Local Area Plans:

NORTHERN URBAN DEVELOPMENT CORRIDOR

Ethekwini Municipality

Verulam-Cornubia Local Area Plan

Final

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SYNOPSIS:
Local Area Plan for the Verulam-Cornubia local area, situated in the Northern Urban Development Corridor

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QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2000.

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Verulam-Cornubia Local Area Plan
Prepared as part of the Northern Urban Corridor Study for the:

Ethekwini Municipality

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1 INTRODUCTION

1.1 Project Background and Description

The Local Area Plan for the Verulam-Cornubia area is one of three Local Area Plans prepared as part of a spatial and transport planning project for the Northern Urban Development Corridor (NUDC), situated in the northern planning area of the eThekwini municipal area. The Local Area Plans represent Phase C of the project and have emerged from a rigorous process that:

- identified the key strategic issues impacting on development in the NUDC;
- tested long term development scenarios for the NUDC; and
- developed a spatial concept for the NUDC as a whole.

The spatial aspects of this project have been undertaken in parallel to an intensive transportation planning exercise, focused around the upgrading of the R102 to accommodate the new King Shaka International Airport and Dube Trade Port and associated development that is likely to evolve in the surrounding area. The proposals of the spatial concept for the NUDC (as reflected in the three Local Area Plans) have been tested from a bulk infrastructure perspective, the results of which are contained within an Implementation Plan.

Refer to Figure 1-1 to locate this report in the overall project process.

---

1 The eThekwini Municipality appointed SSI Engineers and Environmental Consultants (Pty) Ltd (the Consultant) to undertake “The Basic Planning of Alternative Route Alignments of the R102 Including Linkages to Dube Trade Port; and Local Area Development Plans for the Northern Ethekwini Urban Development Corridor”. CONTRACT NO: DPU/FPB 0005.
1.2 Purpose

The Local Area Plan is a medium term plan that provides direction on development in the Verulam-Cornubia local area for the next 20 years to 2030. The Local Area Plan is situated within the municipality’s hierarchy of plans below the Northern Spatial Development Plan (NSDP) (refer to Figure 1-2). It provides detailed physical planning directives for the area, unpacking and refining the intentions of the NSDP at a level that can inform the review and preparation of land use schemes. It performs as part of a package of municipal policies and tools to assist in land use decision-making processes.

1.3 Structure of Report

The Local Area Plan is structured into three main sections (see Table 1-1):

- The **Strategic Assessment** (section 2) provides a strategic context for the area, reviewing the policy environment and context, and providing an overview of the area and its component parts.
- The **Development Framework** (section 3) unpacks the development vision and development concept for the area within the context of the NUDC, i.e. the future desired reality for the area. It then provides detailed development guidelines to give effect to this concept and vision.
- The **Development Plan** (section 4) provides direction on how to achieve the development concept over time, with an implementation plan indicating implementation programmes and projects.

![Figure 1-2: Ethekwini Hierarchy of Plans](image)

The purpose of this Local Area Plan is to provide a guideline document specific to the Verulam-Cornubia Local Area that will enable the Municipality to:

- guide public and private development through the identification of priority areas and interventions;
- make decisions regarding investment in services infrastructure and associated phasing; and
- give clarity and direction to developers and land owners in the area with respect to the type and intensity of development.

<table>
<thead>
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<td>Strategic Context</td>
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<td>The current reality:</td>
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<td>Snapshot of area and strategic issues and priorities.</td>
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<td>Development Guidelines</td>
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<td>Development Framework</td>
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<tr>
<td>Development Plan</td>
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<tr>
<td>Status Quo/ Current Reality</td>
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*Verulam-Cornubia Local Plan v3.1 (18 February 2011)*

2
2 POLICY ENVIRONMENT AND CONTEXT

A plethora of legislation, policies and strategies from national and provincial government govern and influence spatial planning and development. In this report we draw specific attention to the provincial and municipal planning context outlined in three strategic spatial planning frameworks which provide the strategic direction critical to the future development and growth of Verulam-Cornubia:

- Provincial Spatial Economic Development Strategy
- eThekwini Spatial Development Framework
- Northern Spatial Development Plan

Key development principles from these strategies and the national, provincial and local legislation and policy environment are then identified to guide the future development of Verulam-Cornubia in its NUDC context.

2.1 Provincial Spatial Economic Development Strategy

The Provincial Spatial Economic Development Strategy (PSEDS) has been developed within the framework of the NSDP and the Provincial Growth and Development Strategy (PGDS). The PSEDS identifies a number of nodes and corridors throughout the Province and eThekwini is identified as a Primary Node and the eThekwini/Umhlathuze corridor, as a Primary Corridor (Figure 2-1). The main focus of this corridor is to focus on the development opportunities being presented as part of the King Shaka/Dube Trade Port initiative and to create opportunities for linking and strengthening the second and first economies.

The NUDC is an integral segment of this corridor and the following priorities have been set in the PSEDS for the area:

Agriculture and Land Reform
- Protect high potential agricultural land for commercial production of high value perishable produce destined for export through airport (Umhlanga to Ballito)
- Develop agricultural potential in low income peri-urban fringe (Ndwedwe) to benefit from opportunities created by Dube Trade Port

Tourism
- Development of cultural tourism in low income peri-urban fringe (Ndwedwe)

Industry
- Fast track the development of Dube Trade Port
- Ensure the sustainable management of industrial and residential land development between eThekwini and KwaDukuza municipalities

Services
- Address land tenure issues and housing backlog
- Improve catchment management on Umgeni and secure water resources
- Provide adequate affordable housing and related services

As part of efforts to fast-track the implementation of the PSEDS, funding from Province has been made available via the KZN Corridor Development Programme, to eThekwini Municipality in order to undertake the NUDC project (incorporating this Local Area Plan).
2.2 Ethekwini Spatial Development Framework (SDF)

The SDF (Figure 2-2) identifies a number of key development principles which have been used as an overarching guideline for directing all land use, development and management strategies in the Municipality:

- **A compact city model**, underpinned by two important concepts:
  - Urban core - central urban area which generally has servicing capacity and thus opportunity for densification and support thresholds for a range of services.
  - Urban edge - a tool to curb urban sprawl, promote compaction, public transport, protect environmental assets and prevent inefficient expenditure on infrastructure.

- **Suburban Infill Areas** are those that are beyond the urban services edge boundary and where servicing limitations and challenges exist and where it is not cost effective to provide additional services.

- **Rural areas** are those areas where development is a mixture of traditional land tenure interlaced with subsistence and commercial agriculture and supported by basic infrastructure.

- **Subject to servicing and the phasing limitations on bulk infrastructure, the strategic intent of the SDF is for urban expansion to occur along the Northern Corridor of the City.**
2.3 Northern Spatial Development Plan (NSDP)

The Northern Spatial Development Plan (NSDP) attempts to translate the policy intent of the SDF into more geographically specific physical development and land use management guidelines. Key aspects of the NSDP are (Figure 2-3):

- The concept of **structuring elements** - spatial elements/ concepts such as corridors and spines, nodes, densities, lifestyle options etc. that provide a ‘toolkit’ for preparing more detailed local area plans for the NUDC.

- The concepts of an ‘urban development line’ and a ‘development phasing line’ - moving away from the Urban Edge concept.

- The identification of three parallel north-south development corridors with different characteristics and roles, i.e. Coastal, Urban Development and Rural. The **Northern Urban Development Corridor** (NUDC) is essentially a linear system of urban land use, oriented and integrally linked to multiple forms of transportation routes/spines and is serviced by a hierarchy of nodes e.g. business, industrial, social, recreation etc (NSDP, 2008).

- For planning purposes, the **NUDC comprises three local areas (LA’s)** – i.e. identifiable geographic areas within the sub-metro area which are physically and functionally connected and which display predominant and homogeneous characteristics – Phoenix-INK, Verulam-Cornubia and Tongaat-Dube DTP. Refer to Figure 2-4.

![Figure 2-3: Northern Spatial Development Plan](image-url)
The NSDP identifies the role of the Verulam-Cornubia local area as follows:

- Residential expansion zone.
- Regional Public Transportation Intermodal Terminal (Verulam)
- Mixed use, business and industry opportunity

### 2.4 Development Principles

The following development principles are articulated across the key policies and legislation governing development in the NUDC and which need to be addressed in the local area plans:

- Any planning must align with the principles contained within the National SDP
- The northern expansion of Durban is supported
- Development of NUDC has national, provincial and local policy support
- Promotion of high density living environments
- Promotion of high quality and sustainable living environments
- Clustering of economic, social and transport facilities is required to maximize thresholds and to ensure the maximum and efficient use of resources
- Fully integrated multi-modal transport systems must be promoted through the integration of land use and transportation (e.g. densification)
- Increase in mixed use/multi-use spaces
- Basic needs of citizens in NUDC must be met
- The development of the corridor requires more than just physical investment and intervention and must focus on the development of people
- Development must not compromise environmental assets
- Integrated catchment management should govern development and infrastructure services planning
- Development of the corridor must not compromise high value/potential agricultural land
- Development in corridor is not to be “business as usual”
- Focused investment to ensure sustainable and maximum impact
Emerging from the above, the **objective of the NUDC project** is summarised as follows:

*To Promote, enable and manage existing and future public and private development in the Northern Urban Development Corridor in accordance with the vision of the eThekwini Municipality.*

The **primary roles** of the Corridor may be used as guiding principles for its development and management described broadly as follows:

- **National Role** – Economic growth driver through establishment and enhancement of the national logistics platform infrastructure and linkage to global markets.

- **Provincial Role** - Connectivity between national and regional logistical and economic installations and enhancement of metropolitan capacity to enhance the provincial economy.

- **Local Roles** –
  - Enhancement of Metropolitan economic base
  - Provision of more efficient, equitable and sustainable living environments
  - Enabling a more balanced and equitable spatial development pattern in the metropolitan area.
3 STRATEGIC ASSESSMENT

3.1 Regional and Local Context

3.1.1 Regional Context

The Verulam-Cornubia local area is located within the Ethekwini-Umhlathuze provincial corridor, as defined in the PSEDS. The National Route (N2) acts as the development spine of the corridor which is anchored by the Durban Port in the south and Richards Bay port to the north, which together function as the primary logistics gateway into Southern Africa (Figure 3-1).

The main focus of this corridor is to give strategic attention to the development opportunities being presented as part of the new international airport/Dube Trade Port initiative and to create opportunities for linking and strengthening the second and first economies.

Ilembe District Municipality

Beyond the northern border of Ethekwini Municipality is the rapidly developing KwaDukuza Municipality, one of four local municipalities that make up the Ilembe District Municipality. The SDF for Ilembe echoes the development principles and concepts contained within NSDP (National) PSEDS and NSDP (eThekwini). Ilembe is also located on the eThekwini/Umhlathuze provincial corridor and identifies the R102 and N2 major transport routes as its central development axis for development and investment. KwaDukuza and Ndweni local municipalities are already gearing up to harness the development potential associated with the Dube Trade Port, particularly with reference to industrial and agri-processing opportunities linked to the Dube Trade Port.

3.1.2 Municipal Context

The Verulam-Cornubia area is the smallest of the three local areas in the NUDC, comprising 17% of the NUDC area (5,825 ha) and 10% of the Northern Municipal Planning Region (refer to Table 3-1). Verulam-Cornubia consists of the area north of Phoenix and generally south of the Mdloti River and Tongaat. It includes the Verulam Local Urban Node (Town Centre) and its suburbs including the Ottawa industrial area, and the large undeveloped area of Cornubia, owned by Tongaat Hulett. The municipality has recently purchased a significant portion of this area for development.

3.2 Demographics

8% of the NUDC population resides in the Verulam-Cornubia area, over 86,000 people, which equates to only 2% of the municipal population. The population density is close to the municipal average at 14.8 persons/ha, reflecting the large areas of undeveloped land in the area (Table 3-2).

<table>
<thead>
<tr>
<th>Local Area</th>
<th>Area (ha)</th>
<th>% of NUDC</th>
<th>% of NMPR</th>
<th>% of EMA</th>
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<tr>
<td>Verulam-Cornubia</td>
<td>5,825</td>
<td>17%</td>
<td>10%</td>
<td>3%</td>
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<tr>
<td>NUDC</td>
<td>33,665</td>
<td>56%</td>
<td>15%</td>
<td></td>
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<tr>
<td>NMPR</td>
<td>59,764</td>
<td>26%</td>
<td></td>
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<tr>
<td>EM</td>
<td>229,193</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8% of the NUDC population resides in the Verulam-Cornubia area, over 86,000 people, which equates to only 2% of the municipal population. The population density is close to the municipal average at 14.8 persons/ha, reflecting the large areas of undeveloped land in the area (Table 3-2).

<table>
<thead>
<tr>
<th>Local Area</th>
<th>Population</th>
<th>Persons/ha</th>
<th>% of NUDC</th>
<th>% of NMPR</th>
<th>% of EMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam-Cornubia</td>
<td>86,224</td>
<td>14.8</td>
<td>8%</td>
<td>7%</td>
<td>2%</td>
</tr>
<tr>
<td>NUDC</td>
<td>1,021,350</td>
<td>30.3</td>
<td>86%</td>
<td>29%</td>
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<tr>
<td>NMPR</td>
<td>1,188,432</td>
<td>19.9</td>
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<td>34%</td>
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<tr>
<td>EM</td>
<td>3,536,965</td>
<td>15.4</td>
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The population is relatively young, 37% is aged 19 or less (Table 3-3). Education levels in the area are low with only 26% having completed secondary school or post-school higher education, but levels are higher than Phoenix-INK (Table 3-4).
There are 23,430 households in the Verulam-Cornubia area, comprising only 3% of the households in the NUDC. The household density per ha is lower (4 h/h per ha) than in the NUDC as a whole (7.2 h/h per ha). Refer to Table 3-5 below.

Table 3-5: NUDC Households

<table>
<thead>
<tr>
<th>Local Area</th>
<th>Household</th>
<th>Derived Occupancy</th>
<th>HH/ha</th>
<th>% of NUDC</th>
<th>% of NMPR</th>
<th>% of EMA</th>
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<tbody>
<tr>
<td>Verulam-Cornubia</td>
<td>23,430</td>
<td>3.7</td>
<td>4.0</td>
<td>10%</td>
<td>8%</td>
<td>3%</td>
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<tr>
<td>NUDC</td>
<td>242,796</td>
<td>4.2</td>
<td>7.2</td>
<td>84%</td>
<td>28%</td>
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<tr>
<td>NMPR</td>
<td>289,105</td>
<td>4.1</td>
<td>4.8</td>
<td>33%</td>
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<td>EM</td>
<td>866,333</td>
<td>4.1</td>
<td>3.8</td>
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Residential land use (formal and informal) accounts for 22% of the area, and as with the other local areas, is primarily low-density suburban in nature. The majority of the residential development is of a formal nature.

Commercial uses are concentrated around the town centre which is nodal in nature and constrained by the R102. Commercial land uses account for 0.7%. The Verulam CBD is a sub-metropolitan node with a rich cultural history linked to the sugar cane industry in KwaZulu Natal. The CBD contains a vibrant mix of land uses and serves the rural hinterland in both commercial activities, as well as that of a transport interchange for the regional public transportation.

Industrial land use is located at Ottawa, Canelands and on the northern edges of the town centre, and accounts for 1-2% of the area.
Agricultural land uses account for approximately 50% of the local area. Large commercial sugar-cane farms under the ownership of the Tongaat-Hulett Group are located on the eastern edge of the local area towards the N2 (41%). These farms are extensive and land consumptive in nature. Mixed farming activities occur on the western edge of the area (8%) around Redcliffe. The conversion of large-scale agricultural holdings to urban land uses offers the greatest opportunity to the development of the NUDC.

As with other areas in the NUDC, open space (D’MOSS) is generally limited to river courses (apart from the Trenance Park Nature Reserve) and accounts for 12% of the area. Undeveloped fragments of land account for 9% of land use in the area.

Figure 3-2 illustrates the spatial structure of the Verulam-Cornubia local area, specifically the sub-metropolitan node of Verulam Local Urban Node (Town Centre), the industrial node of Ottawa and the large extent of undeveloped agricultural land adjacent to the N2, i.e. Cornubia.

3.4 Housing

Greenfields housing provision tends to dominate in the Verulam-Cornubia area. A key mega-project, and public-private partnership with Tongaat Hulett Developments, is the Cornubia development which is planned to generate approximately 15,000 units in the low-income housing range. The project also aims to provide for the gap and affordable housing market, and is seeking far higher densities than the current housing model provides.

The status of the eThekwini Housing Programme within the Verulam-Cornubia area is summarised in Table 3-7. Key aspects of the Programme are:

- **Upgrade projects** – 1 project is approved to the benefit of 513 poor households. A further 11 projects are planned to the benefit of 8,606 households. Together these projects will require a total investment of almost R688 million, of which R215 million will need to be raised by the Municipality as an infrastructure top-up.

- **Greenfields projects** – 1 project is approved to the benefit of 513 households. A further 6 projects are planned to the benefit of over 17,000 households. Together these projects will require a total investment of R1.4 billion, with a top-up from the Municipality of R438 million.

### Table 3-7: Housing Projects in Verulam-Cornubia

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of Projects</th>
<th>No of HH</th>
<th>Total Project Value (Rm)</th>
<th>Infrastructure Top-up (Rm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade - Approved</td>
<td>1</td>
<td>513</td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td>Upgrade - Intended</td>
<td>11</td>
<td>8,093</td>
<td>647</td>
<td>202</td>
</tr>
<tr>
<td><strong>Total Upgrade:</strong></td>
<td><strong>12</strong></td>
<td><strong>8,606</strong></td>
<td><strong>688</strong></td>
<td><strong>215</strong></td>
</tr>
<tr>
<td>Greenfields - Approved</td>
<td>1</td>
<td>513</td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td>Greenfields - Intended</td>
<td>6</td>
<td>17,017</td>
<td>1,361</td>
<td>425</td>
</tr>
<tr>
<td><strong>Total Greenfields</strong></td>
<td><strong>7</strong></td>
<td><strong>17,530</strong></td>
<td><strong>1,402</strong></td>
<td><strong>438</strong></td>
</tr>
</tbody>
</table>

3.5 Development Trends and Potential

#### 3.5.1 Development Trends

Table 3-8 provides details of development applications over the 2007-2009 period as well as information on developer’s intentions in the Verulam-Cornubia local area.

There have been few major development applications in the Verulam-Cornubia area over the 2007-2009 period. A shopping centre development and office park development is proposed in the Ottawa area and a smaller shopping centre and service station on Hammonds Farm on Jabo Ngcobo Drive (M27). Small private residential and commercial developments have been proposed within Verulam including the development of a new hotel.

Nonetheless, there is a great deal of interest in developing in the area. An EIA is underway for the large-scale Cornubia development which will yield a complete new town of at least 40,000 low to middle income units, 50 ha business park and 1,000,000m² of commercial development. Other interest for business park and industrial development south of the new international airport includes areas to the south west of Mount Moreland and Sibaya West.
Figure 3-2: Verulam-Cornubia Spatial Structure
Table 3-8: Development Applications for V/Cornubia (2007-2009) & Developers Intentions

<table>
<thead>
<tr>
<th>Formal Application Submitted</th>
<th>Industrial Hectares</th>
<th>Floor Area</th>
<th>Office/Retail/Mixed Use Hectares</th>
<th>Floor Area</th>
<th>Residential Hectares</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-9ha</td>
<td>600m²</td>
<td>1ha</td>
<td>3,000m²</td>
<td></td>
<td>1-2ha</td>
<td>185 units</td>
</tr>
<tr>
<td>1ha</td>
<td></td>
<td>2ha</td>
<td></td>
<td></td>
<td></td>
<td>600 units</td>
</tr>
<tr>
<td>90ha</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12,000</td>
</tr>
<tr>
<td>EIA for Chicken Coop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EIA Cornubia - Ottawa Flats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rezone for Slag Plant - Redcliffe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rezoning for Service Station and Offices east of Verulam (Lotus)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rezoning Service Station and Offices – Hammonds Farm (M27)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rezoning for Medical Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Development Intent (no formal application to date)

<table>
<thead>
<tr>
<th>Industrial/Business Park</th>
<th>Hectares</th>
<th>Floor Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt Moreland South Industrial (800,000m²)</td>
<td>80ha</td>
<td>150ha</td>
</tr>
<tr>
<td>Sibaya West Industrial (1,500,000m²)</td>
<td>50ha</td>
<td></td>
</tr>
<tr>
<td>Cornubia Phases 2, 3 &amp; 4 Business Park (500,000m²)</td>
<td>100ha</td>
<td></td>
</tr>
<tr>
<td>Office/Retail/Mixed Use</td>
<td>Hectares</td>
<td>Floor Area</td>
</tr>
<tr>
<td>Cornubia Phases 2, 3 &amp; 4 Commercial (1,000,000m²)</td>
<td>50ha</td>
<td></td>
</tr>
<tr>
<td>Mt Moreland South Industrial (800,000m²)</td>
<td>80ha</td>
<td>60ha</td>
</tr>
<tr>
<td>Sibaya West Offices (600,000m²)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land Use</th>
<th>NUDC ha</th>
<th>Verulam-Cornubia %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Gardening</td>
<td>64</td>
<td>0.2%</td>
</tr>
<tr>
<td>Forestry</td>
<td>6</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sugar Cane</td>
<td>9,453</td>
<td>28.1%</td>
</tr>
<tr>
<td>Other Farming</td>
<td>775</td>
<td>2.3%</td>
</tr>
<tr>
<td>Undeveloped Land</td>
<td>3,295</td>
<td>9.8%</td>
</tr>
<tr>
<td>Potential Land</td>
<td>13,592</td>
<td>40.4%</td>
</tr>
</tbody>
</table>

(Source: Landcover (2005) dataset from Ethekwini Municipality)

Table 3-9: Potentially Developable Land in Verulam-Cornubia

Table 3-10: Major Land Owners in Verulam-Cornubia
3.6 Social Facilities

The bulk of existing social facilities in the Verulam-Cornubia area are situated in Verulam and its surrounding suburbs – refer to Table 3-11. According to the Access Mapping Report, interventions in order to address backlogs have been identified as (CSIR, 2008):

- Increase capacity of 2 clinics within Verulam-Cornubia
- 1 Fire Station for Verulam
- 10 Primary Schools and 10 Secondary Schools
- No sports facilities are required (current oversupply).
- By 2020, 226ha will be required in the north area for burial space.
- There is a major backlog in the provision of parks in the whole NUDC area. 458ha is required for local parks and 150ha for regional parks.

Table 3-11: Social Facilities in Verulam-Cornubia

<table>
<thead>
<tr>
<th>Educational Facilities</th>
<th>NUDC</th>
<th>Verulam-Cornubia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Schools</td>
<td>168</td>
<td>14</td>
</tr>
<tr>
<td>Secondary Schools</td>
<td>65</td>
<td>6</td>
</tr>
<tr>
<td>Combined Schools</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Libraries</td>
<td>18</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Facilities</th>
<th>NUDC</th>
<th>VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Community Health Centres</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Primary Health Care</td>
<td>49</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sports and Recreation</th>
<th>NUDC</th>
<th>VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports field</td>
<td>121</td>
<td>4</td>
</tr>
<tr>
<td>Swimming Pools</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Indoor Halls</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Stadia</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Parks (Local)</td>
<td>261</td>
<td>18</td>
</tr>
<tr>
<td>Parks (Regional)</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>Cemetery</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Civic and Safety</th>
<th>NUDC</th>
<th>VC</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAPS Stations</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>Fire Stations</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Community Halls (ABC)</td>
<td>29</td>
<td>3</td>
</tr>
<tr>
<td>Community Halls (DE)</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Municipal Offices/Depots</td>
<td>32</td>
<td>8</td>
</tr>
</tbody>
</table>

3.7 Economic Environment

3.7.1 Overview of Employment

An overview of employment in the whole Verulam-Cornubia area indicates that approximately **44.7% of the population is economically active**, with a slightly higher percentage unemployed (47.1%). Refer to Table 3-12. At the lower income end of the spectrum the unemployment level ranges from a low of 41.1% at Canelands to a high of 73.2% at KwaSumubi. At the other end of the spectrum, unemployment ranges from a high of 19.2% at Oaklands down to a low of 7.3% at Lotusville. These numbers clearly illustrate the wide range of household living standards within this zone.

17% of employment opportunities in the NUDC are located in Verulam-Cornubia providing over 8,000 jobs (see Table 3-13).

Table 3-12: Verulam Employment Profile

<table>
<thead>
<tr>
<th>Node</th>
<th>Population</th>
<th>Econ Active</th>
<th>Econ Act %</th>
<th>Unempl</th>
<th>Unempl %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam</td>
<td>63,337</td>
<td>27,891</td>
<td>44.0</td>
<td>10,150</td>
<td>36.4</td>
</tr>
<tr>
<td>NUDC TOTAL</td>
<td>858,868</td>
<td>383,817</td>
<td>44.7</td>
<td>180,905</td>
<td>47.1</td>
</tr>
</tbody>
</table>

Table 3-13: Verulam Firms and Employment

<table>
<thead>
<tr>
<th>Economic Node</th>
<th>No. of Firms</th>
<th>No. of Employees</th>
<th>% of Local Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam</td>
<td>735</td>
<td>8137</td>
<td>17</td>
</tr>
<tr>
<td>NUDC TOTAL</td>
<td>3415</td>
<td>41123</td>
<td>100</td>
</tr>
</tbody>
</table>

3.7.2 Assessment of Economic Node

Verulam is a mixed area with household incomes ranging from very poor subsistence households to the fairly wealthy, with a predominance of middle income households. Verulam has a well developed local economy with similarities to that of Phoenix but differs in that it has a small agricultural sector, and the manufacturing sector is much smaller. Verulam is a significant employment contributor in the Northern Corridor, due largely to the well-developed retail, services and automotive sectors. The retail sector offers a comprehensive variety of goods and is proportionately larger than that of
Phoenix. The ratio of population to employer organizations is a credible 86, which under normal conditions would indicate a well-balanced local economy. This ratio is enhanced by the large number of small businesses and, the fact that 46% of those employed are able to find employment within the area. Nonetheless 10,000 people must travel outside the area daily to their places of employment.

The weakness in the economic structure of the area is the high unemployment amongst the African sector of the population. The best route to address the situation is through a combination of skills development and manufacturing growth. The ideal development area would be in manufacturing, particularly as there is suitable land available, e.g. in the Ottawa sub-area. The area is slightly disadvantaged by its location, which is a little out of the way. It does, however, stand to benefit from the new Dube Trade Port development, but road and rail linkages will need to be improved.

Table 3-14: SWOT Analysis of Verulam-Cornubia economic node

<table>
<thead>
<tr>
<th>Economic Node</th>
<th>Strengths</th>
<th>Weaknesses</th>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
</table>

In summary, the Verulam-Cornubia area plays an important economic role as middle to lower-middle income residential hub and retail and service centre. It has the potential to expand and consolidate its role as a commercial centre for the area provided that municipal support is provided to the area. However, significant employment of residents is located in nodes on the periphery of and outside the area (especially Umhlanga). Local retail and services are well developed for the local population, plus some light Industry. There is scope for light industrial/commercial expansion in the short to medium term at Canelands and Ottawa, with both requiring infrastructure enhancements. The poorly maintained and sub-optimal urban fabric with sub-optimal inter-node connectivity could be partially addressed through the planned urban centre upgrade. The Cornubia development could more than double the local population and further raise the economic profile of the area. High residential densities are essential in light of Dube Trade Port and the demand for non-residential land in the medium to longer term.

3.8 Natural Environment

A review of the environmental resources in the Verulam-Cornubia local area is provided in Table 3-15. Key issues include:

- **Open space** (D’MOSS) in the area is limited primarily to river courses and accounts for 12% of the area – with the exception of the Trenance Park Nature Reserve. Refer to plan overleaf.

