutional structuring and is focused on the strategically identified areas (sub-regions).

These performance indicators include:

- Population increase in the sub region as compared with that in other areas of eThekwini;
- Value of buildings plans (for redevelopment) contributing to densification approved in the sub-regions;
- Applications for subdivisions received within the sub-regions (outside of nodal focus areas);
- PRASA and ETA statistics for station utilisation (Railway and BRT) in the Corridor – collective for all stations;
- Overall investment by eThekwini in densification related initiatives.
- Project specific progress measured against project parameters (time, money) established action plan for nodal densification;
- Public sector capital investment to support densification;
- Private sector capital investment to support densification;
- Increase in dwelling units per hectare;
- PRASA and ETA statistics for station utilisation (Railway and BRT) in the Corridor – for specific station.