- **The river catchment system** which forms part of the Ohlanga and southern extent of Mdloti catchment is under severe stress and is in poor condition. An intermediate reserve determination has been undertaken for the Mdloti Estuary. Both rivers discharge into prime coastal tourism areas of the eThekwini coastline.

- **The noise zones** associated with the new international airport will have the most impact on the Verulam-Cornubia area, particularly the area south of the airport (including Waterloo and Cornubia).

- **The visual impact** of new development will emerge over time as an issue as agricultural land is transformed for urban development, and will need attention during development approval processes.

Refer also to Figure 3-3 overleaf showing environmental sensitivity and remaining vegetation in Verulam-Cornubia LA.
Figure 3-3: Environmental Sensitivity and Remaining Natural Vegetation
Table 3-15: Environmental Resources Overview – Verulam-Cornubia

<table>
<thead>
<tr>
<th>Resource Category</th>
<th>Entire Study Area</th>
<th>Verulam-Cornubia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity (incl. protected areas)</td>
<td>• Transformed Coastal Belt Vegetation, coastal forests</td>
<td>• Trenance Park Nature Reserve</td>
</tr>
<tr>
<td></td>
<td>• Limited protected areas</td>
<td>• Small pockets of forest at western edge and adjacent to rivers/wetlands</td>
</tr>
<tr>
<td></td>
<td>• Harvesting medicinal plants</td>
<td></td>
</tr>
<tr>
<td>Water And Catchment Management</td>
<td>• All river systems receive water from treatment works</td>
<td>• Ohlanga (poor)</td>
</tr>
<tr>
<td></td>
<td>• Poor condition of all rivers</td>
<td>• Mdloti on border with Tongaat-DTP (changes from good to poor past Verulam)</td>
</tr>
<tr>
<td>Rivers (health)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estuaries (health)</td>
<td>• Poor condition and some highly degraded</td>
<td>• Ohlanga (poor)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mdloti (poor)</td>
</tr>
<tr>
<td>Wetlands</td>
<td>• Along most watercourses</td>
<td>• Along most watercourses</td>
</tr>
<tr>
<td></td>
<td>• Often degraded and under stress</td>
<td>• Often degraded and under stress</td>
</tr>
<tr>
<td>Impoundments</td>
<td>• Most dams outside study area</td>
<td>• Hazelmere (Mdloti) (outside study area)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SASA dam next to Phoenix Highway interchange on R102</td>
</tr>
<tr>
<td>Open Space</td>
<td>• 589.8ha identified for social purposes</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>• Sugarcane dominates</td>
<td>• Sugarcane</td>
</tr>
<tr>
<td>Heritage</td>
<td>• Cultural resources, mostly structures, throughout the area</td>
<td>• Local cultural structures in Verulam</td>
</tr>
<tr>
<td>Disaster &amp; Risks</td>
<td>Climate Change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Warmer, more intense rainfall</td>
<td></td>
</tr>
<tr>
<td>Mining &amp; Quarrying</td>
<td>• Sand mining in the rivers and estuaries</td>
<td>• Quarrying west of Verulam</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air quality</td>
<td>• Burning sugarcane</td>
<td>• Burning sugarcane</td>
</tr>
<tr>
<td></td>
<td>• Airport operations</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>• Noise impact from new international airport at DTP</td>
<td>• 45-65dB contour affects Mt. Moreland, Cornubia</td>
</tr>
</tbody>
</table>

3.9 Transport

3.9.1 Regional Transport Context

The land use corridor and the transport corridor in the Northern Urban Development Corridor are effectively one and the same. Development has occurred over the years along nodes linked through the north-south rail line and the provincial road R102 and the national road N2 between and Durban and Richards Bay. The transport corridor provides access from the north of the province (e.g. Stanger, Richards Bay) and the north east of the country and abroad (e.g. Swaziland, Mozambique) to the eThekwini Metropolitan area and vice versa. In addition the transport corridor provides access to and from the nodes within the area. Generally this transportation network provides good access to all the residential, commercial and industrial activities within the NUDC as well as outside the area.

3.9.2 Public Transport System

The existing Public Transport System consists of a north-south rail corridor linking Stanger via Tongaat, Verulam, Mt Edgecombe and KwaMashu to the CBD of Durban. In addition to the rail line the movements within the study area and to destinations outside the study area are serviced by bus and mini taxi.

Several critical issues currently face the existing public transport (PT) service provision including:

- Escalating subsidy and declining levels of service for the formal commuter bus industry.
• Decreasing ridership, profit margins and aging fleet for the informal/unsubsidised commuter bus industry.

• Over trading, decreasing profit margins, ageing and unreliable fleet and ongoing violence remain issues within the minibus taxi industry.

At an overall system level, direct competition between modes leads to loss of profits across all modes, deterioration in service provision and subsequent loss of public transport patronage.

In the NUDC corridor study area 185 public transport facilities can be found, of which 164 are bus/taxi ranks and 21 are railway stations (CPTR 2004). The Verulam-Cornubia local area has the smallest share of public transport facilities in keeping with its relatively smaller population size and density – 20 bus/taxi ranks and 2 railway stations. Refer to Table 3-16.

Table 3-16: Public Transport Facilities for Verulam-Cornubia area
(Source: CPTR 2004)

<table>
<thead>
<tr>
<th>Public Transport Facilities</th>
<th>Entire NUDC area</th>
<th>Verulam-Cornubia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount</td>
<td>%</td>
</tr>
<tr>
<td>Bus/Taxi Ranks</td>
<td>164</td>
<td>100%</td>
</tr>
<tr>
<td>Railway Stations</td>
<td>21</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>185</td>
<td>100%</td>
</tr>
</tbody>
</table>

Rail Ridership
Table 3-17 depicts the passengers boarding and alighting for the years 2004 and 2008 at the railway stations north of the Umgeni River to Stanger for a weekday. It can be concluded that the number of passengers have increased at almost all the stations on this railway line. Improvement of service, improvement of security and the relatively low fares are the most likely explanation for this increase in train ridership over the 4 year period.

Table 3-17: Rail Passengers for Stations North of the Umgeni River
(Source: Rail Census 2006 and 2008)

<table>
<thead>
<tr>
<th>Passengers per weekday</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 - board</td>
</tr>
<tr>
<td>2008 - board</td>
</tr>
<tr>
<td>2004 - alight</td>
</tr>
<tr>
<td>2008 - alight</td>
</tr>
</tbody>
</table>

Rail Infrastructure
The rail infrastructure in the eThekwini Metropolitan area is shared between passenger and freight transport. The rail line north of Mount Edgecombe has ample spare capacity. However, capacity on the section south of Mount Edgecombe (currently at 81% utilisation) needs to be increased to utilize the spare capacity further north. Transnet has indicated that the freight services on the north south line are likely to increase due to forecasted increase of freight movements between the Ports of Durban and Richards Bay as well as to provide an alternative for the Durban – Gauteng Corridor rail line. Prasa and Transnet have executed a Rail Capacity Study for the eThekwini Metropolitan Area, and have identified a number of solutions to address the current constraints.

Bus/Taxi Ridership
Table 3-18 below identifies the origins and destinations of bus and minibus taxi trips during the morning peak per public transport priority zone. During the morning peak 6,600 bus and minibus taxi trips have their origins in Verulam. As a destination Verulam attracts 8,200 trips; 30% of the road based public transport trips in the NUDC. Verulam has balanced origins and destinations explaining that it is a public transport node and therefore a major destination from the rural areas.
Table 3-18: Road Based Public Transport Trips during Morning Peak Hour
Source: eThekwini Public Transport Restructuring (October 2008)

<table>
<thead>
<tr>
<th>Priority Zone</th>
<th>Origin</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam</td>
<td>6,600</td>
<td>8,200</td>
</tr>
<tr>
<td>Verulam-Cornubia Total:</td>
<td>6,600</td>
<td>8,200</td>
</tr>
<tr>
<td>NUDC Total:</td>
<td>101,200</td>
<td>27,300</td>
</tr>
</tbody>
</table>

Bus/Taxi Infrastructure
Apart from the taxi and bus ranks, road based public transport in the area has no dedicated infrastructure. Figure 3-4 below shows the current road based mini bus taxi and bus lines in the NUDC. Bus and minibus taxis are using similar routes and are competing for the same passengers. On the north-south corridor minibus taxis are competing with rail as well. In general, the minibus taxis are fully utilized with little or no spare capacity left during the morning peak hour on almost all the routes. The majority of bus routes show a similar pattern. Buses and minibus taxis share the road with private vehicles and experience similar delays during the peak hours on congested road sections and intersections.

Planning for the Future
Strategic considerations for public transport in the NUDC are as follows (IRPTN Scoping Study):

- The north-south rail corridor between KwaMashu and Umlazi is the logical backbone to the ETA public transport system (in terms of national policy the eThekwini IRPTN);
- Current peak period rail demand of 40,000 can be expanded through rail service capacity improvements and by providing effective feeder and distributor services up to about 30,000 passengers per direction per hour. This means that ultimate peak capacity is probably 60,000 to 70,000;
- Peak rail capacity is significantly short of overall peak period demand for public transport of 144,000 in the north-south corridor (KwaMashu, Inanda, Verulam and Tongaat,).

The IRPTN Scoping Study and the study ‘Restructuring of PT services’, identified the need for thorough integration of public transport networks and an increase of public transport for the NUDC. The IRPTN Scoping Study suggests the phasing, trunk length and first cost estimates based on Bus Rapid Transit (BRT) standards. The infrastructure costs for implementing an IRPTN system within the Metropolitan area north of the Umgeni River was estimated in the (eThekwini IRPTN Scoping Study, 2008) at R 2.5 Billion. ETA is currently developing an Integrated Rapid Public Transport Network & Services Plan that will incorporate a development scenario identified in the NUDC study.

Tongaat Hulett and Dube Trade Port have suggested alternative alignments for a BRT or Light Rail Transit (LRT) route linking Cornubia with the KSIA and with Umhlanga Town Centre and Gateway.

3.9.3 Road Network

Current National and Regional Road Network
Figure 3-5 illustrates the current road network for the whole NUDC area. Key elements of the network are:

- The main north–south roads N2 and R102 and the extension to Pinetown / New Germany with the MR577 (Dumisani Makhaye Drive).
- Several east-west arterials such as Curnick Ndlovu (KwaMashu Highway) (M25), Queen Nandi Drive (M45), Inanda Road (M21), Mount Edgecombe Highway (M41) and Phoenix Highway in the Phoenix-INK local area, which link to the north–south roads.
- In the Verulam-Cornubia area the east-west link consists of Jabu Ngcobo Drive (M27).
- The Tongaat/Dube area is served by the east–west link Ushukela Drive (Watson Highway) (M43) and with the Ballito Drive, just north of the eThekwini Municipal Border.

The relative classification of roads in the Verulam-Cornubia area is shown in Table 3-19.

Table 3-19: Roads in the Study Area Categorized by Classification
(Source: KZN DoT)

<table>
<thead>
<tr>
<th>Class of Road</th>
<th>Entire NUDC area</th>
<th>Verulam-Cornubia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>length (km)</td>
<td>%</td>
</tr>
<tr>
<td>1 Primary Distributor</td>
<td>90</td>
<td>100%</td>
</tr>
<tr>
<td>2 Regional Distributor</td>
<td>57</td>
<td>100%</td>
</tr>
<tr>
<td>3 District Distributor</td>
<td>161</td>
<td>100%</td>
</tr>
<tr>
<td>4 District Collector</td>
<td>191</td>
<td>100%</td>
</tr>
</tbody>
</table>
Figure 3-4: Public Transport Routes and Facilities
Figure 3-5: NUDC Transportation Network
Current Constraints

Heavy traffic & Toll on N2
The N2 north of Tongaat is a toll road. Some road users, including heavy traffic, do not to pay the toll and use the alternatives R102 or M4 for the north – south movements to Durban with the following results:

- There is significant deviation by heavy traffic onto the M4 through Umhlanga to the port of Durban that is causing congestion and concern.
- A further diversion area is the R102 via Ottawa, Tongaat, and further north outside the study area (New Guelderland) to avoid weighbridges and toll plazas.

Regional and Metropolitan Infrastructure

- On the R102, the intersection with the Phoenix Highway experiences poor levels of services. The projected solution ('Partial Interchange') as part of the upgrade of the R102 has been delayed due to lack of funding.
- R102 - demand exceeds capacity at selected intersections
- M41 - demand exceeds functional capacity
- N2 - through capacity affected by limited I/C capacities – overall operation close to capacity
- M4 - at limit of capacity along certain sections

The first two problems are currently being addressed by increasing the capacity on the M41 and the R102 corridor.

Planning for the Future

The committed and planned road infrastructure relevant to the study area is listed in Appendix A. During the next stages of this study these proposals will be tested on alignment, capacity and program for implementation related to forecasted land use development pace.

3.9.4 Local Traffic and Transportation Issues

Verulam CBD
The R102 serves as a sub-regional connection providing access for Verulam to the broader region. In the west there are two main roads which intersect the R102 into Verulam namely Inanda Road and Todd Street. These roads connect the residential component of Verulam to the Town Centre. In the east Jabu Ngcobo Drive (M27) connects the town to surrounding areas. The internal system within Verulam generally comprises a traditional grid system, making movement through the town relatively simple and offers users choice.

Transportation Issues and Constraints for Verulam

- A major drawback of the town from a movement point of view is the limited connections to the R102 corridor. The central artery (Wick Street) of the town presently terminates in the north effectively rendering the Town Centre as a large urban cul-de-sac.
- Consequently the Town Centre has limited accessibility and lacks interceptory characteristics. It is unable to be attractive to passing movements. In addition, different movements and access to the various clusters of the Frame and to the Core have to share the limited movement system.
- Traffic movements for shopping to the Core and goods related traffic have to share the same roads and use the same roads for access and exiting
- Pedestrian circuits are well handled through the Core on both sides of the major roads as a consequence of previous urban improvement and landscaping initiatives. The pedestrian routes in the form of lanes and arcades are not clear and lack clear visible paths for pedestrian movement.
- Parallel and right angled parking is well handled in the Core of the Town Centre. Access to the internal parking areas lacks visual clarity and ease of use. In addition, integration of the internal parking areas would facilitate improved movement and access.
- There is a clear need to create a second alternative ingress and egress from the Town Centre, especially to separate goods vehicles from pedestrian related activities.
- The bus/taxi terminal is well located in a cluster at the edge of the Core. However, it is clearly too small and there is a need to consolidate, enlarge and formalise the taxi ranks, as well as to integrate or interrelate it with the bus facility.

Table 3-20 summarises the essential traffic & transportation issues in Verulam.
<table>
<thead>
<tr>
<th>CORE ISSUE</th>
<th>DESCRIPTION</th>
<th>IMPLICATIONS FOR PLANNING &amp; DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road pavement Conditions</td>
<td>The Town Centre road network is predominantly in good condition, with localized areas where immediate attention is warranted. The road pavement condition of the district collector routes in the vicinity of the study area is in poor condition and requires attention.</td>
<td>Poor pavement conditions decreases user comfort, increases travel times and poses safety threats. It therefore makes the access to Verulam Local Urban Node (Town Centre) less attractive and deters trips. Rehabilitation, maintenance and upgrades required to redress this.</td>
</tr>
<tr>
<td>Pedestrian Facilities</td>
<td>Numerous accidents and high risk of collision</td>
<td>Improved pedestrian facilities are required throughout the Verulam Local Urban Node (Town Centre) to facilitate safe movement of pedestrians and reduce existing accident trends. Gear the city core to accommodate pedestrians.</td>
</tr>
<tr>
<td>Public Transport</td>
<td>The Verulam Town Centre is serviced by rail, bus and mini-bus taxi services, making the area highly accessible by public transport. Due to the high levels of public transport provision, the Verulam Local Urban Node (Town Centre) acts as a transportation hub which serves not only Verulam but also surrounding residential and rural areas. High levels of public transport trips suggests that the area is utilized as a local economic centre and a transfer node to the northern region of the Municipality.</td>
<td>The eThekwini Transport Authority is currently undertaking a process to restructure the public transport system of the Municipality. An Operational Design for the system was completed by Goba in September 2008, proposing the use of mini-bus taxi feeder services into the Verulam Local Urban Node (Town Centre) and movement of persons to other locations in the municipality via rail and bus line haul services.</td>
</tr>
<tr>
<td>Regional and Local Accessibility</td>
<td>The Mdloti River, R102 (MR2) and rail line impedes movement and limits accessibility between the study area and the surrounding residential areas.</td>
<td>These divides are currently crossed at isolated points, thereby providing limited integration or permeability between Verulam Local Urban Node (Town Centre) and surrounding local areas.</td>
</tr>
<tr>
<td>Todd Street and the MR79 form two of three major district distributors that service the Verulam Local Urban Node (Town Centre).</td>
<td>This through traffic results in unnecessary congestion and vehicular movement through the major access into and out of the Town Centre.</td>
<td></td>
</tr>
<tr>
<td>Local Roadway Capacity</td>
<td>The R102 (MR2), MR79 (M27-Jabu Ngcobo Drive) and Todd Street district collector routes are currently experiencing traffic demands at close to their theoretical capacity.</td>
<td>This could impair future development and growth in the study area especially if the Verulam Local Urban Node (Town Centre) is to rely on a wider market area t to ensure sustainability.</td>
</tr>
<tr>
<td>Modal Split</td>
<td>Verulam currently has a large public transport patronage (47% out &amp;62% in).</td>
<td>Current public transport modal split should be maintained and improved upon. This must be achieved through improved levels of service to attract a greater person trip market share.</td>
</tr>
</tbody>
</table>
3.10 Bulk Water Infrastructure

Bulk potable water is supplied into Verulam-Cornubia from:

- **Midmar Water Treatment Works**, owned and operated by Umgeni Water, via the Western Aqueduct, into the Phoenix-INK area and through to the Mount View, Everest Heights and Trenance zones of the Verulam area. Current capacity of the works is 250ML/day. Investigations into upgrading the capacity of the works to 375ML/day are underway.

- **Hazelmere Water Treatment Works**, owned and operated by Umgeni Water, that supplies into the Waterloo and Grange reservoir zones in the Verulam area. Current capacity of the works is 44ML/day. Investigations into upgrading the capacity of the works to 90ML/day are underway.

Existing storage reservoirs in the study area, owned and operated by eThekwini Water and Sanitation have a total reservoir capacity for the Verulam-Cornubia area of just over 48 ML. There are over 19,000 metered connections in the area, of which the majority are domestic. Refer to Table 3-21 below, and Bulk Water Plan Figure 3-6 overleaf.

<table>
<thead>
<tr>
<th>Local Area</th>
<th>Reservoir Capacity (ML)</th>
<th>Metered connections</th>
<th>Domestic</th>
<th>Non-Domestic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam-Cornubia</td>
<td>48,267</td>
<td>19,222</td>
<td>18,591</td>
<td>631</td>
</tr>
<tr>
<td>Total NUDC</td>
<td>415,347</td>
<td>146,653</td>
<td>143,024</td>
<td>3,629</td>
</tr>
</tbody>
</table>

New Storage Reservoirs proposed in the Verulam-Cornubia area will ultimately increase reservoir capacity by well over 142 ML, as shown in Table 3-22.

<table>
<thead>
<tr>
<th>Local Area</th>
<th>Reservoir/ Reticulation Zone Name</th>
<th>Ultimate Reservoir capacity (ML)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam-Cornubia</td>
<td>V/C Total:</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>Mamba Ridge</td>
<td>tba</td>
</tr>
<tr>
<td></td>
<td>Blackburn (initial)</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Blackburn (ultimate)</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Trenance 1</td>
<td>tba</td>
</tr>
<tr>
<td></td>
<td>Waterloo</td>
<td>15</td>
</tr>
<tr>
<td>NUDC</td>
<td>NUDC Total:</td>
<td>188</td>
</tr>
</tbody>
</table>

Currently, two major upgrades to the trunk network are being investigated:

- **The Northern Duffs Road to Waterloo Pipeline.** This will have a take-off from the Western Aqueduct upstream of where this crosses the Umgeni River and will traverse Newlands, Kwa Mashu, and Phoenix prior to reaching the Waterloo reservoir in Verulam. Preliminary investigations indicate that this may be a ND 800 pipeline.

- **The augmentation of the Northern Aqueduct Pipeline** to ensure adequate supply to the proposed Cornubia Township and the northern reaches of the eThekwini Municipality area.

Strategic Water Supply Issues

- Constraints to future development generally relate to the supply of bulk potable water and not in the infrastructure for storage and delivery.

- EWS officials are of the opinion that restrictions to supply via the Western Aqueduct are limited to timing of the implementation of new infrastructure and that water resources are not an issue.

- EWS has expressed a concern that, notwithstanding the raising of the wall, Hazelmere Dam may silt up with routine flooding as no silt traps were ever installed upstream of the dam. This could potentially lead to a reduction in the assured yield from the dam.
Figure 3-6: Bulk Water
Currently spare capacity in most of the city’s reservoirs is generally less than 48 hours. Augmentation of existing reservoirs and the construction of additional new storage capacity are required.

The reduction of water loss is a key city priority, through the following initiatives:

- A multi-million rand project for the replacement of all old small diameter AC reticulation mains.
- The identification and ring-fencing of reservoir supply areas into discrete zones, upgrading of the bulk and sales meters and pressure reduction to limit real water losses.

EWS officials expressed concern at the perceived ad-hoc manner in which planning and implementation of new development has previously taken place resulting in an uncoordinated approach to planning for new bulk water infrastructure.

3.11 Bulk Sanitation Infrastructure

There are two existing wastewater treatment works that treat effluent draining from the Verulam-Cornubia area providing a total capacity of 15.96 ML/day, with an average flow of 7.72 ML/day, as indicated in Table 3-23 below and Figure 3-7 overleaf.

The following new wastewater treatment works infrastructure will be constructed in the future:

- A new Mdloti regional works with a capacity of 53 ML/d. This capacity is based on the outcome of the environmental reserve determination for return effluent discharge into the estuary and is inclusive of all discharges from Verulam, Genazzano, Umdloti works, etc.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam-Cornubia</td>
<td>7.72</td>
<td>14.3</td>
<td>2.4</td>
<td>15.96</td>
<td>7.72</td>
</tr>
<tr>
<td>Verulam</td>
<td>6.16</td>
<td>12.5</td>
<td>nil</td>
<td>13.7</td>
<td>6.16</td>
</tr>
<tr>
<td>Umdloti</td>
<td>1.56</td>
<td>1.8</td>
<td>2.4</td>
<td>2.26</td>
<td>1.56</td>
</tr>
<tr>
<td>Total NUDC:</td>
<td>159.94</td>
<td>189.1</td>
<td>126.08</td>
<td>177.51</td>
<td>159.94</td>
</tr>
</tbody>
</table>

The following works, current average dry weather flows given, will be decommissioned:

- Verulam (6.16 ML/d) - flows will be diverted to the new Mdloti regional works.
- Umdloti (1.56 ML/d) - flows will be diverted to the new Mdloti regional works.

Strategic Sanitation Issues

- Due to the limitations in effluent return discharge into the Mdloti and Tongati estuaries, sewage yield from the catchments in excess of these amounts will need special management, e.g. effluent reclamation and re-use or some inter-catchment transfer.
- Development should proceed upwards and outwards from the treatment works to improve efficiency of development of the sewerage infrastructure network. This seldom happens, very often due to non-technical decisions or allowances being made with regard to these developments. This normally impacts negatively on optimizing capital expenditure for the treatment works and associated infrastructure.
- Upgrading of existing or development of future wastewater treatment works will, generally, be a balancing act to determine as and when the saturation point with new development is reached.

3.12 Investment in Verulam-Cornubia

Over the 2009/10 to 2012/13 period, Verulam-Cornubia will receive approximately 16% of the NUDC portion of the municipal capital budget – just under R600 million - broken down as follows:

- Housing – R405 million (72%)
- Local infrastructure – R127 million (23%)
- Community Facilities – R18 million (3%)
- Economic Development – R9 million (2%)
Figure 3-7: Bulk Sanitation
Refer to Table 3-24 below for the annual breakdown.

Key strategic projects and interventions in the area over the period include:

- Cornubia Housing Development - Phase 1: R216 million; Phase 2: R73 million
- D403 link road to Verulam – R33.5 million
- Verulam Fire Station – R9 million
- Verulam Local Urban Node (Town Centre) Renewal – R9 million
3.13 Key Strategic Issues

In Section 2, the report detailed the legal and policy context which must guide and direct future development in the Verulam-Cornubia LA, and summarised these into a number of key development principles. Section 3.1 – 3.12 provided an overview of the area, exploring its key attributes and issues that need to be considered. Section 3.13 now condenses this information into key and critical aspects that will provide strategic direction and informants for the preparation of the spatial development plan and associated transportation and infrastructure plans.

a) Key Spatial Expansion Drivers

- The LA should accommodate and/or support where appropriate the development objectives of the KSIA/DTP “Aerotropolis” concept
- The public housing programme should be reviewed and aligned to support the development of the corridor
- Climate change implications should be considered in the planning and development of the open space system of the LA
- The need to protect agriculture land in the hinterland west of the study area

b) Key Constraints

- Noise zones resulting from the establishment of the airport
- Topographic constraints associated with the Ohlanga and Mdloti Rivers will limit options for north south movement corridors

b) Key Issues

- Low density urban sprawl and a fragmented development pattern threaten efficient and sustainable development and also the erosion of agricultural and sensitive environmental assets west of the study area.
- The overall visual amenity of landscape and townscape is poor as a result of increasing impacts on the natural assets base and the proliferation of low density mono functional housing typologies
- The undirected expansion of the northern areas threatens the identity of the town of Verulam and its associated neighbourhoods
- The role of the Verulam CBD as a commercial and service centre is being increasingly eroded by the establishment of regional shopping and business centres
- The existing fragile natural environmental assets are under increasing pressure from low density and fragmented urban expansion
- There is limited connectivity with the new airport and trade port and to surrounding metropolitan and national transportation networks
- Low residential densities result in low thresholds for public transport, community facilities and commercial activities
- Lack of a variety of housing opportunities for low and middle income families in close proximity to the new “Aerotropolis”
- High levels of unemployment and high percentage of low income families
4 SPATIAL DEVELOPMENT FRAMEWORK

4.1 Emerging Spatial Structure of Ethekwini

The spatial structure of the Ethekwini Municipality Area (EMA) is changing. Whereas previously the structure was focused primarily around the CBD, the Port and related South Durban Basin and the Pinetown New Germany hubs, the structure is reforming and new key strategic zones/hubs are emerging on the outskirts of the Municipality. The new King Shaka Airport and Dube Trade Port have established themselves in the north and Cato Ridge in the west is growing in importance (Figure 4-1).

These emerging zones/hubs have strategic significance to the City in that they are major drivers and locations of economic growth and employment creation and play an important role in the logistics platform of the EM and the national logistics platform for South Africa. Each has a different role. The City and Port are the business engine of Durban focussed around transportation, maritime industry and business support, the SDB’s role is to support the Port and forms the petrochemical hub, the West will to support road based logistics and industrial development whilst the new northern hub will provide the air-based logistics installations and related supportive industrial and business development.

The four zones and hubs of the EM collectively form the largest and southernmost node of the Ethekwini-Umhlathuze Provincial development corridor.

In order to respond to the emerging development pattern, a balance between national and metropolitan efficiency imperatives and those of City residents is required. Accordingly, the desirableness and attractiveness of the EMA as a destination of choice for doing business, for living and for visiting should also be protected and enhanced.

All of the above should be contemplated within a sustainable spatial and physical development framework that protects scarce resources (i.e. environmental and agricultural assets) and which builds in a capacity to accommodate climate change implications.

The NUDC, and subsequently the Verulam-Cornubia LA, must be understood within this development context. The north is moving away from being an area that accommodated high income residential expansion, the relocation of the offices sector to the Umhlanga Ridge and public housing projects. The north is changing into a more complex and integrated development region, a region that engages with the new national and metropolitan logistics imperatives.

The NUDC project is about ensuring an appropriate spatial response to this context.
4.1.1 Verulam-Cornubia Local Area

The Verulam-Cornubia LA is located within the NUDC, a key structuring component of the Northern Municipal Planning Region of Ethekwini. The LA is located in the centre of the corridor (Figure 4-2).

Figure 4-2: Verulam-Cornubia LA within NUDC Study Area

4.2 Strategic Spatial Structuring Directives

In order to respond to the transforming structure of the City a number of levels of development guidelines are required and which together form an overarching spatial development framework. These guidelines include the following:

1. Strategic and metropolitan level Spatial Structuring Directives (i.e. macro level land use guidelines) – contained in the EM Spatial Development Framework (SDF) and Integrated Development Plan (IDP) (CHAPTER 4)
2. Development Control Guidelines (i.e. land use management guidelines and controls) – contained in Town Planning Schemes and Bylaws (CHAPTER 4)
3. Implementation and Phasing Guidelines i.e. a land release strategy and associated infrastructure development programme – Integrated Development Plan (IDP) plans and budgets (CHAPTER 5)

This chapter contains sub-metropolitan level strategic spatial structuring directives and development control guidelines whilst the implementation and phasing guidelines are contained in Chapter 5.

The strategic spatial development strategies for the NUDC include the following:

- Provide for economic development and growth and accommodate the population expansion that is anticipated in the northern areas of the metropolitan area
  - Provide for well located and well serviced economic areas
  - Provide for well located and well serviced residential areas
- Creating a More Efficient Urban Form
  - Establish an Urban Development Line and Development Phasing Line
  - Promote and encourage densification
  - Encourage a transit-orientated urban development form
- Creating Structure and Identity
  - Clarify Sub-Area Roles in terms of their national, metropolitan and/or local significance
  - Provide for a Variety of Lifestyle Options
4.3 Development Concept for Verulam-Cornubia

4.3.1 Vision

The Verulam-Cornubia LAP is an important component of the NUDC and will be integrated into this mixed use development corridor through consolidating existing and anticipated future population and economic growth in the northern metropolitan area into a spatial pattern that enhances the roles and characteristics of established nodes and neighbourhoods with Verulam. The area has the capacity to absorb a large percentage of expansion to the north and Durban and the potential exists to develop a new town, Cornubia.

It will do this through the integration of existing development with new opportunities for housing, business, industry, commerce and logistics through an efficient transport oriented urban form and through transportation systems and networks will be multi modal and will promote the increased use of public transportation and accommodate the efficient movement of freight.

The urban form will be more compacted and structured and it will be punctuated by an integrated open space system that provides for the protection of biodiversity and for the recreational and cultural needs of the local and metropolitan population, whilst enhancing the resilience of the natural systems and local communities with respect to the implications of global environmental change.

The relatively undeveloped state of most of the land within the study area and most of the sub-areas within it, provide the opportunity to establish a settlement structure and form that will be distinctive and which sets a new precedent for the way living and working environments are developed and managed.

4.3.2 Spatial Development Strategies

The spatial development strategies for the Verulam-Cornubia LA are as follows:

a) Protection

- **Contain and prevent urban sprawl** from eroding the metropolitan agricultural and environmental asset base located to the west of Verulam
- **Protect and where possible enhance and expand the natural asset base** contained in the river systems of the Ohlanga and Mdloti Rivers so as to maximise opportunities for local and regional recreation, environmental services provision and to support climate change mitigation initiatives

b) Expansion

- **Promote the establishment of the area of Cornubia as a new town** to accommodate expansion of residential areas and associated economic activity in the north
- **Provide for improved and additional private and public transportation network elements that will effectively link and integrate the two towns of Verulam and Cornubia** into the networks of the central, southern and western metropolitan areas and which will provide for efficient separation of regional, metropolitan and local traffic

c) Consolidation

- **Consolidation, expansion and redevelopment of the town of Verulam** as an identifiable and discrete town providing a balanced living environment for existing and future new residents in the north
- **Consolidation of environmental assets** contained in Ohlanga and Mdloti catchments into an integrated open space systems that will provide for biodiversity conservation and enhancement and for the recreation needs of the population.
d) Creation

- Provide capacity through existing and new transportation networks for *increased and improved public transportation options* to serve the existing towns and neighbourhoods and proposed new town

- Promote *higher net densities* in residential areas through the identification of land for a wider mix of housing types that cater for a mix of income groups and lifestyle options

4.3.3 Spatial Development Concept

The vision, roles and objectives for the Verulam-Cornubia LA are articulated in the following spatial development concept diagrams and explained in text that follows. This concept provides the overarching rationale for the more detailed spatial framework plans.

A summary of the spatial concept is provided in Figure 4-3 to Figure 4-7.
**Figure 4-3: Elements of Spatial Concept - UDL & Compaction**

- Establish and enforce urban development line (UDL) west of Verulam-Cornubia to protect agricultural assets and environment assets and to promote more efficient development of urban areas within the corridor.

- Increase overall net residential densities within the various neighbourhoods of the local area to create increased thresholds for public transportation, provision of services and creation of improved economic opportunities.

**Figure 4-4: Elements of Spatial Concept - Integrated Open Space System**

- Protect and consolidate the open space systems associated with the river systems to provide for local and regional recreation needs.

- Develop the open space network as a system to maximise the delivery of environmental services provision and to support climate change mitigation initiatives.
Figure 4-5: Elements of Spatial Concept - Nodes & Expansion Areas

- Provide for urban expansion through the expansion and consolidation of the town of Verulam
- Protect and consolidate Verulam Town Centre as a sub-metropolitan service centre
- Provide for urban expansion through the establishment of a new town at Cornubia

Figure 4-6: Elements of Spatial Concept - Transportation Network

- Protect and enhance regional mobility through the identification of a clear road hierarchy
- Consolidate R102 as a transit oriented multi-modal development spine
- Establish the northern expressway as a new north-south link
- Establish new east-west transport links to create a regional accessibility and mobility grid
- Provide for the proposed new north-south transit oriented multi-modal spine to connect Phoenix and INK in the south with the “Aerotropolis” and Ilembe in the north
Figure 4-7: Summary of Spatial Concepts for Verulam-Cornubia LA
a) Accommodate Economic Development and Growth and Accommodate Population Expansion

Provide Well Located and Well Serviced Economic Areas
Identify and establish new areas to accommodate anticipated economic growth in a manner that reinforces the objectives of compact city growth so as to contribute to the restructuring of the northern areas of the metropolitan area. The areas need to be sufficient to accommodate anticipated growth and development of the metro in relation to the anticipated growth pulses of the new “Aerotropolis”.

They need to be located in a manner that takes cognisance of the existing servicing infrastructure whilst also providing direction as to where new infrastructure is to be provided if the compact city objectives are to be achieved.

Provide Well Located and Well Serviced Residential Areas
Existing and new residential areas need to be provided that will meet the anticipated growth of metropolitan population that will locate in the in the northern metropolitan areas

These areas need to be restructured and or located in a manner that increases and improves their connectivity to the metropolitan systems of opportunity in terms of employment and social services

As with economic areas these areas need to be located in a manner that takes cognisance of the existing servicing infrastructure whilst also providing direction as to where new infrastructure is to be provided if the compact city objectives are to be achieved

b) Creating a More Efficient Urban Form

A key condition that needs to be promoted within the Verulam-Cornubia LA is a compact urban form. This will require the containment of urban sprawl and may be accomplished through the establishment of an Urban Development Line (UDL) in conjunction with an appropriate urban densification strategy for the corridor. Furthermore identity and structure need to be created and maintained in order to establish quality working and living environments.

Establish an Urban Development Line and Development Phasing Line

The Urban Development Line (UDL) is located along the western boundary of the NUDC and demarcates the boundary between long term future urban areas, rural and agricultural areas within the Northern Municipal Regional NMPR).

The phasing of development inside the UDL and within the NUDC will be determined by a “development phasing line” (DPL). The “development phasing line” indicates the interim spatial limits to which development will be allowed to establish in accordance with transportation and infrastructure availability and capacity and municipal planning objectives. It will be a primary tool for influencing the pattern of urban expansion within the demarcated NUDC.

Not all areas within the UDL will be available for development. Environmentally sensitive areas will be protected as will areas identified for future bulk infrastructure and major transportation corridors.

The rationale for the UDL and DPL is to promote:-

- the protection of high value agricultural land in the metropolitan hinterland
  - Linked to long term food security objectives for the metropolitan region
  - Linked to agriculturally oriented export opportunities associated with the Dube Trade Port
- to protect upper catchment ecological/biodiversity assets
- to promote intensive use of land within the corridor and integrate fragmented urban development
- that the development of a viable public transport system is supported
- the efficient and cost effective use of municipal bulk infrastructure
- the protection of rural lifestyle options

The UDL includes expansion areas for future growth which are adjacent to existing urban areas. Cognisance of geophysical elements, river and wastewater catchments, land use and related patterns, demographic and population profiles and trends, socio-cultural and

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2 The UDL demarcated in the 2009 NSDP has been refined through the NUDC Project.
historic environments and visual resource analysis has been taken into account in determining the UDL (Figure 4-8).

In the Verulam-Cornubia LA, the UDL has been determined by the Ngovolwana River (Inthatakusa) and the ridgeline that Sunkist and Hillcrest Drives follow in the West, the Verulam Quarry, Black Mhlasini and Mdloti Rivers to the north.

The DPL includes the sub-area of Verulam, of which a portion on the western edge of Redcliffe is excluded. The Cornubia sub-area south of the Mdloti River is also included. Sibaya West has not been identified for development prior to 2030.

**Promote and Encourage Densification**

Major planning concerns relating to existing and emerging urban form are:

- low development yields (i.e. low “net” residential density) that is being achieved in greenfield developments
- fragmented pattern of urban settlement that has occurred
- low levels of densification in brownfields (existing) residential areas.

The goal for the corridor is thus to achieve higher overall “gross” densities across the study area through both the development of higher “net” residential densities in targeted areas as well as through infill and densification.

Although Infill and densification of the NUDC is occurring on a daily basis through the conversion of agricultural land to residential uses, ad hoc redevelopment in existing areas and the development of backyard shacks within informal areas, this needs to be increased and focused in target areas.

The spatial strategy to achieve this is therefore to:-

- limit the urban development footprint according to the UDL
- promote higher “net” residential densities in targeted areas (both greenfield and brownfield)
- Create new residential development opportunities that connect fragmented areas and consolidate urban form around high accessibility routes and spines.
The overall target density for the NUDC is a gross base density\(^3\) of 40du/ha, however the following density targets apply to specific areas within the Verulam-Cornubia LA (Table 4-1).

**Table 4-1: Density Targets for NUDC**

<table>
<thead>
<tr>
<th>Spatial Element</th>
<th>Minimum Density</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within and in Proximity to Sub-Metropolitan Nodes</td>
<td>Net Density(^4) of 80-150du/ha</td>
<td>Verulam CBD</td>
</tr>
<tr>
<td>Within and in Proximity to Local Urban Nodes</td>
<td>Net Density of 40-80du/ha</td>
<td>New Cornubia Node</td>
</tr>
<tr>
<td>Within and in Proximity to Neighbourhood Nodes</td>
<td>Net Density of 40-80du/ha</td>
<td>New neighbourhood nodes to be identified in Cornubia development</td>
</tr>
<tr>
<td>Within and in Proximity to Rail or Mass Transit Stations</td>
<td>Net Density of 80-150du/ha</td>
<td>In the residential areas that are within 2 km proximity to major public transport facilities and within 400-800m of all existing and proposed rail stations and sub-metropolitan bus or taxi ranks</td>
</tr>
<tr>
<td>Within and in Proximity to Development Spines</td>
<td>Net Density of 80-150du/ha</td>
<td>In the residential areas that are within 2 km of the R102 and other recognised Development Spines</td>
</tr>
<tr>
<td>Other Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>Net Density of 40-80 units/ha</td>
<td></td>
</tr>
<tr>
<td>Suburban</td>
<td>Net Density of 15-40 units/ha</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>Net Density of 1-15 units/ha</td>
<td></td>
</tr>
<tr>
<td>Interface with UDL and Environmentally Sensitive Areas</td>
<td>Net Density of 5-15du/ha</td>
<td>Within 400m proximity to the Urban Development Line – must take cognisance of local context</td>
</tr>
</tbody>
</table>

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1. Gross Base Density - The average number of dwelling units per hectare across the NUDC excluding major land-extensive uses such as the open space system (ESMP), industrial areas, and the airport and trade port.
2. Net Density - The number of dwelling units per hectare of land calculated on land used for residential purposes only.

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**c) Create Structure and Identity**

**Clarify Sub-Area Roles**

The Local Area’s (LA’s) indentified in the NSDP are spatial planning units within the Municipality’s overall planning system. The NSDP identified three local areas within the NUDC: Phoenix-INK, Verulam-Cornubia and Tongaat-DTP. Essentially these were determined by major north/south and east/west geo-physical barriers i.e. the N2, M41, rural edge and the Ohlanga and Mdloti Rivers.

The Verulam-Cornubia LA has been divided into three (3) discrete sub-areas which are spatially and functionally connected and which display their own set of landscape and settlement characters and identity (Figure 4-2). These sub-areas contain a number of inherent opportunities for, and constraints to development by virtue of their land use characteristics and their metropolitan accessibility levels. And these characteristics combine to provide a specific role in the broader metropolitan growth and development objectives.

The role that each sub-area will play has been defined by the function of its primary land use characteristics (i.e. social, economic or environmental). Table 4-2 indicates the type of role that is, or could be played, by the sub-areas in the Verulam-Cornubia LA and indicates the significance of the role in terms of either a national, metropolitan or local scale. These roles are also spatially represented in Figure 4-10.

Land use proposals for the LA respond and complement these roles and are outlined in the land use and activity framework and the sub-area guidelines prepared for the LAPs.

The primary roles for each of the sub-areas in Verulam-Cornubia LA are outlined in Table 4-2.
Figure 4-9: Verulam-Cornubia Sub-Areas

Figure 4-10: Primary Precinct Roles
Table 4-2: Primary Roles for Sub-Areas in Verulam-Cornubia

| Verulam | • Local mixed use, mixed density and mixed income urban living areas  
|         | • Sub-metropolitan mixed use, business and services town centre (Verulam)  
|         | • Regional public transport intermodal terminal (Verulam)  
|         | • Consolidation of Existing Industrial precinct (Canelands)  
|         | • Protection of urban development line  
|         | • Protection of the environmental roles of the Ohlanga and Mdloti River systems  

| Cornubia | • New Town to accommodate local mixed use, mixed density and mixed income urban living areas expansion zone  
|         | • New local light industrial node (Ottawa Flats)  
|         | • Establishment of part of the new north-south multi modal transit oriented development spine connecting Phoenix-INK and the metro HPPTN to the Airport and Dube Trade Port.  
|         | • Protection of the environmental roles of the Ohlanga River systems  

| Sibaya West | • Short term agricultural zone  
|            | • Long term expansion zone new town to accommodate local mixed use, mixed density and mixed income urban living areas.  
|            | • Protection of the environmental roles of the Mdloti River system.  

Provide for Variety of Lifestyle Options
Residents will find themselves in different lifecycle/stages and their demands and needs for residential and employment spaces will change over time. The LA must therefore provide for a range of lifestyle stages and choices.

Future planning for the LA should also protect against a “sameness” to the landscape and living environment and should seek to ensure that a distinctive local character and identity is ascribed to new, and redeveloped residential areas.

The primary lifestyle options that can be identified within the LA and that need to be protected, enhanced and/or established include (Figure 4-11):

- Urban
- Suburban
- Rural Agricultural

Figure 4-11: Residential Lifestyle Options

The differentiating characteristics of an area falling within the lifestyle options will in turn be discernable through elements such as local or neighbourhood settlement density, building form, public space and local landscape characteristics.

Urban settlement types, particularly higher density options, should be located along major transportation routes and sub-area collector roads, within the hierarchy of mixed use nodes and/or neighbourhood centres.

Suburban options should be used in low density form as low impact edges to various components of the open space system and the agricultural hinterland. Medium density options should be used to infill between higher density environments and low density edges.
In Verulam-Cornubia LA, urban and suburban lifestyles are the most appropriate lifestyles to design for.

**Establish a Hierarchy of Development Nodes**

Nodes are clusters of mixed land use, including residential, which provide opportunity for mixed public and private investment and which service surrounding urban or rural areas with respect to commercial and social services and public transportation.

Through the establishment of a hierarchy of development nodes, an interconnected polycentric system of service points is provided thereby improving accessibility to opportunities, reducing the need for lengthy travel trips and assisting in the spatial restructuring of the metropolitan area.

Nodes are also a means by which to establish identity within the urban fabric. The physical form of the nodes is dependent on the function, size and age of the node and could take the form of a grid of streets, a single major intersection, a single activity street or single large site. However, all types of node include a cluster of mixed use and activity (See Chapter 4.6).

Each of the nodes in the Verulam-Cornubia LA will perform the following roles/functions:-

**Sub-Metropolitan Nodes**

Destinations that offer day to day business, transport and social services to sub-metropolitan areas.

- **Verulam CBD**
  Multipurpose business, social service and intermodal transportation terminal centre that services the surrounding urban and rural communities beyond the NUDC.

**Local Urban Nodes**

Lower order nodes that offer day to day business, transport and social services local communities only.

- **Proposed Node in Cornubia**
  A proposed local urban node (town centre) to serve the greater Cornubia community with a mix of commercial and social services.

**Neighbourhood Nodes**

A day to day shopping and social services centre for a neighbourhood only.

- **New Neighbourhood Nodes in Cornubia**
  Proposed neighbourhood nodes to serve local neighbourhoods within Cornubia with limited commercial and social services.

**Establish a Hierarchy of Development Spines**

A hierarchy of development nodes is supported by a concomitant hierarchy and network of development spines i.e. road and/or rail transportation routes that link various nodes, industrial opportunity areas and high density residential areas into linear urban systems.

These spines provide an opportunity to integrate land use and transportation into more accessible, efficient and sustainable urban living systems, the promotion of cohesive and integrated communities and the efficient use of, and access to urban resources thus supporting the notion of transit-orientated development.

**Metropolitan Spines**

Provides linkage across and access to local areas and the metropolitan area as a whole

- **R102/Gopalal Hurbans Road and Rail Line**
  The metropolitan spine is to be extended along the R102 northwards to link Dube Trade Port/KSIA with the sub-metropolitan nodes of Verulam and Tongaat and to Stanger and beyond in the north. This is to be strengthened by a public transport spine between Bridge City and the Dube Trade Port/KSIA.

- **New Transport Oriented Multi Modal Spine**
  Extends from Bridge City (public transport terminal for HPPTN) through Mt Edgecombe industrial and business node through Cornubia to Airport and reconnects to existing line north of Tongaat. The new spine will eventually link KSIA directly with the Durban CBD as well as with the northern expansion of the corridor to Ilembe and eventually to Richards Bay. The spine will be a mixed use commercial, industrial and social services corridor that will contain residential uses associated with business and which will be designed to mitigate any noise impacts associated with the King Shake Airport.
Sub-Metropolitan Spine
Provides access and linkage across within local areas

The Verulam-Cornubia LA does not have any sub-metropolitan spines within its boundaries, these occur in the adjacent LAs and are supported by a number of local level spines and east-west linkages that will link the coastal and urban development corridors with the rural hinterland corridor.

- New Cornubia Arterial
- M27 (Jabu Ngcobo Drive)

Open Space System
The environmental assets within Verulam-Cornubia LA are under pressure from encroaching urban uses. The green corridors associated with the river catchments that traverse the area need to be protected, and where possible expanded and enhanced. These corridors provide vital ecological and recreational amenity services for the metropolitan area as a whole and specifically the Verulam-Cornubia LA.

The portions of the Ohlanga and Mdloti River Catchment Systems within the Verulam-Cornubia LA which drain west/east and which link the ecological assets contained within the rural hinterland of the metropolitan area with those located in the coastal corridor are severely impacted by existing urban and agricultural development. These portions must be protected and enhanced to be able to provide the links between the hinterland and coastal systems and to continue to provide ecological services and concomitant benefits to metropolitan residents.

In addition to these sub metro and local environmental services roles the open space system is an integral part of the City’s “infrastructure” that will need to be planned and incorporated into its climate change mitigation strategies.

Transportation Concept
The transportation network will be enhanced in response to the long term NUDC land use projections described in the previous sections. Key elements and concepts underpinning the proposed NUDC transportation network include the following:

Transit Oriented Development
To support compact urban development and the proposed restructuring of the NUDC a new Central Mobility Corridor is proposed in the centre of the corridor, parallel to the N2.

This multi modal transportation element will form the central spine of the higher density and mixed land uses proposed for this part of the corridor. It will also form the extended public transport trunk route linking Bridge City (HPPTN terminal point) through the proposed Cornubia Town Centre with Dube Tradeport / King Shaka International Airport with the other nodes in the NUDC. It will also link the NUDC with the Durban CBD in the south and with destinations further north of the metropolitan area.

Regional Mobility
High quality mobility on the national road network is essential if the metropolitan area, the province and the country are to maintain and or increase economic growth.

One of the key strengths of the NUDC is the high quality road connectivity in the metropolitan area and the region via the N2. To ensure these benefits remain now, and are enhanced in the future, the role of the N2 needs to be protected and strengthened as a national and regional mobility corridor that provides reliable travel times for goods and persons.

Strengthening the R102 as an additional metropolitan and regional mobility corridor is a fundamental strategy for protecting and supporting the N2 as the strategic national corridor linking Durban to Richards Bay and further north. Providing for local trips starting and ending within the region will find in the R102 a viable alternative for the N2.

Transit Oriented Development
To support compact urban development and the proposed restructuring of the NUDC a new Central Mobility Corridor is proposed in the centre of the corridor, parallel to the N2.

This multi modal transportation element will form the central spine of the higher density and mixed land uses proposed for this part of the corridor. It will also form the extended public transport trunk route linking Bridge City (HPPTN terminal point) through the proposed Cornubia Town Centre with Dube Tradeport / King Shaka International Airport with the other nodes in the NUDC. It will also link the NUDC with the Durban CBD in the south and with destinations further north of the metropolitan area.

Integration with the metropolitan area and the surrounding region
The abovementioned networks and systems in addition to the completion of the MR577 south of the Umgeni River will provide a high quality regional mobility corridor that will link the NUDC with the large industrial area in Pinetown / New Germany and the other
parts of the metropolitan area. This presents a much shorter travel time for residents of Ntuzuma, Inanda and KwaMashu to the main employment nodes outside of the NUDC.

The Inanda, Ntuzuma and KwaMashu area will also be linked to the existing and envisioned commercial and industrial developments in the north via the Northern Expressway. The additional link will open up new opportunities for these fragmented communities as a result of the shorter travel time and higher levels of accessibility to employment and amenities.

**East West connectivity**
In addition to strengthening the regional mobility corridors with the R102 and the M4, east-west cross linkages are proposed between them to strengthen the north-south oriented networks and provide linkages to N2 at strategic locations offering increased and improved choice and accessibility.

**Transportation Principles**
Developing a transportation network for the NUDC requires strategic interventions. These can be applied at two planning levels; land use and transport network. Land use interventions entail the mix of residential, commercial and industrial land, their density and characteristics. Transport interventions are based on a given land use mix and are focused on travel patterns (where to and what time of the day) and modes of transport.

Key to developing the NUDC is the concept of Transport Oriented Development (see box).

Additional transport interventions are also required, these include:

1. Trip Reduction:
   The transport system as a whole will adjust over time due to the congestion on the road network and changes in live style (e.g. working from home). A reduction of 3% in the private vehicle trips for the morning peak was assumed due to this system adjustment

2. Modal Shift:
   By limiting the increase in road capacity and increasing the capacity and quality of public transport services it can be expected that more people in all income groups will use public transport for their daily commute. Based on travel time (for both modes) and number of transfers (for public transport) the modal split was determined.

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**Characteristics Transport Oriented Development:**
- A regional node containing a mixture of uses in close proximity including office, residential, retail, and civic uses High density, high-quality development within 10-minute walk circle surrounding public transport nodes
- Walkable design with pedestrian as the highest priority
- Public Transport Nodes as prominent feature of town centres
- Feeder transit systems with buses and minibus taxis
- Reduced and managed parking inside 10-minute walk circle around public transport nodes

**Benefits of Transport Oriented Development:**
- Transit investment has double the economic benefit to a city than highway investment.
- Transit can enable a city to use market forces to increase densities near stations, where most services are located, thus creating more efficient sub centers and minimizing sprawl.
- Transit enables a city to be more corridor-oriented, making it easier to provide infrastructure.
- Transit enhances the overall economic efficiency of a city.
- Transit reduces carbon emissions and increases energy efficiency

*Taken from Sustainability and Cities: Overcoming Automobile Dependence, by Newman & Kenworthy.*

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3. Peak Spreading:
The current road capacity can not accommodate the forecasted private vehicle trips in a one hour morning peak. It can be expected that commuters will adjust their behaviour to avoid long travel times. Some motorists will therefore be forced to either travel earlier or later, thereby reducing the demand within the peak hour. The impact of peak spreading is based on the assumption that the current levels of congestion are the benchmark

4. Peak Spreading and Modal Shift:
The expected future land use is of such a magnitude that likely intervention 3 and 4 will arise. In intervention 4 the combined effect of peak spreading and modal shift
was determined will be. The effect of peak spreading was first determined (this is a scaled down affect compared to (3)). Thereafter the modal split was determined in the same way as described with intervention 2.

5. Maximize Short Distance trips within the NUDC:

With the further development of the city it can be expected that people will relocate to be as close to their jobs as possible to reduce their travel time and distance. Those that are unable to relocate in order to be able to reduce their trip to the shortest possible will follow the current trip distribution.

The demand for transport in the NUDC is expected to increase significantly and the current supply of transport will not be able to meet this demand. In order to maintain a sustainable growth to the city of Durban a sustainable transport system for the northern area needs to be developed.

4.4 Spatial Development Frameworks

4.4.1 Open Space Framework

a) Open Space Goals and Objectives

The goal within the Verulam-Cornubia LA is to protect, enhance and expand the existing environmental assets base within the exiting urban and built areas but also to utilise the opportunity to establish a more robust and integrated open space system within the undeveloped areas that will directly meet the needs of the local communities, as well as, respond to wider metropolitan and regional environmental planning needs with regard to environmental services planning and management.

The following is relevant in this regard:

- Maintaining a sustainable supply of environmental goods and services
- Provide for climate change preparedness
- Protection and provision of agricultural resources and assets
- Provision of recreational opportunities and amenity
- Protection and enhancement of environmental assets to meet the needs of the community, as well as local and district planning. This includes
  - agricultural resources
  - the open space system
  - recreational opportunities
  - tourism opportunities
  - coastal resources
- Protecting the open space system as a primary spatial structuring element
- Provide for integrated environmental planning and management, especially with regards to catchment management

Specific objectives include:

- Restricting erosion of the upper reaches of the Mdloti and Ohlanga River Systems
- Identifying opportunities for linking fragmented open space elements in the built up areas of Verulam
- Early identification and protection of core and amenity open space elements in the mid sections of the Mdloti and Ohlanga catchments

b) Open Space System

The broad level objectives listed above can be achieved if an open space system is defined and protected, based on a specific range of biophysical and spatial planning needs. A non-negotiable core open space system must be protected in the interest of maintaining ecosystem services such as Storm water management, soil maintenance and microclimatic amelioration, whilst an additional ‘amenity’ or buffer area is created in-between the core system as open spaces with a more social and recreational function.

The open space system has to satisfy two criteria – it must be allowed to function as an integrated system in order to ensure the optimal protection of biodiversity, and it must be sufficient for an adequate sustainable supply of ecological goods and services. This requires a careful combination of system elements in the form of nodes and corridors, as well as ‘buffer’ areas.
Nodes and Corridors

A common approach to open space system planning is to identify conservation cores and link them via corridors, but best practice planning requires a more refined ecological solution. In the Verulam-Cornubia area large expanses of open space surround the developed areas of Verulam, although most have been converted to sugarcane or are in the process of being formally developed as the Cornubia mixed-use precinct. Similar erosion of open space value occurs at Trenance Park. Sensitive biophysical features, however, are concentrated along the Ohlanga and Mdloti Rivers and their estuaries, as well as in the remaining steep valleys of Trenance Park. By applying specific conservation planning considerations on how habitat fragments and linear features should be included in an open space system, the sensitive systems can be included in spatial planning in the following manner:

- The core conservation system will consist of source nodes in the form of Trenance Park and the two river systems. These source nodes will be instrumental in repopulating satellite nodes which will be dispersed in-between the developed areas in the form of servitudes, gardens, parks and other fragments.
- Minimum node size is based on the minimum area required for the maintenance of biodiversity levels and ecological functioning. This is relative to the species or habitats being targeted in the area. The minimum functional size may consist of several connected smaller patches as long as the connectivity is supportive of the ecological functioning of the overall node.
- Connectivity between nodes must be suitable as movement corridors for priority species found in the core nodes, both in terms of day-to-day activities and long-term migration patterns.
- The functionality of a movement corridor is influenced by the species being ‘served’ (i.e. small animals use corridors, but invertebrates and plants don’t) and hence the nature of barriers, type of habitat, presence of ‘stepping stones’, and relative location (i.e. a small dysfunctional patch within a much larger unfragmented area might overcome thresholds and add value).

It has further been proven that the conservation of absolutely relevant habitat fragments, based on fine-scale investigation, is more effective at conserving biodiversity than broad application of buffers. The identification, protection and maintenance, as well as decisions influencing impacts on habitat patches, must therefore be based on a fine-scale demarcation of the patches, along with a consideration of the patch function within a connected local and regional system. Nevertheless, the existing natural assets contained within the study area (i.e. existing EESMP footprint) should be included in the core open space system, as a minimum. All assessments must be compliant with the provincial standards for biodiversity impact assessments.

Ideally, the system should also be representative of the various natural systems present in the study area as the different systems have evolved through time as co-dependent. This implies that the system should represent the natural systems identified in the EESMP:

- **Grassland** - Only secondary (disturbed) grassland remains in the area.
- **Wooded Grassland** - This describes a habitat that contains a mix of grassland and tree species. Specific types include the Coastal Bushclump (Grassland Mosaic) and acacia savannah.
- There are also some areas of **Disturbed Woodland**, particularly of the **Coastal Scarp Forest**, where the natural woodlands have been altered by human disturbances.
- **Forests** - There are a number of forest types present in the study area, particularly along the river corridors and includes the; **Coastal Lowland Forest, Coastal Scarp Forest, Riverine Forest and the Transitional Forest**.
- **Wetlands** - These include the freshwater and estuarine wetlands associated with the rivers and their floodplain

The primary cores for the Verulam-Cornubia area are:

- Trenance Park
- Mdloti River
- Ohlanga River

Supportive corridors to be protected are:

- **Watercourses through Waterloo**
- **New open space network in Cornubia and the rest of the area immediately West of the N2**

Important amenity areas are:

- **SASA dam**
**Amenity Areas**
While the EESMP ecological footprint represents the core – it is preferable where possible to extend the open space asset outwards from the core to incorporate other types of open space that enhance and diversify the services that the open spaces provide in improving quality of life, social amenity and economic opportunities. These areas should be retained as open space such that they can provide enhanced social and environmental amenity including:

- Recreational amenity (urban greenways for walking, jogging, cycling, picnicking)
- Visual amenity (attractive green spaces for houses and offices to look onto)
- Cultural amenity (sacred spaces for people to worship, pray and practise traditions)
- Ecological amenity (spaces for nature education, for animals, birds and reptiles to shelter)
- Risk management (additional areas to buffer people from the increasing risks of global warming, storm seas and flooding).

Amenity areas should be delineated to include (eThekwini, 2009):

- Human movement corridors along and between open space open space cores
- Seepage, drainage or potentially flooded zones not included in the EESMP that are not ideal for residential use but that can be used for agriculture, development of natural assets for human enjoyment and economic gain (e.g. wetlands for birding)
- Over steep or unstable areas that are not ideal for development but can play a positive role in the landscape as amenity areas
- Areas of high agricultural potential (mainly for subsistence farming)
- Areas of particular scenic beauty that provide amenity that adds value to transport routes or developed areas

The amenity areas differ from the core conservation areas in that certain types of development may take place there without being detrimental to the role that it plays in providing amenity services to people. For example, some parts of the amenity area may be developed for agriculture, or low intensity forms of development that does not detract from – or may contribute to - the role that the amenity area plays. For example, developments such as nature centres, rustic bush lodges and sports clubs may be considered appropriate in certain amenity areas.
4.4.2 Movement and Circulation (Accessibility) Framework

a) Movement and Circulation (Accessibility) Framework Objectives:

- Create a **sustainable Transport System**
  - Develop **Public Transport as a viable alternative** for residents and workers
  - To create an integrated and sustainable transport network that **reduces dependency on the use of private vehicles**, maximises access to public transport and encourages walking and cycling within and between neighbourhoods
    - Facilitate improved sustainability of travel to work situation – reduce travel times, distances and carbon emissions
    - Provide efficient road and public transport network
    - A walkable street structure orientated to promote energy efficient dwelling layout
    - Attractors (i.e. Community services, schools, local shopping etc) located to promote walking to community services
  - Improve **Road Safety**
    - Ensure appropriate levels of regional and metropolitan access to, from and through the study area
    - Minimise regional and metropolitan through traffic in local areas
    - Enable the establishment of effective and efficient public transportation
    - Promote integrated vehicular and pedestrian access and circulation
  - To support the early provision of local bus services and walking and cycling links through **the sequential staging of the development** of the area

- Establish clear **Hierarchy in the Transport Network**
  - Establish an **accessibility system** that facilitates access and movement between the local area and the rest of the city (metropolitan or primary access) and within the local area (local or secondary access)
  - Establish an optimal **hierarchy of routes** within and through the areas to facilitate this accessibility system
  - This route hierarchy should direct the development of a **public transport system** at metropolitan and local level, and should inform a land use and density response which will reinforce the public transport system
  - To promote the early provision of safe and efficient **pedestrian and bicycle paths** and links which are connected to the key features of the sub-areas and which link to regional and metropolitan networks (outside the sub-areas)
  - Provide **linkages to major employment destinations** within the local area and greater metropolitan area
    - By creating more links for all modes of transport with the evolving employment areas in the North and West of the metropolitan area, the residents of the local area will have the opportunity to reach those areas at lower cost and with a shorter travel time

- Strengthen and rationalise the existing **Public Transport node in Verulam CBD**

b) Movement and Circulation (Accessibility) System

In response to the abovementioned goals and taking into account the traffic modelling under taken for the northern metropolitan area and the LAP study area a number of short and long term changes to the existing road network and infrastructure may be required (See Figure 4-13). Proposals relating to these are discussed below. The traffic study undertaken in preparation of the proposals is described in the detailed transportation reports.

Regional Access
Access to the study area will be gained via the regional and metropolitan access and movement network made up of the north-south rail line, the N2, R102, M41 (Mt.
Edgecombe Highway), and M27 (Jabu Ngcobo Drive) and will be via a series of existing railway stations and existing interchanges on the N2.

**Public Transport**

Verulam CBD and the proposed Cornubia New Local Urban Node (Town Centre) will be the major public transport nodes within the local area. These nodes will be served by an integrated public transport system ensuring optimum connectivity between the local sub-areas as well as with the metropolitan employment areas to the north and the south. The following trunk routes for the road based public transport have been identified linking the local nodes with the major nodes:

- New east-west link from R102 to Gateway
- Gopalal Hurban Road (R102)
- Northern Expressway

In addition the proposed new Public Transport route (which is part of the proposed multimodal transit oriented spine) running through the heart of the Cornubia Development will provide the linkage to the King Shaka International Airport, Dube Trade Port and the adjacent economic development. First demand analyses show potential for rail under the condition of a good feeder system for the long term. Up to 2030 road based public transport is the most feasible. A more detailed feasibility study will determine when this public transport spine will be transferred to rail.

**New Roads**

To provide accessibility for the Cornubia Development, additional linkages within the local area and with the surrounding metropolitan area including the new economic opportunities in the north four major roads are required:

- Central Spine Road linking the Mt Edgecombe Highway (M41/R012) with the King Shaka International Airport, the R102 further north and the N2 via the Jabu Ngcobo Drive (M27).
  - M41 to east-west link (see below)
  - East-west link to KSIA (NOT REQUIRED BEFORE 2030)
- East – west link from the Gopalal Hurban Road (R102) to the Ruth First Highway (M4) from the JG Champion (Northern Drive) intersection via the Central Spine Road and crossing the N2 to a relocated interchange in Umhlanga Rocks (outside the local area).
- East – west link from the Central Spine Road to the N2 - Sibaya interchange. (NOT REQUIRED BEFORE 2030)
- Northern Express Way linking the Curnick Ndlovu (KwaMashu Highway), in the Verulam-Cornubia LA, with the Gopalal Hurban Road (R102) in Verulam at the intersection with Kisoon Rd.

**Interchanges**

Existing interchanges on the N2 include:

- N2 / Mount Edgecombe Highway (M41)
- N2 / Sibaya
- N2 / Umdloti (Jabu Ngcobo Drive (M27)).

No new interchanges are proposed on the N2.

Existing interchanges on the M41 include:

- M41 / Flanders Drive
- M41 / Chris Hani Road (North Coast Road) (R102)

No new interchanges on the M41 are proposed. The development of the Cornubia and the current capacity constraints will require a new configuration of the M41 / North Coast Road interchange.

**Intersections**

With the creation of the new roads in the area as outlined above, new intersections will provide the links with the existing road network. To serve the established developed areas as well as the proposed new developments in the form of further densification in brown field development and expansion in green field development existing intersections on the arterials will be utilised.

**Local Road Network**

In the existing developed precincts within the area, no new collector roads are required. Existing collector roads may need local widening to optimize traffic operations due to increase in expected volumes.

New development within the local area will all require the development of new collector roads to provide access to them and to the surrounding region via the arterials described above.
Figure 4-13: Movement and Circulation (Accessibility) Framework (Ultimate)
Figure 4-14: Public Transport Framework (2030)
Pedestrian Movement
The pedestrian network should operate at two levels. In the first instance high quality pedestrian links to all the primary transport nodes and stops along the trunk routes should be provided for on existing roads and within redevelopment areas. In the second instance public pedestrian links in and along the open spaces should be promoted. These should link all open space and or recreation and should enable walks and trails in these areas.

4.4.3 Land Use and Activity Framework

a) Land Use and Activity Goals and Objectives
The overarching goal is to identify land for the efficient and sustainable expansion of the northern metropolitan area and to enable the establishment of a land use mix and accompanying set of strategic spatial structuring tools and associated development controls that will promote the establishment of efficient and sustainable transit oriented development and urban form.

The following is relevant in this regard:

- Promote the establishment of a balanced, integrated and sustainable mix of land uses and activities
- Promote and encourage the establishment of a range of residential lifestyle options
- Enable the establishment of a hierarchy of commercial, industrial and service nodes
- Promote the establishment of identifiable and discrete neighbourhoods and settlements with discrete centres focused around commercial and community activities
- Ensure the establishment of an appropriate range of regional and local level community facilities
- Promote incremental growth from existing development nodes

Specific Objectives include:

- Halt the piecemeal erosion of agricultural land to the west of Verulam and define the extent of future urban settlement
- Clearly identify land to be released for urban development in the short to medium term (i.e.20 years)
- Regenerate Verulam as a well serviced, balanced, identifiable and discrete town providing a living environment of choice within close proximity of the new economic node of the airport and Dube Trade Port
- Establish Cornubia as a new town featuring high levels of mixed use structured by urban development principles which reflect the objectives of high density and compact transit oriented development.
- Establish new well located mixed use nodes to serve new residential areas
- Consolidate and Establish new industrial areas along the R 102 corridor

b) Land Use and Activity System

Residential
As described in the concept, the Verulam-Cornubia LA must accommodate of a variety of lifestyle options through the establishment of both urban and suburban settlement types.

These types include detached housing, semi-detached, row housing (terrace), 3-4 storey walk ups, duplex complexes, medium-rise buildings (up to 8 storeys) or high-rise buildings and which can be accommodated by/provided by both public and private sector housing.

Mono-functional housing “estates” which obviate integration and regional mobility should be avoided.

Land uses that can associate with and be mixed with residential uses such as home business, community facilities, local neighbourhood shopping etc should be encouraged and facilitated. Refer to Section 4.6.4.

Upgrading of existing informal settlements and the consolidation of existing formal housing neighbourhoods is required in the Verulam sub area. The neighbourhoods between the Verulam CBD and Hammonds farm require redevelopment and the
intensification of residential development, particularly in the vicinity of the Verulam station is required. Neighbourhoods to the west of Verulam require an intensification of residential development.

New residential areas are to be established at Cornubia. In particular as a greenfield initiative this area must accommodate mixed use higher density residential developments.

New residential expansion should also occur in Redcliffe.

Further details related to density and typologies are described in the Housing and Density Framework.

Four types of residential land use categories are proposed:

<table>
<thead>
<tr>
<th>Intention</th>
<th>Types of Land Use Activities Permitted</th>
<th>Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential 1 (5-40du/ha)</strong></td>
<td>Residential Residential Small-Holdings Rural Residential</td>
<td>Neighbourhoods in Verulam border the urban development line (see Housing and Density Framework Plan).</td>
</tr>
<tr>
<td>Creation of a zone to accommodate the low density residential areas located alongside the key the urban development line.</td>
<td>Within 400m of the UDL, densities of 10-15du/ha are applicable.</td>
<td></td>
</tr>
<tr>
<td>The predominant character of these areas will be suburban</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Residential 2 (40-80du/ha)</strong></td>
<td>Residential Places of Worship Library Education Limited Commercial Community Hall Clinic Administration Offices Police Station Public Transportation Facilities</td>
<td>Neighbourhoods in Verulam that surround the major public transport spines of the LA (see Housing and Density Framework Plan).</td>
</tr>
<tr>
<td>Creation of a zone to accommodate new medium and higher density residential development suitable to support and contribute to the character of the NUDC, whilst acknowledging that some pockets of suburban development will remain over time.</td>
<td>Primary land use is residential and where a limited number of compatible ancillary community services uses which have a non-disruptive impact on neighbourhood amenity may be allowed.</td>
<td></td>
</tr>
<tr>
<td>These areas will have a much greater mix of suburban and urban settlement character</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Intention

<table>
<thead>
<tr>
<th>Types of Land Use Activities Permitted</th>
<th>Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential 3 (40-80du/ha)</td>
<td></td>
</tr>
<tr>
<td>Creation of a zone that will provide for higher density residential development along major transportation corridors but also permits a mix of a full range of retail, offices, services and community facilities. The settlement character of these areas will be predominately urban in nature.</td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td></td>
</tr>
<tr>
<td>Hotels</td>
<td></td>
</tr>
<tr>
<td>Places of Worship</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td></td>
</tr>
<tr>
<td>Informal Trade</td>
<td></td>
</tr>
<tr>
<td>Community Hall</td>
<td></td>
</tr>
<tr>
<td>Clinic</td>
<td></td>
</tr>
<tr>
<td>Administration Offices</td>
<td></td>
</tr>
<tr>
<td>Police Station</td>
<td></td>
</tr>
<tr>
<td>Public Transportation Facilities</td>
<td></td>
</tr>
<tr>
<td>Neighbourhoods in Verulam that are located on major public transport spines of the LA (see Housing and Density Framework Plan).</td>
<td></td>
</tr>
</tbody>
</table>

### New Town Cornubia (80-150du/ha)

Creation of a zone that will provide for higher density “New town” development that promotes a full range of retail, offices, services and community facilities. The settlement character of these areas will be predominately urban in nature and focused on public transport.

| Residential                            | Cornubia development along the proposed central public transport spine. |
| Hotels                                 |                       |
| Places of Worship                       |                       |
| Library                                |                       |
| Education                              |                       |
| Commercial                             |                       |
| Light Industry                         |                       |
| Retail                                 |                       |
| Office                                 |                       |
| Informal Trade                         |                       |
| Community Hall                         |                       |
| Clinic                                 |                       |
| Administration Offices                 |                       |
| Police Station                         |                       |
| Public Transportation Facilities       |                       |

### Community Facilities

The efficient and sustainable provision of social facilities requires the provision and operation of different social services which can be best achieved by clustering compatible services in accessible locations.

The range of services provided to an area will be based on availability to all residents within reasonable access times. The co-location with other facilities in as close proximity as possible to identified development nodes, is also a key criteria for the provision of new facilities.

The existing population of Verulam-Cornubia is 81,544 people and by 2030 is anticipated to grow to 230,302.

Based on this population, the required social facilities for the area indicated in Table 4-3. The standards used to calculate the required facilities are summarised in Section 4.5.
### Table 4-3: Required Social Facilities

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Existing</th>
<th>Proposed</th>
<th>Required</th>
<th>Shortfall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDUCATIONAL FACILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crèche</td>
<td>Not known</td>
<td>0</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Primary School</td>
<td>14</td>
<td>0</td>
<td>66</td>
<td>52</td>
</tr>
<tr>
<td>Secondary School</td>
<td>9</td>
<td>0</td>
<td>31</td>
<td>22</td>
</tr>
<tr>
<td><strong>HEALTH FACILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satellite Clinic</td>
<td>9</td>
<td>0</td>
<td>23</td>
<td>14</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hospitals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>SOCIAL FACILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cemetery</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Community Hall</td>
<td>5</td>
<td>0</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Library</td>
<td>2</td>
<td>0</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Old Age Home/Welfare</td>
<td>Not known</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Worship</td>
<td>Not known</td>
<td>0</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td><strong>PUBLIC SERVICE &amp; CIVIC FACILITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Station</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Police Station</td>
<td>1</td>
<td>0</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Post Office</td>
<td>1</td>
<td>0</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td><strong>CULTURAL OPEN SPACES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Gardens</td>
<td>Not known</td>
<td>0</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Market -Trading Spaces</td>
<td>Not known</td>
<td>0</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td><strong>SPORTS &amp; RECREATION AMENITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports fields</td>
<td>4</td>
<td>0</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Play Areas</td>
<td>18</td>
<td>0</td>
<td>92</td>
<td>74</td>
</tr>
</tbody>
</table>

At present there is a backlog of community facilities within the Verulam-Cornubia LA and a recent study has identified the following backlogs (CSIR, 2008):

- Increase capacity of all five clinics within Verulam-Cornubia by extending operating time.
- No sports facilities (current oversupply)
- By 2020, 226ha will be required in the north for burial space (land urgently needs to be acquired for this purpose). Provision should be made in the Cornubia sub-area.

- There is a major backlog in the provision of parks. 458ha is required for local parks and 150ha for regional parks. These park areas are considered additional to the space required for natural ecological functioning.

### Economic Activity/Major Employment Areas

The Verulam-Cornubia LA must provide for the establishment of a mix of different activities in nodes, corridors and districts in a manner which attempts to encourage more vibrant, flexible and efficient living environments.

Within each of the broader land uses, a further level of land use and activity structuring will occur by virtue of the manner in which similar related land uses are grouped together to form functional and identifiable land use or activity “clusters” in response to user demands for location and identity benefits (e.g. entertainment clusters, office clusters, hotel clusters, manufacturing clusters etc).

The following guidelines provide a framework for assisting in the distribution and location of economic activity/land uses within the local area.

**General Industry**

Canelands industrial should be expanded along the R10 corridor.

The dominant types of activities within these areas will be manufacturing, warehousing and distribution.

**Light/Service Industry**

Light/Service industrial activity could be located within the new growth areas identified at Ottawa Flats.

The dominant types of activities within these areas will be light manufacturing and warehousing and distribution.

---

5. The standards used to derive the required social facilities are outlined in Chapter 4
7. General Industry - Has the potential to create dust, noise, odour and other adverse environmental impacts. In general products produced for other industrial businesses. A high reliance on the use of raw materials in the production process.
8. Light Industry - Has limited impact on surrounding neighbourhoods. In general goods are produced for end-users. Limited raw materials are used by light industrial business.
**Business Parks**

Business parks are essentially a blending of industrial warehousing and office space that have traditionally been developed in a land consumptive manner. The siting of business parks within the Verulam-Cornubia should not be encouraged and if considered should be concentrated within the transit oriented development spine and should be developed in a compact and more intensive form. Business Park development should not be permitted along the length of the N2 and should be restricted to a limited strip along the M41 west of the intersection of the N2 with M41 and opposite the existing commercial strip.

The types of activities that should be supported include light manufacturing, technology parks, with limited retail, short-term residential, community facilities and recreation opportunities. Refer to Chapter 4.5 for urban design guidelines.

**Offices**

Office development to serve the sub metropolitan area is to be encouraged within the Verulam CBD, the new Cornubia Town Centre, within the new transit oriented development spine and to a limited degree in the southern corner of Cornubia opposite the existing Umhlanga Ridge CBD. Large scale mono functional office park developments with land consumptive built form and landscaping should be discouraged in favour of more compact and urban mixed-use residential, retail and office development forms.

Home offices to be encouraged in residential areas provided they do not present a nuisance factor to neighbours.

Where appropriate, office development to be integrated with other land uses including high density residential to optimise residential yields, increase net densities, create more mixed use environments and to increase thresholds for public transport.

**Retail / Shopping**

The location and distribution of this economic activity is determined primarily by the location and distribution of the thresholds that it serves. These are invariably residential areas or employment zones and the activity locates in positions that are most accessible to the people residing or working in them.

Retail and shopping development to be encouraged and supported within the existing Verulam CBD and new Cornubia Town Centre, the new transit oriented development spine and to a limited degree in the southern corner of Cornubia to allow for some expansion of the existing Umhlanga CBD. These areas must be supported by high quality and well maintained public environments and linked to public transport. Wherever possible retail / shopping development should be integrated with other land uses including high density residential to optimise residential yields, increase net densities, create more mixed use environments and to increase thresholds for public transport.

**Informal Trading Activity**

Whilst there are initiatives at national and local levels to deal with informal trading it is an imperative for the harnessing of the energy within the activity as well as for its appropriate control that informal trading be addressed in a holistic manner. This requires that informal trading be recognised, acknowledged and accepted as a legitimate sector of the overall economy and accordingly that it be planned for spatially in the same manner as any other land use or economic activity.

Opportunities for informal traders through the provision of appropriate infrastructure and space to trade must be provided for within existing economic centres and proposed new employment districts.

**Urban Agriculture**

Whilst the extent of urban agriculture is limited at present it represents an opportunity for increased economic activity as well as for the supplementing of food sources for poor families. Verulam-Cornubia contains some prime agricultural areas opportunities to develop agriculture entities should be pursued.

Opportunities for intensive agriculture linked to the Due Trade Port and Agri-Processing zone should be encouraged in areas not identified for release until 2030.

Wetlands impacted by informal settlement and/or industrial developments should be converted to urban agricultural fields or gardens to ensure that the food production activity is accommodated and that the wetland functions and benefits are not lost in their entirety.

Traditional medicine plantations should be identified and or created and protected as part of the open space system and as part of land that is able to generate economic activity.
Other agricultural activities such as reed harvesting, woodlots and orchards should be encouraged in peripheral areas as a means of soil erosion control and as potential economic activity generators.

**Noise Sensitive Zones**
The operations of King Shaka International Airport and Dube Trade Port have a negative impact on neighbouring land uses due to noise. This is particularly applicable to residential neighbourhoods where the ambient noise exceeds acceptable levels.

For planning purposes, the Ethekwini Municipality has adopted an “in-principle” decision to use the noise contours for the 2035 development footprint of the airport as a guideline to directing urban development. Any development within the 55dB DNL\(^9\) contour is considered sensitive to noise (SANS 1010) and must adhere to additional development controls if permitted.

No permanent residential development is permitted with the 55dB DNL (2035) noise contour i.e. tourist accommodation permissible with sound attenuation.

Cornubia and Sibaya West sub-areas are impacted by the 55dB DNL contour.

---

**Table 4-4: Land Use Noise Sensitivity Matrix\(^{10}\)**

<table>
<thead>
<tr>
<th></th>
<th>&lt; 45dBA</th>
<th>45 - 50dBA</th>
<th>50 - 55dBA</th>
<th>55 - 60dBA</th>
<th>60 - 65dBA</th>
<th>65 - 70dBA</th>
<th>&gt; 70dBA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESIDENTIAL DISTRICTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential 1 (5-40du/ha)</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Residential 2 (40-80du/ha)</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Residential 3 (40-80du/ha)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>New Town (40-80du/ha)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td><strong>NON RESIDENTIAL DISTRICTS</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Commercial</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
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<tr>
<td>Community Facilities</td>
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<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Mixed Use Nodes</td>
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<td>✗</td>
</tr>
<tr>
<td>Industrial</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>Agriculture</td>
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<td>✓</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

A summary of land use allocations for 2030 is included in Table 4-5.

---

\(^9\) DNL is Day Night Average Sound Level – recognised industry standard to measure average aircraft noise levels over a 24 hour period.

\(^{10}\) Adapted from SANS 10103:2004 Recommended Noise Levels for Town and Regional Planning Purposes
### Table 4-5: Land Use Summary

<table>
<thead>
<tr>
<th>VERULAM-CORNUBIA</th>
<th>CORNUBIA</th>
<th>VERULAM</th>
<th>SIBAYA WEST</th>
<th>VERULAM-CORNUBIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EXISTING</td>
<td>2030</td>
<td>EXISTING</td>
<td>2030</td>
</tr>
<tr>
<td><strong>RESIDENTIAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential 1 (5-40du/ha)</td>
<td>-</td>
<td>-</td>
<td>384</td>
<td>68</td>
</tr>
<tr>
<td>Residential 2 (40-80du/ha)</td>
<td>-</td>
<td>-</td>
<td>763</td>
<td>103</td>
</tr>
<tr>
<td>Residential 3 (40-80du/ha)</td>
<td>-</td>
<td>-</td>
<td>624</td>
<td>65</td>
</tr>
<tr>
<td>New Town (80-150du/ha)</td>
<td>-</td>
<td>986</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>COMMERCIAL</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Commercial (MU: Retail/Office/Admin)</td>
<td>-</td>
<td>-</td>
<td>59</td>
<td>-</td>
</tr>
<tr>
<td><strong>INDUSTRIAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Park</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Light/Service Industry</td>
<td>-</td>
<td>200</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>General Industry</td>
<td>-</td>
<td>-</td>
<td>36</td>
<td>132</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>-</td>
<td>-</td>
<td>44</td>
<td>-</td>
</tr>
<tr>
<td>Agriculture</td>
<td>-</td>
<td>-</td>
<td>432</td>
<td>-</td>
</tr>
<tr>
<td>Open Space</td>
<td>-</td>
<td>241</td>
<td>-</td>
<td>602</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>-</td>
<td>1,427</td>
<td>1,910</td>
<td>1,403</td>
</tr>
</tbody>
</table>
Figure 4-15: Land Use and Activity Framework
4.4.4 Housing and Density Frameworks

a) Housing and Density Goals and Objectives

The goal in this LA is to utilise new housing opportunities to regenerate the town of Verulam through creating additional thresholds for economic and community activities and services and to improve thresholds for transport oriented development and sustainable urban infrastructure. In addition it is to provide for the development of a mix of new housing at higher densities and a range of typologies in the new town of Cornubia.

The following is relevant:

- Promote the use of increased net residential densities within brownfield and green fields developments
- Promote densification initiatives, either compaction or infill, should be prioritised within nodes and along transport routes
- Provide for a range of housing options should be encouraged to provide for different family sizes ad income groups
- Encourage the development of a variety of housing types appropriate to the locale, this assists in creating diverse socioeconomic communities and avoids an urban form that is monotonous and sterile
- The upgrading of existing informal settlements and the establishment of “greenfields” developments should ensure that the overall structure of Verulam-Cornubia’s activity system is not compromised

b) Housing and Density System

Create Urban Areas

Housing will be used to help Verulam to both compact its existing areas and to grow into new areas, so that it can play its role as one of the five significant urban centres in the Northern Urban Development Corridor.

Housing will be used to create urban areas that are dense enough to offer citizens efficient public transport, better access to social and commercial facilities, and improved thresholds for economic activity.

Within 2km of the R102, of the Verulam Sub-Metropolitan node (Town Centre) and the railway stations, and of the future north-south arterials, the municipality will encourage and promote:

- A minimum net density of 60 dwellings per hectare.
- Town-houses, row-houses, and flats for new areas
- For existing suburban areas, the municipality will encourage and promote multiple dwellings (including a second house, garden flats, or rooms with shared ablutions) as well as the redevelopment of properties for town-houses, row-houses, and flats.

Further away than 2km from the R102, of the Verulam Sub-Metropolitan node (Town Centre) and the railway stations, and of the future north-south arterials, the municipality will encourage and promote a minimum net density of 40 dwellings per hectare.

Upgrading Informal Settlements

Broad support is suggested for the continuance of the Upgrades of Informal Settlements at:

- Amaoti – Amaotana
- Amaoti-Moscow
- Blackburn Village
- Cross Roads
- Hibiscus Rd
- Hilltop Rd
- Ivy Close
- Oakford Rd
- Amaotana
- Redcliffe Canelands Parkridge (with portion within the UDL)
- Trenance Park 4B
- Verulam 2

However, significant revisions in prevailing project methodology are recommended. It is suggested that:

- All the informal settlements first be provided with health and safety infrastructure the form of communal stand-pipes, fires escape and fire-fighting infrastructure, communal ablutions operated by the municipality, hygienic waste collection points, lighting to main pedestrian routes, and prepaid electricity meters to each structure.
- Only once all six have been brought to this standard should the process of upgrade continue.
For the Upgrades, it is recommended that there should be minimum net densities of 40 Dwellings per hectare (double-storey units)

The above recommendations do not necessarily apply to Trenance Park 4B, for which housing subsidies have been approved, and for which planning and procurement is likely to be at an advanced stage.

Greenfields Development
Priority should be given to continue with the projects which have been approved for subsidies, namely:

- Trenance Park 2B
- Hammonds Farm

Priority should be given to those Greenfields Projects that consolidate the urban areas of Tongaat, especially within 2km of the Verulam Sub-Metropolitan node (Town Centre), the R102 and the railway stations, and of the future north-south arterials, particularly

- Cornubia Phase 1
- Cornubia Phase 2
- Cornubia Phase 3
- Hammonds Farm
- Hibiscus Road

The Greenfields Projects should be planned (and if need be re-planned) in order to achieve net densities of 60 or more dwellings per hectare. This applies to all of the abovementioned projects, as well as to:

- Redcliffe Phase 1 Valley View

Other Greenfields Projects that are not yet in the Housing Plan but which are candidate projects to consolidate and grow the urban areas of Verulam, especially within walking distance of the Verulam Sub-Metropolitan node (Town Centre), the R102 and the railway stations are Redcliffe (Valley-View Rd) and Redcliffe (Oakford Rd), and broad support is given to their inclusion in the Housing Plan.

The candidate Greenfields Project Redcliffe (Parkridge) is not yet in the Housing Plan, and it falls outside the proposed UDL. It has not yet been approved for subsidies. It is recommended that the project be reviewed jointly by DPEMU, Housing and Engineering, with a view to removing the project from the Housing Plan, alternatively amending the UDL, alternatively redefining the project such that it makes less demand on services and social facilities (e.g. such that its density permits an on-site sanitation solution that matches the local soil conditions)

Compaction and Infill
Contribute to the establishment or consolidation of development spines within 2km of the Verulam Sub-Metropolitan node (Town Centre), the R102 and the railway stations, and of the future north-south arterials, the municipality will promote:

- The more intensive development of existing residential properties for additional residential use, for use by extended families or tenants
- Minimum net densities of 60 dwellings per hectare
- The use of parts of the residential properties for small business, especially those that are non-polluting and which do not cause public nuisance.
Figure 4-16: Housing Density Framework
Figure 4-17: Public Housing Projects
4.4.5 Landscape and Built Form Framework

a) Landscape and Built Form Goals and Objectives

The goal in this LA is to establish distinctive landscape and townscape qualities for the existing town of Verulam and for the new town of Cornubia set them apart from other urban settlement in the NUDC.

To this end the following is relevant

- Promote the establishment of a legible environment
- Promote the protection and/or rehabilitation of the natural sub-tropical coastal character and landscape of the local area
- Protect and enhance the special visual qualities of the local area
- Promote the protection and establishment of a range of identifiable/discrete settlement characters and townscapes
- Promote the development of built form which respects and enhances the character of the local area and which creates environments with identity and character

b) Landscape and Built Form Features

The following landscape and built form (townscape) elements should be used to guide development within the local area.

Landscaped Movement Corridors

- Establish the N2 as a corridor of high landscaping quality with respect to planting/adjacent property landscaping and built form quality. Do not permit mass ribbon industrial/business/office park development
- Establish the R102, the Jabo Ngcobo Drive (M27) and central public transport spine as a corridor of high landscaping quality with respect to planting/adjacent property landscaping and built form quality

Areas of High Landscape and Scenic Quality

- Protect view sheds of the Ohlanga and Umdboti rivers/floodplains/wetlands from bridges and promote sensitive and ecologically sound design and construction of such infrastructure

Buffer Zones

- Areas immediately adjacent to areas of high landscape quality and scenic quality should be subjected to additional development controls that ensure that development is sensitive to the specific quality of the locale in which it falls e.g., Umdboti and Ohlanga River Valleys, Trenance Park

Gateway Zones

- Promote the establishment of metropolitan scale gateway features (i.e. landmark buildings and/or infrastructure elements and landscape features at the Entrances to Verulam and Cornubia and to major industrial areas such as Canelands and Ottawa.

Urban and Suburban Settlement

- Utilise settlement layout, built form, density and landscaping to promote the establishment of discrete and identifiable neighbourhoods and precincts
- Establish mixed use green lungs along minor river lines
- Establish feature planting of all sub-metropolitan, local urban nodes (town centres)
- Establish / maintain landscape plans for industrial precincts in Verulam, Canelands and Ottawa.

Landmark Features

Significant highpoints and ridgelines (skylines) should be sensitively treated according to their context in terms of the overall local area, the sub-area they fall in or the neighbourhood/precinct in which they are located. These points should be enhanced either, through appropriate built form, or through the preservation of important and high quality natural features.
4.5 Sub-Area Guidelines

Three discrete, but interconnected Sub-areas have been identified within the Verulam-Cornubia local area (see Table 4-6 & Figure 4-19). Each Sub-area and neighbourhood has been defined by major natural features such as river valleys and escarpments, major transport corridors (i.e. freeways or rail lines), their unique character and identity, and/or primary land use characteristics i.e. identifiable residential, commercial or industrial area focused around economic activity and social facilities or areas of high ecological value.

Roles have been identified for each Sub-area based on their inherent qualities and characteristics to support and accommodate a specific form of human settlement and activity, and to either protect and/or enhance the environment. These roles relate to the function that each will play in the municipality and describe the contribution they make to the overall planning and development objectives of the Municipality as described in the Municipal IDP and its component plans.

The planning and management of these Sub-areas should be aimed at turning these functional areas into local activity systems which provide a range of facilities, economic opportunities and services required by local residents. The role, key characteristics, spatial development concepts and key actions are outlined for each of these functional Sub-areas in Table 4-7 to
Table 4-9

These Sub-Area Guidelines do not prescribe the detailed layout and land use mix of any new growth areas. Development in these areas must be preceded by a detailed Framework Plan, and component precinct plans, which should indicate the proposed land use distribution and mix, zoning and development controls, residential densities, landscaping, built form directives, transport and infrastructure services, and development phasing.
<table>
<thead>
<tr>
<th>Sub-area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verulam</td>
<td>Bordered on the south by the Ohlanga River, the west and northwest by the Ngovolwana River (Inthatakusa) and the ridgeline along Sunkist and Hillcrest Drives, the northwest and north by the Black Mhlasini River and Mdloti Rivers, the upper east by a cadastral line parallel to and approximately mid-way between the R102 and N2, and the lower east by the north-south railway line. Includes Verulam Local Urban Node (Town Centre), Verulam suburbs, Waterloo, and Ottawa and Canelands industrial areas.</td>
</tr>
<tr>
<td>Cornubia</td>
<td>Bordered on the south by the R102, the west by the north-south railway line, the north by the Ohlanga River and the west by the N2. Predominantly agricultural land under sugar cane.</td>
</tr>
<tr>
<td>Sibaya West</td>
<td>Bordered on the west by a cadastral line parallel to and approximately mid-way between the R102 and N2, the north by the Mdloti River, the west by the N2 and the south by the Ohlanga River. Consists of agricultural land under sugar cane.</td>
</tr>
</tbody>
</table>
Table 4-7: Sub-Area Verulam

| PREFERRED ROLE | | |
|----------------|----------------|
| Ecological Role | • Metropolitan environmental asset (Ohlanga and Mdloti Rivers).  
                   • Sub-Metropolitan environmental asset (Trenance Park Nature Reserve). |
| Economic Role | • Sub-metropolitan mixed use, business and services town centre  
                     • Protection of urban development line |
| Social Role | • Regional public transport intermodal terminal  
                   • Local mixed use, mixed density and mixed income urban living areas |

| LAND USE | | |
|-----------|----------------|
| Residential | • Consolidate and regenerate existing urban and suburban residential areas through protecting and enhancing the different urban lifestyle options they offer.  
                     • Establish and promote higher density residential development along R102, at neighbourhood nodes and around railway stations, in accordance with Housing and Density Framework, and Northern Corridor Study.  
                     • Most of the informal settlements in the Local Area are located in this Sub-Area. For the informal settlements, provide health and safety infrastructure as described in the Housing and Density Framework above (and with additional reference to the Human Settlements Department’s Informal Settlements Programme)  
                     • After providing health and safety infrastructure for the informal settlements, upgrade the informal settlements as described in the Housing and Density Framework above  
                     • Establish new mixed medium and high density residential areas in undeveloped zones. |
| Commercial | • Consolidate and enhance mixed use development at Verulam Local Urban Node (Town Centre), to enhance it role of mixed business, social service and intermodal transport terminal service centre to surrounding urban and rural communities.  
                     • Consolidate and enhance mixed use development at local neighbourhood nodes, and around railway stations. |
| Industrial/Business Park | • Consolidate, enhance and expand Canelands and Ottawa Industrial areas. |
| Community Facilities | • Consolidate existing community facilities in local nodes commensurate with the demographic and land use mix of the sub-area, and in line with the standards set out in the Access Mapping Report (CSIR, 2008).  
                     • Cluster community facilities in accessible locations, on public transport routes and/or in local nodes.  
                     • Refer to the Land Use Guidelines in section 4.6 for the range of community facilities required in the Local Area to support development up to 2030. |
| Open Space | • Formalise Trenance Park Nature Reserve and provide more secure protection of the core section to prevent encroachment by development and agriculture, and to enhance its valuable role as an ecological node. Trenance Park has potential as a representative and accessible sub-regional protected open space, featuring diverse topographical features and habitat.  
                     • Management of Ohlanga River as an ecological corridor to focus on maintaining the water management features of the wetlands, opportunities for agriculture and recreation in the broad floodplain, and prevention of further encroachment.  
                     • The open space areas in Waterloo will support the core Ohlanga system, especially as corridor between the Ohlanga and Mdloti river systems and should therefore be managed as both corridors and ecological amenity areas.  
                     • Management of Mdloti and Mhlasini Rivers to be protected from further encroachment and pollution (the river system flows through varied land uses) particularly as its runoff enters the Mount Moreland wetlands and Mdloti estuary. |
| Agricultural | • Enforce Urban Development Line by preventing any urban development expansion west of Sub-area’s western and north-western boundaries, to consolidate agricultural and rural hinterland and protect rural lifestyles.  
                     • Provision of land for agricultural purposes to meet demand in area and limit encroachment into ecologically sensitive areas. |
### HOUSING AND DENSITY

#### Housing Typology and Mix
- A range of housing types and tenure options should be provided to accommodate different family sizes and income groups.
- Townhouses, row-houses and flats should be established in new development areas, with the exception of suburban development adjacent to sensitive environmental features (i.e. Trenance Park and the Mdloti and Ohlanga Rivers), and the Urban Development Line.
- Within existing suburban areas, multiple dwellings (e.g. second units) should be encouraged, as well as the redevelopment of properties for townhouses, row-houses and flats.

#### Density
- A gross base density of 40 dwelling units per ha (du/ha) should be achieved within the Sub-area.
- A net density of 100-150 du/ha should be achieved within and in close proximity to the Verulam CBD.
- A minimum net density of 80-150 du/ha should be achieved within 2km of the R102, the Verulam CBD and railway stations.
- A minimum net density of 40 du/ha should be achieved in upgrades projects, while greenfields projects should achieve net densities of 60 du/ha or more.
- A net density of 5-40 du/ha should be achieved in the vicinity of the Urban Development Line, taking cognisance of the local context.

### MOVEMENT AND CIRCULATION

#### Access
- Existing intersections of Gopalal Hurban Road (R102) and Jabu Ngcobo Drive (M27).

#### Road Network
- N2 is national and regional access and linkage spine. Gopalal Hurban Road (R102) and Jabu Ngcobo Drive (M27) & Inanda Road (M21) and Vincent Dickens Road (Provincial Main Road 100) are Metropolitan and Inter Precinct Connectors.

#### Public Transport
- The railway system with stations in Verulam and Canelands are part of the metropolitan Primary Public Transport Corridor linking Verulam to Durban CBD in the south and to Tongaat and Stanger in the north. The Verulam Railway Station will serve as an integrated multi modal transfer point.
- The road based Public Transport is projected on Ntuzuma Highway and Gopalal Hurban Road (R102) to provide high quality public transport links to and between the major public transport node in the sub-area Verulam CBD and providing linkages to Tongaat and King Shaka International Airport in the North and to Phoenix and Pinetown / New Germany in the south.
- Internal road network of sub-area must include public transport routes in feeding to the public transport nodes.

#### Pedestrian Network
- All neighbourhoods within the sub-area should be designed to accommodate comfortable and secure pedestrian routes that link to public transport nodes (stops and stations).

### SETTLEMENT AND ENVIRONMENTAL CHARACTER

#### Built Form
- The unique built form character of the Verulam Local Urban Node (Town Centre) should be protected and enhanced through the upgrade of the public realm, and new development or building upgrades that enhance this character.
- Built form should establish urban legibility, enhance the unique features of the area and create environments with identity and character.
- Establish new development areas and neighbourhoods with local identity and character, to avoid monotony and ‘sameness’ in the landscape.
- Built form along the R102 should enhance the role of R102 as a corridor of high landscaping and built form quality.
- Suburban built form should be established in areas adjacent to sensitive environmental features (i.e. the Mdloti and Ohlanga river valleys) and the UDL.
- Refer to the Urban Design Guidelines in section 4 for detailed guidelines on residential, mixed use and business park layout and built form.

#### Landscape
- Establish the R102 as a corridor of high landscaping and built form quality.
- Planting and landscape furniture should be established along public transportation routes, within the Verulam CBD, and in key public places and open spaces.
- Establish and maintain landscaping plans for industrial precincts in Verulam, Canelands and Ottawa.
- Establish gateway features at the entrance to Verulam CBD and Canelands and Ottawa industrial areas.

#### Visual Amenity
- Appropriate buffer zones/development controls to be established to ensure that development adjacent to Trenance Park, and the Mdloti and Ohlanga River valleys is sensitively designed.
- Protect view sheds of Ohlanga and Mdloti rivers/floodplains/wetlands.
### Environmental Services Delivery

- The hills of the Trenance Park area provide microclimatic amelioration effects for the surrounding area.
- Natural habitats sustain predatory species in terms of nesting and foraging to aid in pest control.
- Open space plays a critical role in the facilitation of nature-based recreation.
- Agricultural support services – water availability, pest control, soil conditioning, nutrient cycling and dust control.
- Wetlands and functional riparian ecologies serve to manage Storm water runoff and pollution control.
Table 4-8: Sub-Area Cornubia

<table>
<thead>
<tr>
<th>PREFERRED ROLE</th>
<th></th>
</tr>
</thead>
</table>
| **Ecological Role** | • Metropolitan environmental asset (Ohlanga River) - river system acts as biological system and surface water management feature, and important ecological link between estuaries and other components of the catchment.  
• Opportunity for extensive network of open spaces to be established throughout the new development. |
| **Economic Role** | • New local industrial node (Ottawa Flats) and mix of retail, offices and business parks associated with new transit oriented development spines and limited Umhlanga CBD expansion |
| **Social Role** | • Local mixed use, mixed density and mixed income urban living areas expansion zone |

<table>
<thead>
<tr>
<th>LAND USE</th>
<th></th>
</tr>
</thead>
</table>
| **Residential** | • Establish new mixed density housing development opportunities to provide a range of urban lifestyle options.  
• Residential development to be orientated towards and integrated with public transport.  
• Residential development is not encouraged within the 55dB King Shaka Airport noise zone (2035) but may be permitted in accordance with appropriate noise attenuation mitigation measures as prescribed by the Environmental Health Department. |
| **Commercial** | • Establish new mixed use local urban node (Cornubia Town Centre) on R102 and proposed north-south movement spine between R102 and King Shaka Airport.  
• Establish mixed use neighbourhood nodes to service local community needs.  
• Establish mixed use transit oriented development spine and limited expansion of Umhlanga CBD |
| **Industrial/Business Park** | • Consolidate and expand industrial opportunity area at Ottawa Flats.  
• Business Park development not permitted along the length of the N2. Limited Business Park development should be concentrated along the M41 around the new Cornubia Town Centre and or within the proposed new transit oriented development spine. |
| **Community Facilities** | • Establish community facilities in local and neighbourhood nodes commensurate with the demographic and land use mix of the sub-area, and in line with the standards set out in the Access Mapping Report (CSIR, 2008).  
• Local level community facilities (such as schools etc) are not encouraged within the 55dBA King Shaka Airport noise zone (2035) but may be permitted in accordance with appropriate noise attenuation mitigation measures as prescribed by the Environmental Health Department.  
• Sub-metropolitan level facilities could be established within the transit oriented development spine in accordance with noise mitigation controls  
• Cluster community facilities in accessible locations, on public transport routes and/or in local nodes.  
• Refer to the Land Use Guidelines in section 4 for the range of community facilities required in the Local Area to support development up to 2030. |
| **Open Space** | • Protect and enhance the Ohlanga River system and associated environmental assets (e.g. drainage lines, stream, wetlands) as ecological core through the development of an integrated, expanded and robust open space system to ensure the delivery of ecosystem goods and services in the area.  
• Best practice open space provision is required for all new developments — specifically with regards to adequate EESMP no-go areas and suitable buffers for sensitive areas particularly along Ohlanga River and around wetlands.  
• SASA dam should be maintained as a recreational area, but in such a state that it offers refuge for birdlife. It is therefore an amenity area for both social and ecological functions. |
| **Agricultural** | • Existing extensive agricultural practices to continue until full transformation to urban development.  
• Agricultural activities not to encroach on Ohlanga River system in order to ensure optimal functioning of system. |

<table>
<thead>
<tr>
<th>HOUSING AND DENSITY</th>
<th></th>
</tr>
</thead>
</table>
| **Housing Typology and Mix** | • A range of housing types and tenure options should be provided to provide for different family sizes and income groups.  
• Townhouses, row-houses and flats should be established in the new Cornubia development area, with flats at the new Cornubia Town Centre.  
• Housing typology to be public transport orientated, i.e. higher density typologies adjacent to public transport routes and the Cornubia multi modal transfer point. |
For the informal settlement at Blackburn Village, provide health and safety infrastructure as described in the Housing and Density Framework above (and with additional reference to the Human Settlements Department’s Informal Settlements Programme).

- After providing health and safety infrastructure for Blackburn Village, upgrade it as described in the Housing and Density Framework above.
- Only suburban development should be allowed adjacent to the Mdloti River to enhance and protect this sensitive environmental feature.

**Density**

- A gross base density of 40 dwelling units per ha (du/ha) should be achieved within the Sub-area.
- A minimum net density of 80-150 du/ha should be achieved within and in proximity to the Cornubia Town Centre, the R102 and the new north-south arterial.
- A net density of 5-40 du/ha should be achieved in the vicinity of the Mdloti River.

**MOVEMENT AND CIRCULATION**

**Access**

- No new interchanges off N2. Upgraded interchanges of M41 and existing intersections of Gopalal Hurban Road (R102).

**Road Network**

- N2 is national and regional access and linkage spine. Mt. Edgecombe Highway (M41), Gopalal Hurban Road (R102) and new central spine are Metropolitan and Inter Precinct Connectors.

**Public Transport**

- On the western border of the sub-area is the railway system with stations in Mt Edgecombe, Verulam and Canelands. The railway system is part of the metropolitan Primary Public Transport Corridor providing a linking Verulam to Durban CBD in the south and to Tongaat and Stanger in the north.
- The proposed Cornubia New Local Urban Node (Town Centre) will serve the area as an integrated multi modal transfer point.
- The Public Transport route (multi modal transit oriented development spine) in the heart of the Cornubia Development will provide the linkage to the King Shaka International Airport, Dube Trade Port and the adjacent economic development. A more detailed feasibility study will determine if this public transport spine will be road or rail based.
- The road based Public Transport is projected on Mt. Edgecombe Highway (M41) linking with the Gateway Public Transport Node with the proposed Cornubia New Local Urban Node (Town Centre) Public Transport Node. Internal road network of sub-area must include public transport routes in feeding to the railway stations.

**Pedestrian Network**

- All neighbourhoods within the sub-area should be designed to accommodate comfortable and secure pedestrian routes that link to public transport nodes (stops and stations).

**SETTLEMENT AND ENVIRONMENTAL CHARACTER**

**Built Form**

- Encourage medium rise buildings at Cornubia New Local Urban Node (Town Centre) node to establish urban legibility and gateway into Cornubia development area.
- Built form should establish urban legibility, enhance the unique features of the area and create environments with identity and character.
- Establish neighbourhoods with local identity and character, to avoid monotony and ‘sameness’ in the landscape.
- Built form along the R102 and the new north-south arterial should enhance their role as corridors of high landscaping and built form quality.
- Built form of Ottawa Flats industrial node to enhance R102 as corridor of high landscaping and built form quality.
- Suburban built form should be established in areas adjacent to sensitive environmental features (i.e. the Mdloti River valley).
- Refer to the Urban Design Guidelines in section 4 for detailed guidelines on residential, mixed use and business park layout and built form.

**Landscape**

- Establish the R102 as a movement corridor of high landscaping and built form quality.
- Planting and landscape furniture should be established along public transportation routes, within the new Cornubia Town Centre, local neighbourhood nodes and in key public places and open spaces.
- Establish and maintain landscaping plans for Ottawa Flats industrial precinct.
- Establish gateway features at the entrance to Cornubia New Local Urban Node (Town Centre) and Ottawa Flats industrial area.

**Visual Amenity**

- Appropriate buffer zones/development controls to be established to ensure that development adjacent to the Mdloti River valley is sensitively designed.
- Protect view sheds of Mdloti River/floodplains/wetlands.
- Significant high points and ridgelines should be sensitively treated through appropriate built form.
| Environmental Services Delivery | • Wetlands and functional riparian ecologies serve to manage Storm water runoff and pollution control. 
• Open space will improve the aesthetic values of a densely developed area. |
### Table 4-9: Sub-Area Sibaya West

<table>
<thead>
<tr>
<th>PREFERRED ROLE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecological Role</strong></td>
<td>• Metropolitan environmental asset (Ohlanga and Mdloti Rivers)</td>
</tr>
<tr>
<td><strong>Economic Role</strong></td>
<td>• Extensive and intensive agricultural area.</td>
</tr>
<tr>
<td><strong>Social Role</strong></td>
<td>• Future local mixed use, mixed density and mixed income urban living areas expansion zone (+2030)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LAND USE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential</strong></td>
<td>• Rural lifestyle options to continue in support of agricultural practices in medium term (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td><strong>Open Space</strong></td>
<td>• Preserve Umdloti River, floodplain &amp; estuary as a valuable functional ecological area/linear ecological node. A healthy ecosystem will support the Mount Moreland wetlands and protect the estuary from poor quality water inflows.</td>
</tr>
<tr>
<td></td>
<td>• Future development must preserve the remaining natural habitat, preferably with additional rehabilitated areas.</td>
</tr>
<tr>
<td></td>
<td>• Best practice open space provision is required for all new developments (+2030) – specifically with regards to adequate EESMP no-go areas and suitable buffers for sensitive areas.</td>
</tr>
<tr>
<td><strong>Agricultural</strong></td>
<td>• Existing extensive agricultural practices to continue or to be replaced by intensive agriculture, until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td></td>
<td>• Protect and enhance sustainability of high yielding agriculture areas through promotion of intensive agriculture.</td>
</tr>
<tr>
<td></td>
<td>• Agricultural activities not to encroach on Ohlanga and Mdloti River systems in order to ensure optimal functioning of systems.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HOUSING AND DENSITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing Typology and Mix</strong></td>
<td>• Rural housing typology to be retained until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>• Rural density of 1 du/ha, until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOVEMENT AND CIRCULATION</th>
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<tbody>
<tr>
<td><strong>Access</strong></td>
<td>• No new interchanges off N2; provide linkage with existing N2/Sibaya interchange. Existing intersections of Jabu Ngcobo Drive (M27).</td>
</tr>
<tr>
<td><strong>Road Network</strong></td>
<td>• N2 is national and regional access and linkage spine. The east-west links with the N2 / Sibaya and N2 / Jabu Ngcobo Drive (M27) interchanges and the new central spine are Metropolitan and Inter Precinct Connectors.</td>
</tr>
<tr>
<td><strong>Public Transport</strong></td>
<td>• The Public Transport route in the west portion of Sibaya West area will provide the linkage to the King Shaka International Airport, Dube Trade Port and the adjacent economic development to the north as well as with the Primary Public Transport Corridor to provide linkages to rest of the metropolitan area. A more detailed feasibility study will determine if this public transport spine will be road or rail based.</td>
</tr>
<tr>
<td></td>
<td>• Internal road network of sub-area must include public transport routes in feeding to the railway stations.</td>
</tr>
<tr>
<td><strong>Pedestrian Network</strong></td>
<td>• All neighbourhoods within the sub-area should be designed to accommodate comfortable and secure pedestrian routes that link to public transport nodes (stops and stations).</td>
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<thead>
<tr>
<th>SETTLEMENT AND ENVIRONMENTAL CHARACTER</th>
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<tbody>
<tr>
<td><strong>Built Form</strong></td>
<td>• Rural built form to be retained until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td><strong>Landscape</strong></td>
<td>• Rural landscape character to be retained and protected until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td><strong>Visual Amenity</strong></td>
<td>• Agricultural amenity and character to be retained until medium term transformation to urban residential development (up to 2030 or as determined by LAP review).</td>
</tr>
<tr>
<td></td>
<td>• Areas of high scenic quality and amenity along the Mdloti River to be protected through appropriate built form and the preservation of important features.</td>
</tr>
<tr>
<td>ENVIRONMENTAL SERVICES</td>
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</tbody>
</table>
| Environmental Services Delivery | • Wetlands and functional riparian ecologies serve to manage Storm water runoff and pollution control.  
• New open space areas to support outdoor recreation in new development areas. |
4.6 Development Guidelines

4.6.1 Land Use Guidelines

The successful implementation of this Local Area Plan requires an effective link between the vision and development concept contained in section 3 and the management of land use and development which will take place in the local area. The purpose of these Land Use Management Guidelines is to encourage development to take place in such a manner that it supports and realises the development vision for the area. The guidelines are intended to be used by property owners and developers to guide site development design, and by the Municipality and other stakeholders to review and make decisions on development proposals.

a) Defining Land Use Management

Land use management encapsulates the following activities:

- The regulation and management of land-use changes;
- The regulation and management of ‘green fields’ land development, i.e. the development of previously undeveloped land;
- The regulation of the subdivision and consolidation of land parcels;
- The regulation and management of the regularization and upgrading process of informal settlements, neglected urban centres and other areas requiring such processes; and
- The facilitation of land development through the more active participation of the municipality in the land development process, especially through public-private partnerships.

Land use management plays an important role by responding to a range of impacts and concerns relating to the transformation of the natural and built environment, including:

- Impacts on the natural environment and environmental systems, including loss of open space and natural habitat, catchment management and water quality, soil erosion, loss of agricultural land, food production and food security, access to open spaces for recreation, cultural and educational purposes;
- Health and safety concerns including access to sufficient ventilation and light, the provision of adequate water and sanitation services, safe building construction, noise and air quality, adequate access for fire and ambulance services, safe traffic conditions, site and building design that can minimise crime.
- Efficiency of infrastructure provision and traffic management, including the provision of adequate facilities for loading, parking, pedestrians and public transport, and consideration of development on traffic movement.
- Promotion of amenity in development, including landscape quality and built form aesthetics, privacy and views.
- Social considerations including the impact of development on women, children, the elderly and disadvantaged people, and the adequate provision of social facilities.
- Protecting architectural, historical, cultural and environmentally important land and buildings.

Land use management also promotes specific social, economic and environmental objectives of government that may be neglected by the private land development market. Government interventions to achieve such objectives can include investment promotion, public-private partnerships, relaxing of development controls in certain areas, rating policy, and development levies, etc. The desirability of an area for economic development can be maximised by land use management interventions, for example by managing adjoining and ancillary uses, protecting important view sheds and by controlling traffic and access.

A Land Use Management System (LUMS) refers to all the actions undertaken by a municipality to manage land use, of which Town Planning Schemes are one component. The municipality’s Land Use Management System relevant to this area includes:

- The municipal Spatial Development Framework, Northern Spatial Development Plan, the Verulam-Cornubia Local Area Plan, and the Town Planning Schemes listed in section 4
- Valuation and rating system
- Property registration, ownership and tenure
- Infrastructure and services provision
- Building regulations and bylaws, including signage and elevation control
- Health bylaws
- Environmental legislation and requirements, and
- Road and transportation requirements.

11 Adapted from White Paper on Spatial Planning and Land Use Management, 2001
These Land Use Management Guidelines are therefore one of a range of tools available to the Municipality to guide and manage development in the local area.

b) Status of Town Planning Schemes in Local Area

The following Town Planning Schemes, prepared in terms of the Town Planning Ordinance, Ordinance No 27 of 1949, as amended, are operational in the area:

- Verulam;
- Waterloo;
- Canelands; and
- Redcliffe;

Although the remainder of the area is currently not covered by town planning schemes, the LUMS department within the eThekwini Municipality is currently involved a process to rationalise the applicable development controls under its control and to extend the town planning schemes wall-to-wall, across the Municipality, resulting in a single LUM system.

c) Development Approval Processes

Rezoning, Scheme Extension and Subdivision of Land

Any application to rezone or subdivide land for new development in the area must comply with the requirements of the appropriate Town Planning Scheme, as amended. If the land is currently not zoned, an application must be made to the Land Use Management Branch, Development Planning Department to extend the appropriate Town Planning Scheme to incorporate the site in question, and to zone it appropriately. The applicant should consult with the local planning office to determine the most appropriate zoning/s for the development.

Framework Plan Requirements

Where proposed developments are larger than 100 units or 5ha a detailed Framework Plan, and component precinct plans (depending on the scale of the development) must be submitted, to the satisfaction of the Development Planning Department. The Framework Plan should include at least the following:

- a plan showing the environmental attributes of the site, including wetlands and the 1:100 year flood line;
- a plan indicating the proposed development layout (subdivision and street layout) for the development site;
- a plan indicating tentative subdivision and street layouts for adjacent properties to indicate how the proposed development can integrate in the future;
- a table setting out the proposed land use distribution and mix;
- proposed zoning and development controls;
- residential densities, and anticipated dwelling and population yields;
- landscaping and built form directives;
- transport and infrastructure services provision; and
- development and infrastructure phasing.

These requirements may be adjusted by the Development Planning Department to take into account the unique attributes of individual development sites, and the potential impact of the proposed development.

d) Land Use Management Principles

The following land use management principles should be used to guide site development planning and design, and the assessment of development proposals in the area. Refer to the checklist at Appendix B which can be used to assess to what extent development proposals align with these principles.

Sustainability

The resources making up the natural and built environment should be sustainably managed and used.

Land use and development decisions must promote a harmonious relationship between the built and the natural environment. The long-term availability of physical, social and economic resources to support development should be thoroughly investigated. The life cycle costs of land development and its likely side effects on the environment, community, and the economy need to be understood and taken into account to sustain its benefits, while minimising or mitigating any likely negative impacts.

Land use management norms based on this principle are:

• The use and development of land should promote the protection, enhancement and management of the natural environment in the interests of long term sustainability;
• Environmentally sustainable land development practices and processes should be employed in all developments.
• Land development should promote the establishment and maintenance of viable communities;
• Land development should meet the basic needs of all citizens;
• Land may only be used or developed in accordance with legal processes;
• Decisions affecting land development and land use should firstly take into account national, provincial or local interests as recorded in approved policy and legislation;
• Land development and planning processes must integrate disaster prevention, management or mitigation measures;
• Decision-making must ensure the safe utilisation of land by taking into consideration risk factors such as unstable geological conditions and Flood lines;
• Land which is currently in agricultural use should only be reallocated to other uses where real need exists and prime agricultural land should remain in production.

Equality
Everyone affected by land use management and land development actions or decisions must enjoy equal protection and benefits.

In the past the planning and management of land use has been characterised by extreme inequality. Land use management decision-making must be equitable and must address the inequitable legacy inherited from decades of planning in the interests of a racial minority.

Land use management norms based on this principle are:
• Members of communities affected by land development should actively participate in the process of land development;
• Public involvement in land use planning and development processes must be inclusive of all persons and groups with an interest in the matter being decided;
• Land use regulators and planning authorities must ensure that benefits and opportunities flowing from land development are received by previously disadvantaged communities and areas;
• The appropriateness of land use must be determined on the basis of its impact on society as a whole rather than only the applicant or immediate neighbours.
• Each development proposal should be judged on its own merits and no particular use of land should in advance or in general be regarded as being less important or desirable than any other use of land.
• Land development should result in security of tenure, provide for the widest possible range of tenure alternatives, including individual and communal tenure;
• Where land development takes the form of upgrading an existing settlement, it should not deprive beneficial occupiers of homes or land or, where it is necessary for land or homes occupied by them to be utilised for other purposes, their interests in such land or homes should be reasonably accommodated in some other manner.

Efficiency
The desired result of land use and/or development must be produced with the minimum expenditure of resources.

Optimising land use management and development opportunities requires efficiency in institutional arrangements and operations, adopted procedures, the settlement form or pattern, and the utilization of man-made or natural resources during land planning and development.

Land use management norms based on this principle are:
• Land use planning and development should promote the development of compact human settlements, combating low density urban sprawl;
• The areas in which people live and work should be close to, or integrated with, each other;
• Land development should optimise the use of existing resources including resources such as bulk infrastructure, roads, transportation and social facilities;
• Land development should take place within the fiscal, institutional and administrative means of the municipality;
• The contributions of all sectors of the economy (government and non-government) to land development must be encouraged and optimised so as to maximise the municipality’s capacity to undertake land development;
• The municipality should co-ordinate the interests of the various sectors involved in or affected by land development so as to minimise conflicting demands on scarce resources.

Integration

The separate and diverse elements involved in development planning and land use should be combined and coordinated into a more complete or harmonious whole.

The principle of integration reflects the need to integrate systems, policies and approaches in land use planning and development, in two areas. Firstly it requires that the planning process is integrated, taking into account the often disparate sectoral concerns, policies and laws and their requirements, and reaching conclusions that are efficient and sustainable from a management and governance point of view. Secondly it requires an integrated spatial outcome, one that breaks down not only the racial and socio-economic segregation that characterises the city, but which also strives for the integration of different land uses, places of living with places of working and shopping and relaxing.

Land use management norms based on this principle are:
• Land use planning and development decisions should take account of and relate to the sectoral policies of other spheres and departments of government;
• Land development should contribute to the correction of the historically distorted spatial patterns of settlement in the Republic and to the optimum use of existing infrastructure in excess of current needs;
• Land use and development should promote efficient, functional and integrated settlements;
• Residential and employment opportunities should be located in close proximity to, or integrated with, each other;
• Land use and development should promote racial integration;
• Land use and development should promote mixed use development.
• A diverse combination of land uses, also at the level of individual erven or subdivisions of land, should be promoted;
• Land use and development should be determined by the availability of appropriate services and infrastructure, including transportation infrastructure;
• Land development in rural and urban areas should be promoted in support of each other.

Large gated estates (business park or residential) tend to have a negative impact on city form, connectivity and integration. See Appendix D for guidelines on how to respond to gated estates in such a way as to minimise these impacts and to ensure that integrated settlements are developed in the area.

Fair and good governance

Land use management must be democratic, legitimate and participatory.

Land use management is a centrally important government function, directly affecting the lives of all people. It is therefore particularly important that it is characterised by fairness and transparency and that people are afforded a meaningful right to participate in decisions. Where land development projects are initiated by the private and non-governmental sectors, there must be procedures that ensure that interested parties have an opportunity to express their views or to object. In the interests of good governance it is essential that there be effective coordination between the different sectors and spheres involved in land use and development. The greater the coordination, cooperation and transparency of the planning process within government the greater will be the prospects of members of the public being able to engage with the decision making in a constructive manner.

Land use management and land development norms based on this principle are:
• Affected parties have a right to access information pertinent to land use and development plans that are being considered by land use regulators;
• Capacities of affected communities should be enhanced to enable them to comprehend and participate meaningfully in development and planning processes affecting them;
• Decisions must be made in the public domain, with written reasons available to any interested party on request and no planning decisions taken behind closed doors;
• The names and contact details of officials with whom the public should communicate in relation to land use management and land development matters must be publicised;
• Land use and development decisions must be taken within statutorily specified time frames; and
• Accessible participatory structures should be created to allow interested and affected parties to express their concerns or support for any land use or land development decision at sufficiently early stage in the decision-making process.

e) Land Use Management Elements
Planning for Community and Social Facilities
Effective management of development in the Verulam-Cornubia local area requires that sufficient land is retained for community and social facilities as development by the private and public sector proceeds. In the next 20 years, it is predicted that the population of the Verulam-Cornubia local area will grow from 81,544 to 230,302. This will require that, along with housing development to accommodate this growing population, the right mix of social facilities is provided. Agency needs: provide sufficient facilities as cost effectively as possible. When planning for social facilities, one must ensure that facilities are situated with easy access to reliable public service provision. Wherever possible the provision of social facilities should be combined to provide a multi-purpose centre where sharing of facilities can take place. See example of multi-purpose centre in Cato Manor (Figure 4-19 and Box 1 overleaf).

Table 4-10 provides an indication of some of the standards used for the provision of community facilities. These guidelines are subject to review, and should be used together with consulting the municipality’s Access Model to determine the social facility needs for the area.

Figure 4-19: Example of Multi-Purpose Facility, Cato Manor

Table 4-10

13 PPDC, 2006: 42
# Table 4-10: Community Facility Guidelines

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Standards</th>
<th>Source</th>
<th>Min Size (ha)</th>
<th>Max Access Distance (m)</th>
<th>Location Criteria</th>
<th>Clustering</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDUCATIONAL FACILITIES</strong></td>
<td></td>
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<tr>
<td>Crèche</td>
<td>1,000</td>
<td>KZN PPDC</td>
<td>0.4</td>
<td>750</td>
<td>Predominantly residential areas or places employment &amp; on route taken by older children walking to school</td>
<td>Community Centres</td>
<td>Alternative (KZN PPDC): 2.4 ha (1.4 ha buildings + 1 ha recreational space)</td>
</tr>
<tr>
<td>Primary School</td>
<td>700</td>
<td>KZN PPDC &amp; KZN DoE</td>
<td>2.8</td>
<td>1,500</td>
<td>Close to public transport &amp; located near to but not on main roads (block or two back); ideally accessible by foot; in rural areas may be required to walk further distances</td>
<td>Library; crèche; secondary school; community hall; local sports fields (incl. multipurpose outdoor courts); community parks; swimming pool; urban agriculture; primary health care centre; religious centre</td>
<td>Alternative (KZN PPDC): Min 1.5 ha (buildings + playground); standard size 4.6 ha including all facilities</td>
</tr>
<tr>
<td>Secondary School</td>
<td>1,500</td>
<td>KZN PPDC &amp; KZN DoE</td>
<td>4.8</td>
<td>2,250</td>
<td>Close to public transport &amp; located near to but not on main roads (block or two back); ideally accessible by foot; in rural areas may be required to walk further distances</td>
<td>Library; primary school; tertiary education facilities; community hall; sports stadium; local sports fields (incl. multipurpose outdoor courts); metropolitan &amp; district parks; swimming pool; urban agriculture; primary health care centre; religious centre; hall may be shared with municipality if within walking distance from school</td>
<td>Alternative (KZN PPDC): Min 1.5 ha (buildings + playground); standard size 4.6 ha including all facilities</td>
</tr>
<tr>
<td><strong>HEALTH FACILITIES</strong></td>
<td></td>
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<tr>
<td>Mobile Clinic</td>
<td>1 per 900 du</td>
<td>Behrens &amp; Watson</td>
<td>NA</td>
<td>1,000</td>
<td>Should be within close walking distance of population served.</td>
<td></td>
<td>Temporary service</td>
</tr>
<tr>
<td>Satellite Clinic</td>
<td>2,000</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.25</td>
<td>250</td>
<td>Should be within 5 minutes walk from public transport stop and/or near public transport interchanges &amp; main thoroughfares</td>
<td>Primary &amp; secondary schools; tertiary education facilities; community hall; indoor sports hall; local sports fields (incl. multipurpose outdoor courts); community &amp; district parks; urban agriculture; L1 hospital</td>
<td>Alternative: Clustered 1 per 5 000 people (KZN PPDC)</td>
</tr>
<tr>
<td>Community Health Centre</td>
<td>1 per 70,000-100,000 people</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>4.5</td>
<td>250</td>
<td>Should be within 5 minutes walk from public transport stop and/or near public transport interchanges &amp; main thoroughfares</td>
<td>Primary &amp; secondary schools; tertiary education facilities; community hall; indoor sports hall; local sports fields (incl. multipurpose outdoor courts); community &amp; district parks; urban agriculture; L1 hospital</td>
<td>Alternative: Clustered 1 per 5 000 people (KZN PPDC)</td>
</tr>
<tr>
<td><strong>SOCIAL FACILITIES</strong></td>
<td></td>
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<tr>
<td>Community Facility Sites</td>
<td>1 per 3 000 people</td>
<td>KZN PPDC</td>
<td>0.2</td>
<td></td>
<td>Preferably on or near public transport routes, adjacent to other facilities or open space with which could be consolidated if site not developed as community facility</td>
<td></td>
<td>(A reserved site to be allocated to any community facility at the discretion of the municipality) 1 per 500 to 1 000 units in denser areas (Minimum 2 000m²) Useful for smaller social facilities (e.g. crèches, small clinics, worship centres, small halls, post boxes) when it's difficult to forecast future population in an area but important to reserve land</td>
</tr>
<tr>
<td>Facilities</td>
<td>Standards</td>
<td>Source</td>
<td>Min Size (ha)</td>
<td>Max Access Distance (m)</td>
<td>Location Criteria</td>
<td>Clustering</td>
<td>Comments</td>
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<tr>
<td>Community Hall</td>
<td>1 per 20,000 people</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.25</td>
<td>0.25</td>
<td>Near public transport stops/ interchanges &amp; on main transport routes; access by delivery vehicles required. In local urban node &amp; close to shops or shops included on the premises. Other community facilities such as library; primary &amp; secondary schools; tertiary education facilities; indoor sports hall; sports stadium; local sports fields (incl. multipurpose)</td>
<td>1 per 15 000-30 000 people</td>
<td></td>
</tr>
<tr>
<td>Mobile Library</td>
<td>1 per 2 000 people</td>
<td>Behrens &amp; Watson</td>
<td>1</td>
<td>1000</td>
<td>Where community activities occur (such as within community centres or civic centres) &amp; near or in shopping centres &amp; on main public transport routes in urban nodes. Near schools as increasing importance as study place for learners after school. Other community facilities such as library; primary &amp; secondary schools; tertiary education facilities; community park; religious sites, civic centre or town hall; municipal offices</td>
<td>Primary &amp; secondary schools; tertiary education facilities; community hall; community park; religious sites, civic centre or town hall; municipal offices</td>
<td>Alternative: 5 000 – 50 000 people (Red Book); 1 per 1800 du (Behrens &amp; Watson)</td>
</tr>
<tr>
<td>Library</td>
<td>2,000</td>
<td>KZN PPDC &amp; Red Book</td>
<td>0.5</td>
<td>2,250</td>
<td>Where community activities occur (such as within community centres or civic centres) &amp; near or in shopping centres &amp; on main public transport routes in urban nodes. Near schools as increasing importance as study place for learners after school. Other community facilities such as library; primary &amp; secondary schools; tertiary education facilities; community hall; community park; religious sites, civic centre or town hall; municipal offices</td>
<td>Primary &amp; secondary schools; tertiary education facilities; community hall; community park; religious sites, civic centre or town hall; municipal offices</td>
<td></td>
</tr>
<tr>
<td>Old Age Home/Welfare</td>
<td>1 per 5,000 sites</td>
<td></td>
<td>1</td>
<td></td>
<td>Central and near to but not on public transport routes. With business and institutional uses excluding entertainment, liquor etc. At central edge of neighbourhood Other public facilities to promote multi-functionality. Library; primary &amp; secondary schools; community hall; community park</td>
<td>Other public facilities to promote multi-functionality. Library; primary &amp; secondary schools; community hall; community park</td>
<td></td>
</tr>
<tr>
<td>Worship</td>
<td>1 per 2,000 people</td>
<td>KZN PPDC &amp; eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.15</td>
<td></td>
<td>Critically dependent on hydrological &amp; geological factors; consider strengthening connection between cemetery and community &amp; breaking down the scale of the cemetery (may help to overcome issues relating to private, on-site burials).</td>
<td>Other public facilities to promote multi-functionality. Library; primary &amp; secondary schools; community hall; community park</td>
<td>L1 Hospital; police station; fire station; nature conservation area as eco-cemetery or combined with botanical gardens (e.g. Canada); If cemeteries can be incorporated into parkland or as eco-cemeteries within conservation areas then could form part of usable Open Space provision Alternate standard is 1 per 100,000</td>
</tr>
<tr>
<td>Cemetery</td>
<td>Formulae to calculate cemetery size: Step 1 E = A/1 x B/1,000; Step 2 X = B1 x C x D1; Step 3 Y = B2 x C x D2; Step 4 Z = X + Y</td>
<td>KZN PPDC</td>
<td>2,37</td>
<td>5,33</td>
<td>Gross areas, including pathways, etc: Ethekwini Municipality uses as standard grave site size of 2,4m2 x 1,1m2</td>
<td>Critically dependent on hydrological &amp; geological factors; consider strengthening connection between cemetery and community &amp; breaking down the scale of the cemetery (may help to overcome issues relating to private, on-site burials).</td>
<td>L1 Hospital; police station; fire station; nature conservation area as eco-cemetery or combined with botanical gardens (e.g. Canada); If cemeteries can be incorporated into parkland or as eco-cemeteries within conservation areas then could form part of usable Open Space provision Alternate standard is 1 per 100,000</td>
</tr>
<tr>
<td>Facilities</td>
<td>Standards</td>
<td>Source</td>
<td>Min Size (ha)</td>
<td>Max Access Distance (m)</td>
<td>Location Criteria</td>
<td>Clustering</td>
<td>Comments</td>
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<tr>
<td><strong>PUBLIC SERVICE &amp; CIVIC FACILITIES</strong></td>
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<tr>
<td>Fire Station</td>
<td>1 per 100,000 people</td>
<td>Behrens &amp; Watson</td>
<td>0.5</td>
<td>5,000</td>
<td>Cluster post boxes in highly accessible location within residential areas. Prefer site in urban node or shopping centre; good access from main transport routes; visible to public with disabled access</td>
<td></td>
<td>Alternative: 60 000 people (de facto) eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
</tr>
<tr>
<td>Police Station</td>
<td>1 per 4,500 du</td>
<td></td>
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</tr>
<tr>
<td>Post Office</td>
<td>2,000</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.5</td>
<td>1,000</td>
<td>Cluster post boxes in highly accessible location within residential areas. Prefer site in urban node or shopping centre; good access from main transport routes; visible to public with disabled access</td>
<td>Business &amp; shopping centres near civic centres, municipal offices and other social institutions/ facilities (e.g. pension pay-points &amp; community centres).</td>
<td>Shop size 80-100m² / land 200m²; 500m² if stand-alone facility</td>
</tr>
<tr>
<td><strong>CULTURAL OPEN SPACES</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Food Gardens</td>
<td>1,200</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.15</td>
<td></td>
<td>As close as possible to residential areas where the need exists or travelling and security purposes* close to planned sports fields, parks, etc. to minimise possible fencing costs (garden can latch onto existing fencing) * close to rivers which are natural resources for irrigation * under power-line servitudes where these activities are protected from competing land uses (e.g. housing) * public open spaces in poor areas often become dumping grounds for domestic rubble - these are potential garden sites</td>
<td>Natural Conservation Area; secondary schools; tertiary education institutions; community hall; primary health care centre; smaller community &amp; district parks; sports fields near potential market spaces.</td>
<td>Close proximity to homes of the gardeners; ideally less than 200 m away for surveillance purposes &amp; transport of produce or at least within easy walking distance</td>
</tr>
<tr>
<td>Market - Trading Spaces</td>
<td>2,000</td>
<td>eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>0.4</td>
<td>4,000</td>
<td>Accessible by public or private transport. Usually on the side of major internal roads or close to public transport ranks &amp; interchanges. At designated market/ business areas/ zones (informal trading sites, business hives, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SPORTS &amp; RECREATION AMENITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports fields</td>
<td>2,130</td>
<td>Cato Manor Structure Plan; KZN PPDC &amp; eThekwini Social Facilities Accessibility Model (CSIR, 2006 &amp; 2008)</td>
<td>1.5</td>
<td></td>
<td>In lower income area where public fields are shared with schools should try to provide 1 field per 3 Primary Schools or 12 000 people</td>
<td>Larger competitive sports fields within clusters of schools, close to private sports clubs &amp; public transport services. Can be located in flood lines, as long as all the buildings are outside the hundred year flood line.</td>
<td>Primary &amp; secondary schools; tertiary education institution; community hall; indoor sports hall; sports stadium; district &amp; community parks; swimming pool</td>
</tr>
<tr>
<td>Play Areas</td>
<td>500</td>
<td></td>
<td>0.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Land Use and Activity Framework identified a hierarchy of existing and proposed mixed use nodes within the local area. Nodes are clusters of mixed land use (including residential) which provide the surrounding areas access to a range of commercial and social services and transportation opportunities at different scales. Most nodes irrespective of their place in the hierarchy will invariably be mixed in use; however each has a primary and unique character or role i.e. business, tourism and recreation, shopping, or entertainment. Nodes provide convenient and efficient access to commercial and community facilities while at the same time establishing identity, focus and protection of the character of urban and rural areas.

The physical form of the nodes will be dependent on the function, size and age of the node. They can take the form of a grid of streets, a single major intersection, a single activity street or single large site, but all of which include a cluster of mixed use and activity. The role of the node will inform the nature of investment opportunities and development interventions required i.e. regeneration or revitalization.

The hierarchy of nodes within the metropolitan area is defined in Table 4-11 below. The table also indicates responses around density and public transport, as well as examples of similar nodes in other areas of the municipal area.

**Box 1: Example of sharing of community facilities: Cato Crest Multi Purpose Centre, Cato Manor**

The development of this shared facility achieved significant savings in site size and cost.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Site size (m²)</th>
<th>Typical site Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary School</td>
<td>4 600</td>
<td>4,6 ha</td>
</tr>
<tr>
<td>Primary School</td>
<td>4 000</td>
<td>2,4 ha</td>
</tr>
<tr>
<td>Sports field</td>
<td>7 000</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>1 850</td>
<td></td>
</tr>
<tr>
<td>Community Hall</td>
<td>2 450</td>
<td></td>
</tr>
<tr>
<td>Parking / Public Square</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td>Public Road</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20 830</strong></td>
<td><strong>(2 ha)</strong></td>
</tr>
</tbody>
</table>

Table 4-11: Hierarchy of Nodes

<table>
<thead>
<tr>
<th>TYPE OF NODE</th>
<th>DESCRIPTION/ROLE</th>
<th>LOCATION</th>
<th>LAND USE and DENSITY</th>
<th>TRANSPORT</th>
<th>ZONING OPTIONS</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>METROPOLITAN NODE</td>
<td>A specialised centre of activity that benefits and serves the whole metropolitan area.</td>
<td>Must be in a highly accessible location such as near freeway interchanges or intersections of major arterials.</td>
<td>Will depend on type of specialised activity. Usually a mix of land uses will support the dominant use (e.g. airport).</td>
<td>Highly accessible by public transport and includes high order public transport facilities (bus/taxi rank and/or train station).</td>
<td>Special zone, or mix of commercial, office and general residential zones</td>
<td>King Shaka International Airport and Dube Trade Port, Gateway Shopping Centre, Office Parks and Umhlanga Hospital, Durban and Pinetown CBDs</td>
</tr>
<tr>
<td>SUB-METROPOLITAN NODE</td>
<td>A highly accessible shopping, business, transport and social services centre for a sub-metropolitan area.</td>
<td>Must be in a highly accessible location such as near freeway interchanges or intersections of major arterials.</td>
<td>Mixed-use higher order commercial (retail and office), entertainment, associated with higher density residential development in the vicinity of the node. Could include entertainment and hotels. Includes both town centres and sub-regional shopping centres. Often surrounded by higher density residential development.</td>
<td>Highly accessible by public transport and includes high order public transport facilities (bus/taxi rank and/or train station).</td>
<td>Special zone, or mix of commercial, office and general residential zones</td>
<td>Pavilion Shopping Centre, Westway Office Park, Westville Hospital, Bridge City centre, court, hospital and surrounding high density residential Verulam, Tongaat,</td>
</tr>
<tr>
<td>LOCAL URBAN NODE</td>
<td>A day to day shopping, business, transport and social services centre for a local community only.</td>
<td>Should be located in a highly accessible area.</td>
<td>Integrated mixed use centres with local shopping and social services, with some restaurants and offices. Includes lower order town centres and mid-sized shopping centres. Often surrounded by higher density residential development.</td>
<td>Accessible by public transport and include public transport facilities (bus/taxi rank).</td>
<td>Mix of commercial, office and general residential zones</td>
<td>Phoenix, Newlands, KwaMashu, Cornubia, Musgrave Centre</td>
</tr>
<tr>
<td>NEIGHBOURHOOD NODE</td>
<td>A day to day shopping and social services centre for a neighbourhood only.</td>
<td></td>
<td>Local level and smaller scale convenience shopping and services, usually located within residential areas. May be associated with higher density residential development around the node.</td>
<td>Accessible by public transport and include public transport drop off points. Street based centre with convenient access and parking for quick shopping trips (usually free parking).</td>
<td>Mix of commercial, office and general residential zones</td>
<td>Davenport Centre, Glenwood Windermere Centre, Morningside</td>
</tr>
</tbody>
</table>
4.6.2 Guidelines for the Intervening in the Housing Project Cycle

In order to ensure the use of housing for the overall Local Area objectives as well as the Housing and Density Goals for the Tongaat Local Area, it is suggested that the early stages of the housing project are the ones where it is critical for the municipality to pay close attention. A further rationale for close attention at the early stages is because the majority of the municipality’s capital budget is currently dedicated to housing. It is recommended that the design brief should be developed by a multi-departmental forum such as the Housing Working Group (or its successor structures), with the assistance of the Housing Project Managers and the Housing Planning Unit, and that the housing layouts should be reviewed by the same structure before the detail design and implementation processes commence.

For the housing officials, it is suggested that there should be bonus-linked targets for the provision of health and safety infrastructure, and that the majority of the performance bonuses available should be for the provision of health and safety infrastructure.

In order to help break the patterns of low-density housing typologies (and the link between planning & survey fees and numbers of residential sites), and to help break the pattern of under-provision of social facilities and other uses, it is suggested that there be a further intervention in the design phases by changing the way that planning professionals are paid, and by changing the way that housing official’s performance bonuses are calculated.

For the planning professionals, it is suggested that alternatives be found to fees based on the numbers of individual sites that are planned. One suggestion is to examine the possibility of fee payments as a percentage of total estimated development cost. Another is to agree a fixed fee.

For the housing officials, it is suggested that there should be bonus-linked targets for the provision of complete human settlements, and that the CSIR planning standards be used as the basis for generating numeric targets. It is suggested that some bonuses linked to numeric targets for housing units be retained, but that the targets be broken down into sub-targets for preliminary planning, detail planning, key hand-overs (occupation certificates) and opening of township register.

4.6.3 Environmental Guidelines

Environmental resources in eThekwini place certain limitations on how and where development can occur. The limitations are, however, underscored by the fact that a self-sustaining ecological system will support services that are critical to the successful development of the NUDC. It is therefore necessary for development activities to take place within certain parameters as determined by legislative requirements, the nature of the receiving environment, and the nature of the activity being undertaken. Generally, the parameters will be applied in this order as well – i.e. legislation, location and then activity.

a) Environmental Impact Assessment (EIA) Regulations

Environmental Impact Assessment-based approvals are required for certain developmental activities under the auspices of the Environmental Impact Assessment Regulations. Some of the activities which potentially would trigger the need for environmental approval (from the KZN Department of Agriculture and Environmental Affairs (DAEA) or National Department of Environmental Affairs (DEA)) include:

- Most development activities inside areas protected or recognised through formal protected status, designation in spatial planning frameworks, identification through biodiversity planning processes or under international conventions, as well as within a 5-10km buffer;
- Facilities for any purpose in a watercourse, or within 32 metres from the watercourse unless a setback line has been determined;
- Most development activities in estuaries;
- Removal of natural vegetation irrespective of the level of degradation, in sensitive areas;
- Most water related bulk services installations and facilities, or linear infrastructure where it falls outside an urban area and is longer than 1km;
- Constructing water reservoirs in urban areas on land zoned or earmarked for open space use;
- Masts higher than 15m in urban areas on land zoned or earmarked for open space use;
- Electricity supply and distribution above 33kV levels
- The construction or planning or roads;
• Tracks or routes for motor vehicles in areas of natural vegetation outside urban areas;
• Railway lines;
• Facilities for agri-industrial purposes outside of designated industrial areas;
• Mining and prospecting permits;
• Facilities for the concentration of animals and livestock should the concentration exceed certain specified thresholds;
• Facilities for aquaculture with a throughput of 10 tons or more per year;
• The transformation of undeveloped, vacant or derelict land if the development exceeds certain sizes;
• The dredging, excavation, infilling, depositing, removal or moving of soil, sand, shells, shell grit, pebbles or rock exceeding 5m³ from a watercourse, the sea, seashore or the littoral active zone;
• Construction or earth-moving activities in the sea or within certain coastal zones demarcated by the Integrated Coastal Management Act (this includes buildings, walls, embankments and/or infrastructure) unless it falls outside a setback line;

b) Location guidelines

Heritage
Legislation provides for the formal preservation of cultural resources in the eThekwini Metropolitan Area. At a national level there is the National Heritage Resources Act 25 of 1999, and at a provincial level, the KwaZulu-Natal Heritage Act (Act 10 of 1997) applies. The management of heritage resources in the Province now resides with Amafakalense (Heritage KwaZulu-Natal) as the statutory heritage conservation agency. Locally, by-laws promote preservation through listing of buildings of cultural and historical significance. Most large new development activities require at least a basic cultural historic scan, which will determine whether or not further assessments and authorisations are required.

Additionally, there are a range of incentives within the city to encourage the protection of cultural and historical sites. These include rate rebates, relaxation of certain town planning regulations, transfer of development rights and civic awards.

eThekwini Environmental Services Management Plan
Within the project area the remaining areas of natural habitat, wetlands and riparian areas, forests and current protected areas are important for biodiversity. The Durban MOSS and the Durban Environmental Services Management Plan (EESMP) are the two municipal policies that drive the protection of biodiversity and these important ecological open spaces. The EESMP, approved by Council in 2003, aims to protect and secure the full range of environmental goods and services provided by natural features. About 63 000 ha or 27% of land in the Municipal area has been identified as environmentally sensitive in the EESMP. Much of this land cannot be developed due to the nature of the land (e.g. steep slopes or within Flood lines), because it is zoned as open space or because it is set aside as nature reserve. Other portions of land are privately land and may have been allocated zoning ‘rights’ (i.e. potential development ‘rights’) in the past. Owners or developers of such land are encouraged to seek early input from the Environmental Management Department to ascertain potential environmental constraints on specific properties.

When development is proposed or planned:

• A scan of the Municipality’s Environmental Services Plan (on the Municipality’s GIS system) should be undertaken to determine whether the property is identified as environmentally sensitive, or is adjacent to environmentally sensitive land.
• If sensitive features are present, the developer should consult with the Environmental Management Department regarding the importance of the environmentally sensitive area and its potential impact on the development proposal.
• The outcome of discussions with the Environmental Management Department may include requirements to undertake a site analysis (for example, delineation of wetland areas or a vegetation assessment), to prepare an Environmental Management Plan, as well as advice concerning the EIA process.

At a provincial level the Ezemvelo KZN Wildlife authority has prepared a provincial spatial systematic conservation plan that sets out how protected areas should be designated to maximise biodiversity protection. The plan sets targets for biodiversity protection and
areas of land necessary to meet these targets. Any development that occurs should take cognisance of the spatial targets set in the plan.

**Flood Lines**

In order to avoid damage to structures in flood-prone areas and to avoid disrupting the natural processes within floodplains, low-lying areas should remain free of development. Specifically, land below the 1:100 year flood line should remain uncluttered, but ideally a further setback or buffer area should remain clear.

The development guidelines that need to be applied in the NUDC are:

- No development within the 100-Year Flood line;
- A setback area or buffer strip of natural vegetation or close-growing grass above the designated flood line should be maintained. The width of this strip will need to be determined by the type of adjacent development or activity and factors such soil type, slope, water table, etc.;
- Only compatible Land Use Options are allowed (e.g. picnicking, bird watching, walking trails or carefully planned sport facilities and controlled natural grazing stock);
- Development along a river must be based on a recent mapping the 1:50 and 1:100 year Flood lines;
- Relaxation of development controls may only be considered in special circumstances:
  - if required to protect existing development or infrastructure
  - if there is a demonstrable net benefit to river health
  - if modifications to the riparian zone are required to address Storm water attenuation requirements and the interventions will lead to a demonstrable net benefit to river health

**Wetlands**

Wetlands are particularly important in terms of biodiversity conservation and water resource management. All wetlands therefore deserve protection from detrimental impacts through the application of suitable buffer areas. All developments should identify and delineate wetlands and should strive to retain and rehabilitate such areas. Any development that potentially impacts on a wetland through infilling, removal of material, etc. requires (at least) a Basic Assessment in terms of the EIA regulations.

The management requirements for wetlands are:

- The EIA regulations must be complied with where any development potentially impacts on a wetland area.
- Wetlands should be delineated in accordance with the Department of Water Affairs and Forestry’s minimum requirements, as outlined in “A practical field procedure for identification and delineation of wetlands and riparian areas” (DWAF, February 2003). The delineated wetland area and an additional minimum buffer of 15m outside the temporary zone should then form part of the local open space system, and may not be developed.
- Appropriate mitigation measures shall also be determined through the EIA process.
- Buffers between proposed development and wetland areas shall be determined through the EIA process. Suitable buffers are determined according to the size of the wetland and its conservation importance, as indicated in Table 4-12.

### Table 4-12: Buffer Zone Requirements for Wetlands

<table>
<thead>
<tr>
<th>Ecological Value Ranking:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size: Size: (distance is given in meters)</td>
<td>&gt;20ha</td>
<td>200</td>
<td>150</td>
<td>75</td>
<td>50</td>
<td>50</td>
<td>32</td>
</tr>
<tr>
<td>&lt;20ha</td>
<td>100</td>
<td>75</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

**Forests and Protection of Trees**

DWA, DAEA and Ezemvelo Wildlife are currently preparing policy principles and guidelines for co-operative control of development affecting natural forests in KwaZulu-Natal. Certain trees are also protected in terms of the List of Protected Tree Species published under The National Forests Act, 1998 (Act No. 84 Of 1998) as contained in the Government Gazette No. 767 (5 August 2005). A licence is required to interfere with any

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14 Developed for Cape Nature, from CSIR, J.Nel, pers. comm.)
such listed protected trees. For example, the Coastal Red Milkwoods *Mimusops caffra* which are typical of the dune and coastal forests are listed.

**Water resources and catchment management**

To ensure that the estuarine ecosystems remain intact and function in a manner that provides vital ecosystem services, the correct river discharge dynamics need to be maintained in order to ensure proper breach/flushing events and acceptable levels of pollution concentrations (sediments, nutrients, biological contaminants). The impact of sand mining along watercourses must be a specific consideration, as it influences the rate of beach regeneration through sediment deposition.

**Activity guidelines**

**Waste management**

Certain (most) activities and processes dealing with waste handling, processing and disposal require waste management licenses from either provincial or national authorities in terms of the Environmental Management: Waste Act (Act No. 59 of 2008). The Waste Management Regulations specify which activities require approval, and that the application process is identical to the EIA Regulations.

The Integrated Waste Management Plan (IWMP) of 2004 provides the road map for eThekwini as it outlines the intentions of the local authority and proposes actions and interventions to achieve these. The main goal of integrated waste management planning is to optimise waste management in a region by maximising efficient and minimising financial cost and environmental impacts (eThekwini Municipality, 2004).

**Agriculture**

Policy directives specific to eThekwini are outlined in the Agricultural Development Framework Plan for the Northern Agricultural Region (Institute of Natural Resources, 2005) which indicates the following as objectives for agriculture within eThekwini:

- Improvement of rural food security;
- The establishment of a small-scale commercial agriculture sector;
- Intensification and diversification of agricultural production;
- Establishment of an agribusiness sector; and
- Promotion of land reform initiatives.

**High Risk Areas**

The City has a disaster management plan that can manage and respond to disasters as they occur. From an environmental perspective, the objective is to manage growth and development in such a manner that hazardous environments are avoided, no new hazardous areas is created, and the ability for the environment to self-correct is maintained.

**Mining and Quarrying, Including Sand Winning**

Authorities tasked with permitting, monitoring and regulating mining activities in the eThekwini area should take full account of environmental resources that will be impacted on by mining activities, and then force the design and operation of the mining activities to accommodate the need for sustainability of shared access to the biophysical resources.

In particular, water use regulations pertaining to mining activities have been promulgated under the auspices of the National Water Act (Act No. 36 of 1998). Guidance on these “Regulations on use of water for mining and related activities aimed at the protection of water resources” (Government Notice No. GN704 dated 4 June 1999) is provided in the DWAF best practice guidelines mining (Water Management for Surface Mines (DWAF, 2008a), Integrated Mine Water Management (DWAF, 2008)). The requirements and guidance are extensive, but the responsibility for their application resides with the mining operators, Department of Mining and DWAF.

Sand winning, in particular, require a Consent Use Permit from the Municipality and is subject to authorization by the Department of Mineral and Energy Affairs and any environmental authorization in terms of the relevant legislation or as required by the Municipality. If the proposed sand winning is on communally held land the application is subject to the written authority of both the relevant Inkosi and the Ingonyama Trust. Any approval granted to undertake the activity shall be valid for a period not exceeding 2 years. Thereafter the applicant may reapply for the permit to be extended.

The Municipality shall monitor the practice and shall have the right to withdraw its approval should any detrimental environmental impacts or practices be detected and which are not addressed within a specified period determined by the Municipality. The approval would be subject to the reinstatement/ rehabilitation of the site to the...
satisfaction of the Municipality in accordance with an EMP detailed in the environmental assessment as required by the Municipality.

These reinstatement/ rehabilitation plans would also be detailed in the Environmental Management programme report that must be submitted to the Department of Mineral Resources in terms of the Minerals Act.

Air Quality and Pollution
Regulations that specify which activities and conditions require permitting under the National Environmental Management: Air Quality Act (AQA) (No 39 of 2004) were published in 2010. Like noise, air pollution is specifically included in Part B of Schedule 5 of the Constitution, which means that air pollution control is a local authority competence, provided that the local authority concerned has the capacity to carry out this function. Emission licenses are therefore issued by the local authority. Typically, the following activities require licenses (thresholds and conditions apply):

- Combustion installations;
- Petroleum storage and handling;
- Aluminium production;
- Agglomeration processes producing pellets or briquettes;
- Metal recovery;
- Storage and handling of coal and ore;
- Brick kilns and cement production;
- Production of chemicals and chemical fertilizers; and
- Waste incinerators;

Soak pits
Where the soil profile and slope stability allow, then generally for individual erven, individual sites may consider using soak pits for Storm water management. Such installations must, however, be designed with adequate capacity, access for maintenance and a sufficient lifespan.

Consequently, where existing soak pits are in use, a professional engineer must inspect all existing soak pits and certify the actual capacity and condition when new ground works or construction is proposed. New soak pits may be built on the basis of one cubic metre of clear volume to drain each and every 40 square metres of all hardened areas.

Noise Impact
At present the legal situation regarding environmental noise and in particular aircraft noise is in a transition phase. Provisions have been made in the Constitution and in framework legislation such as the National Environment Management Act for the generation of legal prescriptions for the control of noise, but empowering legislation to implement these measures is still under revision and not yet in place. In terms of the Constitution, noise pollution is a local government function, provided the local government has the capacity to perform this function. For this reason, noise pollution is set out in Schedule 5 of the Constitution as an area of provincial legislative competence. Although these are provincial laws, the onus is on local government to implement them.

The National Noise Control Regulations prescribe to the 7 decibel (dB) Rule. The ‘7 dBA rule’ set out in the Environment Conservation Act, which defines disturbing noise as that which exceeds the ambient sound level by 7 dBA or more as not being permissible. This rule allows for the control of environmental noise to be in line with ambient noise levels and to reflect activities in that particular area.

The regulations also describe a controlled area, which, with regard to aircraft noise, is described as a piece of land designated as a controlled area by the municipality where the calculated nosiness index, projected for a period of 15 years, exceeds 65 dBA.

EThekwini municipality deals with environmental noise complaints through its nuisance by-laws. The eThekwini municipality by-laws make it an offence if any person causes or creates a nuisance or allows a nuisance to arise or exist in circumstances under his control. Such a nuisance includes “…the reproduction of noise or vibration which arises from or is caused by the operation or use of equipment or machinery…” and also “…the production of noise by or arising from or caused by the operation or use of any device which produces, reproduces or amplifies sound”. The potential noise impacts of new developments are also dealt with when scrutinizing trade and development applications.

Visual Impact
Naturally, visual impacts are hard to standardise, as they are determined by personal preference and perceptions. It is therefore an aspect of development that must be treated with circumspect when it is necessary to evaluate it within permitting processes. Aspects to look at during visual impact considerations are:
• the Visual Envelope (i.e. extent of potential visibility, or where the development may be visible from);
• the Zone of Visual Influence (ZVI) (i.e. the area within which the proposed development could have an effect on visual amenity);
• viewer incidence;
• distance; and
• screening elements.

Storm water Management
As a general approach to Storm water management, sealed surfaces in catchments must be limited whilst water runoff should be retarded in order to increase on site water retention and absorption. A river and wetland setback standard should be applied so that rivers, wetlands and associated vegetation can contribute to water retarding and absorption. Storm water release from development sites may not exceed pre-development levels. This implies a reduction in the amount of impervious surfaces and on site retention. Without ecological reserve calculations, the ‘pre-development’ levels (esp. Storm water attenuation) are likely pre-1970 when large-scale catchment modifications commenced.

The following specific requirements are therefore applicable to developments:

• A Storm water management plan must be prepared by a suitably qualified civil engineer to the satisfaction of the Coastal, Storm water and Catchment Management Department, taking the following key guiding principles into account:
  o All Storm water generated on the site by the development should be contained on the site and post-development flows should not exceed pre-development flows.
  o Hardened surfaces should be minimised, retaining as much vegetated area as possible.
• The Storm water Management Plan must provide sufficient detail and information for Pre and Post determination of runoff including drainage lengths/slopes/times of concentration/vegetation/soil type/roofs, paved and other hardened areas/runoff coefficients used/rainfall intensities used and show peak runoffs and other assumptions/calculations made.

• Proposed management measures must be shown in detail demonstrating that the proposals are practical and workable.
• All Final stage/Construction drawings must include complete details of all storm-water structures, drainage pipes and sizes and all controls required for construction and must incorporate the approved engineered layout.
• Sensitive environmental areas (e.g. wetlands) should not be used as Storm water management areas as they already fulfil that function and should not be subjected to additional loading.
• Storage of hazardous substances in areas that generate Storm water runoff must comply with all necessary risk preventions such as impervious layers, leak detection and attenuation capture.

Catchment Management
In respect of Integrated Catchment Management, an integrated approach is required with regards to the abstraction from, and releases of water into watercourses since it not only impacts on the streams themselves but also the associated wetlands and estuaries. Holistic perspectives therefore need to:

• Maintain healthy aquatic and riparian ecosystems
• Maintain morphological stability
• Manage flooding to prevent loss of life and unreasonable damage to property
• Prevent pollution of water resources
• Include considerations of costs vs. benefits that account for ecosystem services in terms of social amenity value, ecosystem functionality and contribution to municipal services

Wastewater Treatment
Wastewater requires treatment prior to release and needs to comply with various standards to protection both human health and ecological functioning. Specifically, wastewater releases need to comply with the DWAF General Authorisation standards (General Limit Values) or permitting conditions that apply to permits granted for wastewater release over 2Ml/d (2000m$^3$). On site treatment further needs to comply with the eThekwini Municipality Water & Sanitation Unit Guideline No 12 for the "Installation of Privately Owned Low Volume Domestic Sewage Treatment Systems".
The actual wastewater disposal should also be considered within the context of the overall catchment ecological reserve. Alternative disposal ‘uses’ that replace abstraction from natural or clean sources can be investigated – e.g. the irrigation of sugar cane. Additional considerations become relevant though, such as the need for more stringent treatment during high rainfall periods to compensate for the shorter natural ecological breakdown period. Where it is appropriate nutrient rich water should be directed through wetlands rather than directly into main watercourses, in order to maximize the opportunity for natural ecological processing.

In the study area, discharge standards should exceed (be better than) minimum requirements, as the overall water system is already stressed.

4.6.4 Landscape and Built Form Guidelines

The tables on the following pages provide guidelines for the urban design of residential areas, mixed use nodes, and business parks. These comprise directives on how both the built form and landscape can be designed to facilitate human-scale, attractive, safe and integrated human settlement.
RESIDENTIAL AREAS : URBAN DESIGN GUIDELINES

ASPECT: Layout and Character (Block and Subdivision Layout and Land Use)

1. Residential areas should be designed as neighbourhoods which form part of an identifiable “village” (urban or suburban) and which has a distinctive character. The character should be determined by the type and scale of streets, mix of building typology, landscaping, and by a mix of residential densities.
2. The character of residential areas/neighbourhoods or parts thereof should reflect the location of the neighbourhood in the precinct in which it is situated, and it should display clearly its urban and/or suburban features.
3. Residential areas should be structured by a hierarchical road and pedestrian network.
4. The structure of residential areas should be articulated by the location of community facilities and public places in central and or accessible locations which provide landmarks and legibility to the neighbourhood.
5. The structure of residential areas should be articulated by the shape, extent and potential use of the proposed open space network of the precinct within which it falls i.e. active open space or natural open space.
6. Higher density areas should be located in and around mixed use nodes and along public transport routes. Lower density areas should be located adjacent to rivers, streams and valleys, on steeper slopes i.e. adjacent to the proposed open space system. Densities should align with the Housing and Density Framework.
7. The layout of residential areas should respond clearly to important view sheds and vistas.
8. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the node.
9. Gated residential estates should comply with the Gated Estate Guidelines at Appendix D.

ASPECT: Public Realm

1. Streets, squares and parks should generally be treated as part of the overall open space system to provide linkage and structure to neighbourhoods.
2. Lower order streets and streets serving higher densities should be designed as multifunctional spaces to accommodate parking, play spaces etc.
3. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.
4. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.
5. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.
6. Lighting should be commensurate with the function of a street and/or public space.
7. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated.
8. Pedestrian route design should be integrated with overall neighbourhood design to ensure comfort and convenience for pedestrians and appropriate linkage with surrounding neighbourhoods.
**ASPECT: Built Form**

1. Building massing, and hence density, should conform to the density distribution guidelines for each Sub-Area.
2. Built form in higher density areas should be medium rise in accordance with location to other uses and activities in the area and should be used to define the character of the neighbourhood.
3. Building frontages, particularly in medium and high density typologies, should contribute to the public nature of streetscape. This can be accomplished through locating entrances at street level and through ensuring maximum surveillance of the street from units facing the street.
4. Building forms (in conjunction with the use of appropriate material, colours and textures) should be articulated and modulated to ensure a human scale and to merge in with surrounding landscape.
5. Built form in low density areas should be conceived of as “elements in the landscape” and should be unobtrusive in terms of massing, colours and materials.
MIXED USE NODES: URBAN DESIGN GUIDELINES

ASPECT: Layout and Character (Block and Subdivision Layout and Land Use)

1. Nodes should be designed and developed as “village or town centres” which display an integrated and cohesive character including a “high street”, public squares and spaces, fine grain block and subdivision pattern, fine grain building scale, identifiable townscape/landscape character, extensive tree planting, high levels of pedestrian orientation, mixes of building type and activity, including residential, and provision for public transport. The character should reflect its role in the metropolitan area and/or the surrounding settlement i.e. sub-metro, local etc.

2. Node developments should include a landmark element(s) that indicates its location in the district or neighbourhood in which it is located. This could be in the form of an appropriately scaled tower building, flagpole or gateway structure/feature.

3. Node Gateways/Entrances should be clearly visible and celebrated through the use of landmark landscaping elements (planting or structural) and or through the appropriate siting of buildings

4. Node edges should include interfaces that are integrated with and sympathetic to surrounding residential areas in terms of access and movement, scale of built form, scale and type of landscaping.

5. Edges and interfaces with limited access roads should be landscaped and/or architecturally treated to contribute to the experience of the road users. No service areas should face on to these roads unless adequately and appropriately screened.

6. Service areas should be hidden from view and should not impact on public spaces or on adjacent development or roads by way of noise, visual intrusion, smell etc.

7. Views lines in and out of the node onto landmark features or of special features/viewsheds of the node or of its surroundings should be accommodated in the layout of the node so as to encourage integration with the surroundings.

8. Land Use Mixes should reflect the role and hierarchy of the node.

9. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the node.

ASPECT: Public Realm

1. Streets, squares and parks should generally be treated as part of an integrated open space system to provide “linkage and structure” to the node, but also as the spaces in which public life occurs.

2. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.

3. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.

4. Hard (square) and soft (parks) public spaces and parking areas should be designed as focal points within the open space system linked together with streets as part of the overall public space system.

5. Street and public place design including landscaping should reflect a community/public character and scale

6. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.

7. Lighting should be commensurate with the function of a street and/or public space.

8. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated. Pedestrian routes should be designed to ensure comfort and convenience for pedestrians and should not be provided as an afterthought.
MIXED USE NODES: URBAN DESIGN GUIDELINES

9. Pedestrian movement should be integrated with surrounding areas and landscaping should contribute to movement hierarchy and to protection from sun and wind and should contribute to safety and security through lighting and appropriate route location.

10. Parking areas should be integrated with the node fabric as public space. They should be landscaped to prevent heat build up, to attenuate Storm water and to integrate building clusters.

ASPECT: Built Form

1. Built form in nodes should be concentrated and compact so as to define public spaces and places between them and so as to convey their public status in the landscape.

2. Built form should be fine “grain” and human scale – either as a collection of small buildings grouped tightly together or as larger buildings with fine grain modulation of facades and elevations.

3. Buildings should accentuate the role and character of the node with respect to scale and building typology.

4. Building massing and its articulation should be used to integrate nodes with surrounding residential areas. There should be no “back of building” conditions.

5. Built form should be used to articulate and or celebrate gateways and intersections and should provide landmark features within the overall settlement fabric.

6. Ground floor uses of buildings should be pedestrian oriented uses that provide interest, generate street activity and ensure surveillance of the street or public place onto which they face.

7. Roofs should be integrated with surrounding buildings and environments in terms of shapes and sizes, elevations, colours and textures so as to create an unobtrusive but interesting contribution to the landscape.
BUSINESS PARKS: URBAN DESIGN GUIDELINES

ASPECT: Layout and Character (Block and Subdivision Layout and Land Use)

1. Business Parks should be designed and developed to display an integrated and cohesive character. The character should reflect its role in the metropolitan area and/or the surrounding settlement i.e. sub-metropolitan, local etc.

2. Although Business Parks will predominantly consist of light industrial, warehousing and office uses, it should also accommodate other support uses including commercial, recreation, social and high density residential components to create an environment that meets a range of employees’ needs (e.g. restaurants, shops, child care facilities, gyms/recreation centres), facilitates a more vibrant atmosphere, and allows for 24 hour use of the area, improving security and safety.

3. Business Park layout should provide for human-scale public squares and spaces, a fine grain block and subdivision pattern, fine grain building scale, identifiable townscape/landscape character, extensive tree planting/landscaping, high levels of pedestrian orientation, mixes of building type and activity, including residential, and provision for public transport.

4. Business Park developments should include a landmark element(s) that indicates its location in the district or neighbourhood in which it is located. This could be in the form of an appropriately scaled tower building, flagpole or gateway structure/feature.

5. Business Park gateways/entrances should be clearly visible and celebrated through the use of landmark landscaping elements (planting or structural) and/or through the appropriate siting of buildings.

6. Wherever possible existing vegetation or distinctive site features should be incorporated into the layout of the Business Park. Landscaping should be indigenous in keeping with the sub-tropical character of the area.

7. Business Park edges should be integrated with, and sympathetic to, surrounding and internal residential areas and developments in terms of access and movement, scale of built form, and scale and type of landscaping.

8. Site design should ensure compatible transition from light industrial/warehousing uses to less intensive land uses, using streets, landscape features, open space/recreation areas or landscaping to effectively buffer uses.

9. Sites used for light industrial and warehousing purposes should be orientated towards access roads, and should not be accessible through residential streets.

10. Edges and interfaces with limited access roads (e.g. R102/N2) should be landscaped and/or architecturally treated to reduce visual impact and contribute to the experience of the road users. No service areas should face on to these roads unless adequately and appropriately screened.

11. Service areas should be hidden from view and should not impact on public spaces or on adjacent development or roads by way of noise, visual intrusion, odour etc.

12. Views in and out of the Business Park onto landmark features or of special features/viewsheads of the Business Park or of its surroundings should be accommodated in the layout of the Business Park so as to encourage integration with the surroundings.

13. A mix of site sizes should be provided to allow for a range of development options.

14. A land use mix on large sites should be encouraged to blend industrial warehouse and office uses with supporting uses creating a more human-scale and employee-friendly environment (multi-purposed facilities).
BUSINESS PARKS : URBAN DESIGN GUIDELINES

ASPECT: Public Realm

1. Streets, squares and parks should generally be treated as part of an integrated open space system to provide “linkage and structure” to the node, but also as the spaces in which public life occurs.
2. Streets and spaces should accommodate pedestrian activity in accordance with the role of the road/street in the overall precinct movement network.
3. Streets and public spaces should incorporate facilities for public transport and provision for disabled persons.
4. Hard (square) and soft (parks) public spaces and parking areas should be designed as focal points within the open space system linked together with streets as part of the overall public space system.
5. Street and public place design including landscaping should reflect a community/public character and human scale.
6. Landscaping should provide protection from climatic conditions of wind and sun and create street character and identity.
7. Lighting should be commensurate with the function of a street and/or public space.
8. Access and circulation networks and infrastructure for pedestrians and vehicles should be clearly differentiated. Pedestrian movement should be integrated with surrounding areas, and pedestrian routes should be designed to ensure comfort and convenience for pedestrians and should not be provided as an afterthought.
9. Landscaping should contribute to the movement hierarchy, to protection of pedestrians from sun and wind and should contribute to safety and security through lighting and appropriate route location.
10. Public parking areas should be integrated with the Business Park developments as public space. They should be landscaped to prevent heat build up, to attenuate Storm water and to integrate building clusters. Extensive parking areas in front of buildings should be broken up into smaller components and/or placed behind buildings to improve the human scale and the integration of elements within the Business Park.

ASPECT: Built Form

1. Built form in Business Parks should be as concentrated and compact as possible (within the limitations of the type of use) so as to define public spaces and places between them, and to create a human scale.
2. Built form should be fine “grain” and human scale – either as a collection of small buildings grouped tightly together or as larger buildings with fine grain modulation of facades and elevations.
3. Buildings should accentuate the role and character of the Business Park through building design, scale and typology.
4. Built form should be used to articulate and or celebrate gateways and intersections and should provide landmark features within the overall settlement fabric.
5. Building orientation and massing should be used to integrate the Business Park with surrounding residential areas and other uses. Large and bulky industrial buildings and ancillary structures should be oriented away from residential development/areas to avoid a negative visual impact.
6. A back-to-back relationship between light industrial and residential buildings is preferable where transitional uses are not in place, but may require substantial screening of unsightly views to ensure compatibility.
7. Buildings (including main entrances and pedestrian access) should be oriented towards the street. There should be no “back of building” conditions, or if this is unavoidable appropriate screening should be used to ensure no negative visual impact to adjacent uses.
8. Ground floor uses of commercial or mixed use buildings should be pedestrian oriented uses that provide interest, generate street activity and ensure surveillance of the street or public place onto which they face.
9. Roofs should be integrated with surrounding buildings and environments in terms of shapes and sizes, elevations, colours and textures so as to create an unobtrusive but interesting contribution to the landscape.
5 DEVELOPMENT PLAN

5.1 Implementation Framework

The NUDC is a part of the ongoing efforts and initiatives of both the Municipality and Province to give effect to the approved policies and strategies to deliver sustainable spatial development within the City and the Province.

The intention of this chapter is to identify some of the elements of an approach that will assist with the implementation of development within the NUDC and to begin to identify some of the critical actions that will need to be undertaken in order to significantly change the manner in which development will unfold in the north.

The approach has been informed by the following contextual characteristics of the north:

- The northern area of the Ethekwini Municipality is one of four sub metropolitan regions each competing for municipal investment to support and or stimulate growth and development;

- There are a myriad of development entities operating in the northern sub metropolitan areas each with their own agenda and each competing for public investment to support their development objectives. (i.e. HDA, THD, DTP, INK, DOT, ACSA etc)

Ethekwini has struggled to secure levels of economic growth and job creation to lift residents out of poverty and support sustainable development. The patterns of land ownership combined with the relocation of the airport have delivered a major development impetus to the north. Whilst being cognisant of the need to meet varied economic development needs around the entire city there is a case to seek to build on this northern impetus to secure private investment in employment creating businesses. Considerable land assets are available for these uses and could gain considerably through the delivery of whole communities in close proximity to support demand and to supply labour.

5.1.1 How to Build the Corridor?

The NUDC is at present not set up as a special project or initiative and therefore is not likely to be developed effectively and efficiently if it is left to happen in a “business as usual” and reactive development control manner.

The Municipality has however, through this project, initiated a process which is proactive and forward looking by identifying and assessing long term needs for land release and for associated infrastructure and transportation requirements.

However, the efficient and sustainable development of the NUDC will require on going significant, strategic and proactive intervention by the Municipality, in conjunction with other key role players, to change the nature of planning and development in the north and to influence the spatial redirection of both private and public investment.

5.1.2 Critical Success Factors

The following key interventions will be necessary in order to initiate and or consolidate development investment spatially within the NUDC in a manner that reinforces sustainable economic growth objectives in the eThekwini IDP and that are necessary to create employment and reduce poverty.

The key interventions are identified and explained below:

- Coordinate, integrate and align activities and energies of all key stakeholders
- Release land for development in a coordinated manner
- Align Public Investment for infrastructure, transportation, housing, community facilities
- Prioritise more detailed levels of planning in areas that will require rezoning
- Enforce the Urban Development Line and Development Phasing Line.
a) Coordinating, Integrating and Aligning

In the first instance it will be necessary for the Municipality to take the lead through playing an active coordinating and directing role in the area. In this regard three areas of coordination should be targeted.

- Alignment of Municipal stakeholders
- Alignment of other key public stakeholders
- Coordination of Private Stakeholders

In the first instance the objective is to ensure that all municipal sectors are made fully aware of the NUDC initiative and that their respective planning and budgets reflect the intentions of the initiative. The PSC for this project could be the initial coordinating mechanism.

In the second instance all provincial and national spheres of government and parastatals should made fully aware of the NUDC initiative and urged to align their respective planning and budgets to reflect the intentions of the initiative.

In the third instance a development forum consisting of key public and private sector development stakeholders in the north should be established in order to confirm and communicate a common direction for the north and to achieve a greater level of coordination with respect to individual stakeholder investment objectives.

The objectives of the forum should be based on the following principles:

1. Understanding and supporting existing energies and strengths of all stakeholder groups (i.e. Ethekwini Municipality, Dube Trade Port, Tongaat Hulett Developments, Airports Company SA and the Departments of Transport, Human Settlements, Agricultural and Environmental Affairs and Cooperative Governance and Traditional Affairs etc). Establishing what initiatives exist/or require establishing and communicate how the north fits into metropolitan priorities

2. Focusing investment – sectorally and spatially – Identifying and agreeing on common areas for both new development areas and for brownfields development and or redevelopment

3. Integrating investment by promoting projects and initiatives which mix public and private investment, where necessary, to achieve common goals

4. Shared benefits by ensuring that all stakeholders benefit from opportunities for development created by public investment.

c) Land “Release” Approach for 2030

Where should land be released for development?

The release of land for urban development has been informed by the objectives of the NUDC project as they relate to all of the Ethekwini Municipality’s existing policies with respect to the establishment of compact and integrated cities. However, it has also been considered in the light of the commitments and stated intentions of the Municipality, other government entities and the private sector.

The key element of the land release approach is to release land for both residential and non residential purposes in a manner that consolidates the existing fragmented urban form and that concentrates development around the proposed main transportation spines. It is necessary for there to be a shared commitment to this as both the state and private sector players have previously struggled to deliver development informed by these sustainability imperatives. In this context priority should be given to releasing land in areas where market demands intersect with infrastructure capacity or where infrastructure can be easily extended whether it is by the private sector or public sector or in some form of partnership (Figure 5-1).
It will do this through releasing land for development in the following areas:

- Cornubia new town project area,
- in the town of Verulam adjacent to its existing western residential areas,
- in the town of Tongaat adjacent to its existing residential areas,
- In the area known as Inyaninga,
- In areas that are already zoned for urban development.

**How much land should be “released”?**

The quantum of land that will be required to accommodate residential and economic growth for the next 20 years has been determined through the Scenario Development phase of the project and is summarised in Table 5-1, Table 5-2 and Table 5-3.

**Table 5-1: Industrial Land Requirements**

<table>
<thead>
<tr>
<th>Industrial Land Uses</th>
<th>Low Scenario</th>
<th>High Scenario</th>
<th>Gross Area provided in NUDC Framework (2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix /INK</td>
<td>8ha</td>
<td>15ha</td>
<td>245ha</td>
</tr>
<tr>
<td>Verulam/ Cornubia</td>
<td>38ha</td>
<td>90ha</td>
<td>331ha</td>
</tr>
<tr>
<td>Tongaat/Dube Trade Port</td>
<td>153ha</td>
<td>504ha</td>
<td>882ha</td>
</tr>
<tr>
<td>NUDC</td>
<td>199ha</td>
<td>609ha</td>
<td>1,458ha</td>
</tr>
</tbody>
</table>

**Table 5-2: Commercial Land Requirements**

<table>
<thead>
<tr>
<th>Commercial Land Uses</th>
<th>Low Scenario</th>
<th>High Scenario</th>
<th>Gross Area provided in NUDC Framework (2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix /INK</td>
<td>28ha</td>
<td>60ha</td>
<td>153ha</td>
</tr>
<tr>
<td>Verulam/ Cornubia</td>
<td>18ha</td>
<td>70ha</td>
<td>tbd</td>
</tr>
<tr>
<td>Tongaat/Dube Trade Port</td>
<td>23ha</td>
<td>72ha</td>
<td>73ha</td>
</tr>
<tr>
<td>NUDC</td>
<td>69ha</td>
<td>202ha</td>
<td>226ha</td>
</tr>
</tbody>
</table>

**Table 5-3: Residential Land Requirements**

<table>
<thead>
<tr>
<th>Residential Land Uses</th>
<th>Low Density (15du/ha)</th>
<th>High Density (100du/ha)</th>
<th>Gross Area provided in NUDC Framework (2030)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phoenix /INK</td>
<td>59ha</td>
<td>393ha</td>
<td>303ha</td>
</tr>
<tr>
<td>Verulam/ Cornubia</td>
<td>411ha</td>
<td>2,740ha</td>
<td>1,223ha</td>
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<tr>
<td>Tongaat/Dube Trade Port</td>
<td>208ha</td>
<td>1,387ha</td>
<td>884ha</td>
</tr>
<tr>
<td>NUDC</td>
<td>603ha</td>
<td>4,022ha</td>
<td>2,410ha</td>
</tr>
</tbody>
</table>

The exact phasing of development by private developers in the targeted areas in the next 20 years will be difficult to predict and therefore an approach should be adopted which provides for a level of flexibility within the targeted areas (Figure 5-2). Such an approach provides for a ‘window’ of development opportunities that can be sustainable serviced and allows for a developer to choose where within the ‘window’ development will occur.
What type of uses should be promoted?

In present day development processes the overwhelming demand from the private sector is for land uses that allow for greater degrees of flexibility whilst the public sector still seeks to secure some greater development certainty in space through relatively traditional zoning instruments. Raising densities and improving urban efficiencies does require a greater degree of flexibility within defined parameters, but also demands levels of public funding and private sector responsiveness that have been absent in many areas. Note should be taken of some of the following imperatives:

- Appropriate housing mix: this must be made possible to deliver housing opportunities across the full spectrum to avoid the existing binary of low cost vs. middle class cluster development.
- Mixed use commercial: Areas with a predominant commercial character could also accommodate mixes of residential and light industrial as well as appropriate institutional uses.
- Mixed use light industrial: Areas with a predominant light industry character could also accommodate varieties of commercial and residential uses as well as appropriate institutional uses.
- General industry and light industry mixes could include agri processing, industrial processes and the like.
- Agriculture, leisure and environmental land uses.

Alignment of Bulk Infrastructure Investment

Key bulk infrastructure elements relating to transportation, water and sanitation should be phased and prioritised towards the servicing of the targeted land release areas described above.

Principles that could be used to guide investment phasing within the 20 year planning horizon include:

- Infrastructure investment by public sector may need to invest ahead of demand in order to direct and facilitate private sector investment in targeted areas.
- Infrastructure investment should be monitored against actual development demand within the targeted areas and public investment structured so as to ensure that it will leverage private and other public development investment in these targeted areas.
- Infrastructure required for public housing should be phased as far as possible to align with requirements to service land for private investment that will result in employment generating land uses.

Alignment of Housing Investments

A key driver of new urban development will be the provision of new public low and middle income housing to meet expected population growth and to accommodate relocations from informal settlement upgrading programmes. The programme for the delivery of Greenfield or upgrading projects that have already been identified should be revisited in terms of their phasing in order to align the associated investment with that of the bulk infrastructure investment identified to serve the targeted land release areas.

Priority Planning Actions

Given the approach described above and the focus that this has on aligning stakeholders and their investment if follows that the next levels of detailed planning and design for the targeted areas needs to be prioritised. This needs to occur in terms of the package of plans approach so as to ensure that land is prepared for development in terms of environmental and planning authorisations.

Enforcing the Urban Development Line

The Urban Development Line (UDL), and the Development Phasing Line (DPL), are primary tools for directing both public and private development investment into particular areas so that long term sustainable spatial development objectives can be achieved. They should be implemented in a manner that sends a clear signal to both public and private investors.

The key objective is to make development on the inside attractive for urban development whilst simultaneously making rural / agricultural development viable on the outside of the line. This could be achieved by using a number of tools that could be applied in parallel.

- Restrict urban zonings outside the UDL/DPL.
- Limit infrastructure expansion into the Rural Corridor.
- Support Agriculture and Conservation activities in the Rural Corridor.
- Supporting agricultural land uses in the areas outside the DPL.
- Use Rates to encourage the appropriate development form in urban, suburban and rural areas.
5.2 Implementation Plan

A number of interventions across sectors have been identified in Verulam-Cornubia in order to realise the NUDC initiative. These interventions are listed and categorised in terms of:

- Short Term – immediate to 3 years
- Medium Term – 3 to 10 years
- Long Term – 10 to 20 years

Table 5-4: Implementation Plan

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Project Description</th>
<th>Responsibility</th>
<th>Budget Estimate (Rm)</th>
<th>Phasing (S/M/L term)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRECINCT PLANNING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC-P01</td>
<td>Verulam CBD extension</td>
<td>Precinct Plan for upgrade and extension of area between Verulam CBD and Hammonds Farm</td>
<td>DPEU</td>
<td>tbd</td>
<td>short</td>
</tr>
<tr>
<td>VC-P02</td>
<td>Cornubia</td>
<td>Precinct Plan for pilot public housing project</td>
<td>Housing</td>
<td>tbd</td>
<td>short</td>
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<td>VC-P03</td>
<td>Cornubia Sub-Area</td>
<td>Precinct Plan for Cornubia Sub-Area including for mixed use nodes</td>
<td>Private</td>
<td>tbd</td>
<td>short</td>
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<tr>
<td>VC-P04</td>
<td>Verulam West</td>
<td>Precinct Plan for extension areas in Verulam west</td>
<td>DPEU</td>
<td>tbd</td>
<td>short</td>
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<td>VC-P05</td>
<td>Sibaya West</td>
<td>Precinct Plan for Sibaya West including for mixed use nodes</td>
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<tr>
<td>VC-P06</td>
<td>Ottawa Industrial</td>
<td>Precinct Plan for proposed new Ottawa Industrial Area</td>
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<td>medium</td>
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<tr>
<td>TRANSPORTATION</td>
<td></td>
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<td>VC-T01</td>
<td>Public Transport Spine KSIA</td>
<td>Feasibility Study</td>
<td>PRASA</td>
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<td>VC-T02</td>
<td>East west link R102 – M4</td>
<td>Basic Planning – Prelim Design</td>
<td>eThekwini - developer</td>
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<td>VC-T03</td>
<td>Central Spine M41 – KSIA road</td>
<td>Basic Planning - Design - Construction</td>
<td>eThekwini - developer</td>
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<tr>
<td>VC-T04</td>
<td>Verulam CBD North Link</td>
<td>Basic Planning</td>
<td>eThekwini - developer</td>
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<td></td>
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<td>INFRASTRUCTURE</td>
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<td>VC-I01</td>
<td>Umdloti WWTS (WWTS)</td>
<td>Expansion of Treatment Capacity – 2030 scenario</td>
<td>EWS</td>
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<td>medium</td>
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<tr>
<td>VC-I02</td>
<td>Umdloti WWTS</td>
<td>Gravity Trunks – 2030 scenario</td>
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<tr>
<td>VC-I03</td>
<td>Umdloti WWTS</td>
<td>Pump stations &amp; Rising Mains – 2030 scenario</td>
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<td>VC-I04</td>
<td>Expansion of NUDC reservoir capacity</td>
<td>Increase NUDC reservoir capacity to 270ML – 2030 scenario (V/C – 82ML)</td>
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<td>340$^{17}$</td>
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<td>VC-I05</td>
<td>Umdloti WWTS</td>
<td>Expansion of Treatment Capacity – Ultimate scenario</td>
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<td>VC-I06</td>
<td>Umdloti WWTS</td>
<td>Gravity Trunks – Ultimate scenario</td>
<td>EWS</td>
<td>50</td>
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<td>VC-I07</td>
<td>Umdloti WWTS</td>
<td>Pump stations &amp; Rising Mains – Ultimate scenario</td>
<td>EWS</td>
<td>250</td>
<td>long</td>
</tr>
<tr>
<td>VC-I08</td>
<td>Expansion of NUDC reservoir capacity</td>
<td>Increase NUDC reservoir capacity to 610ML – Ultimate scenario</td>
<td>EWS</td>
<td>760$^{18}$</td>
<td>long</td>
</tr>
</tbody>
</table>

$^{16}$ All Mdloti WWTS upgrades also relate to Tongaat/Dube Local Area.

$^{17}$ Project cost for whole NUDC
<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Project Description</th>
<th>Responsibility</th>
<th>Budget Estimate (Rm)</th>
<th>Phasing (S/M/L term)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VC-09</td>
<td>Northern Aqueduct</td>
<td>Augment Northern Aqueduct to Cornubia / Blackburn – ultimate scenario</td>
<td>EWS</td>
<td>175</td>
<td>long</td>
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<tr>
<td>VC-10</td>
<td>Waterloo water supply</td>
<td>New pumps and pipeline from Mdloti to Waterloo – ultimate scenario</td>
<td>EWS</td>
<td>150</td>
<td>long</td>
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<tr>
<td>VC-11</td>
<td>Umdloti Desalination</td>
<td>Desalination at Umdloti to augment water supply – 100ML/day – ultimate scenario</td>
<td>EWS</td>
<td>1,000</td>
<td>long</td>
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<tr>
<td></td>
<td>ENVIRONMENTAL UPGRADE</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>VC-E01</td>
<td>Trenance Park Conservation Area</td>
<td>Prepare Environmental Management Plan for the conservation area</td>
<td>DPEU</td>
<td>0.1</td>
<td>Short</td>
</tr>
<tr>
<td>VC-E02</td>
<td>Ohlanga River</td>
<td>Prepare Environmental Management Plan for the conservation area</td>
<td>DPEU</td>
<td>0.3</td>
<td>Short</td>
</tr>
<tr>
<td>VC-E03</td>
<td>Umdloti River</td>
<td>Prepare Environmental Management Plan for the conservation area</td>
<td>DPEU</td>
<td>0.3</td>
<td>short</td>
</tr>
<tr>
<td></td>
<td>HOUSING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC-H01</td>
<td>In-situ upgrades (approved)</td>
<td>Housing projects as per eThekwini Housing Plan: Amaoti – Amaotana</td>
<td>Housing</td>
<td>tbd</td>
<td>short</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amaoti-Moscow</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Blackburn Village</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Cross Roads</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Hibiscus Rd</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Hilltop Rd</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ivy Close</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VC-H02</td>
<td>Greenfield projects</td>
<td>Housing projects as per eThekwini Housing Plan: Trenance Park 2B</td>
<td>Housing</td>
<td>tbd</td>
<td>medium</td>
</tr>
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<td></td>
<td></td>
<td>Hammonds Farm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cornubia Phase 1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Cornubia Phase 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cornubia Phase 3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hammonds Farm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hibiscus Road</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

18 Project cost for whole NUDC
5.3 Monitoring and Review

The LAPs prepared for the NUDC are not blueprints for development and therefore must be able to respond to changing circumstances in order to remain relevant. Such changes include changes within the broader policy environment, development pressures and/or changing political priorities. These changes however need to be effected through a coordinated monitoring and review system.

Monitoring and Review is process by which the success of the plan is assessed using key performance indicators that measure development trends, the plan is reviewed in light of these, and where necessary amended, or replaced to reflect necessary changes (Figure 5-3).

In order to measure these, a number of key performance indicators (KPI) linked to the critical success factors outlined in the implementation framework are proposed Table 5-5 to Table 5-10.

Review

The review of the LAPs in the NUDC is the responsibility of the Development Planning and Management Unit in conjunction with other municipal departments and in consultation with public and private stakeholders.

Whilst monitoring is ongoing, the review of the plan should occur every five (5) years. Any form of review must be based on the assessment of the plan according to the KPIs adopted.

Tools

Monitoring and review requires a number of tools. These include:

- **NUDC Trends Document** – a proposed annual publication which provides statistical information on a range of social, economic and environmental indicators, including development trends i.e. average annual take-up rates for industrial development, population and employment growth, housing delivery, public transport ridership, modal splits in public transport, changes in income levels, environmental impacts etc.

- **NUDC Development Database** – a spatial database (GIS) must be developed for the NUDC that captures where development applications are occurring, what types of development are being applied for, where applications conflict with the plan, number of completed building plans etc.

- **Household Travel Survey** – a vital source of information related to vehicle ownership, household travel patterns, origin destination data etc.

- **Town Planning Schemes** – the town planning schemes in the NUDC should be assessed and amended in light of the recommendations of the NUDC concepts and policies especially with respect to density, form and typology. The extension of schemes into Greenfield areas provides an opportunity to direct the nature of permitted development and prevent development from occurring outside of UDL or DPL.

![Figure 5-3: Monitoring and Review Process](image-url)
- **Medium Term Expenditure Framework Budget** – ensuring that the budget priorities of various municipal departments within the Municipality align with the proposed infrastructure plan of the NUDC will assist in releasing opportunity areas in a coordinated manner.

- **Municipal Publications (website and print media)** – the municipal communications department in conjunction with the Development Planning and Management Unit should regularly highlight the NUDC initiative, how the plans to realise the vision for the corridor are being implemented etc.

- **Forums** – integration between municipal departments, between different spheres of government and private stakeholders is best achieved through continued structured interaction.

The proposed KPI for the implementation of the NUDC are outlined in Table 5-5 to Table 5-10

**Table 5-5: KPI for Coordinating, Integrating and Aligning Key Stakeholders**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Target by 2030</th>
<th>Tool to Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adoption of plan by Council</td>
<td>• Council approved plan</td>
<td>• Adoption of plan by March 2010</td>
<td>• Council resolution</td>
</tr>
<tr>
<td>Awareness and acceptance of plan by all public and private stakeholders</td>
<td>• Interdepartmental municipal forum for development within the NUDC is established</td>
<td>• Forums meets quarterly to review progress in the NUDC</td>
<td>• Forum</td>
</tr>
<tr>
<td></td>
<td>• Intergovernmental forum for cross boundary planning between Ethekwini and Ilembe established</td>
<td>• Forums meets quarterly to review progress in the NUDC</td>
<td>• Forum</td>
</tr>
<tr>
<td></td>
<td>• Developers stakeholders forum established</td>
<td>• Forums meets quarterly to review progress in the NUDC</td>
<td>• Forum</td>
</tr>
<tr>
<td></td>
<td>• Marketing of NUDC aims and objectives in municipal publications</td>
<td>• Two articles per year on aspects of the NUDC plan in municipal publications</td>
<td>• Municipal publications</td>
</tr>
<tr>
<td></td>
<td>• Inclusion of implementation projects on municipal, provincial and national budgets</td>
<td>• All implementation projects to be factored into MTEF</td>
<td>• MTEF</td>
</tr>
<tr>
<td></td>
<td>• Initiation of further joint planning exercises where applicable</td>
<td>• Joint planning exercises to release growth areas are undertaken</td>
<td>• Forum</td>
</tr>
<tr>
<td>Objective</td>
<td>Indicator</td>
<td>Target by 2030</td>
<td>Tool to Measure</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
</tbody>
</table>
| Intensification and redevelopment of existing areas | Number of planning applications for brownfields redevelopment | • 30% of all new development within corridor to occur in existing areas | • Trends Report  
• Development database |
| | Review of existing public housing programme | • By July 2011 the Public Housing Sector Programme must align with the NUDC proposals | • Development database |
| Coordinated release of new areas for development | Review of existing Town Planning Schemes in light of new spatial concept and directives | • By December 2011, all existing town planning schemes to be reviewed | • Town Planning Scheme |
| | Extension of town planning scheme | • 100% of land within the DPL to be incorporated into a Town Planning Scheme with relevant controls | • Town Planning Scheme |
| | Provision of bulk infrastructure | • Bulk infrastructure is extended to meet 100% of 2030 development targets | • MTEF |
| | Development applications occur within DPL | • 100% of all applications are compliant with the DPL | • Town Planning Scheme  
• Forum |
| Manage amount of land available for development | Demand for development meets the supply of land | • 60,000 new residential units  
• 610ha of industrial land  
• 200ha of commercial land | • Trends Report  
• Development database |
| Protect biodiversity and environmental assets | Net land allocated for environmental protection | • No net loss of environmentally sensitive areas | • Trends Report |
| Provide good quality and affordable housing for residents in the NUDC | Net increase in residential units in NUDC | • 60,000 new residential units in NUDC | • Trends Report  
• Development database |
| | Upgrading of informal settlements | • All informal settlements to be upgraded | • Trends Report  
• Development database |
| | Increase in the provision of housing for the gap housing market | • 50% of new housing opportunities to be provided for the gap housing market | • Trends Report  
• Development database |
| | Increase in range of housing typologies | • 70% increase in the provision of multi-storey developments in the corridor | • Trends Report  
• Development database |
| Provide complete human settlements | Community facilities provided at the same time as housing | • No housing development permitted without commensurate community facilities provided/budgeted for | • Trends Report  
• Development database |
| | Community facilities backlog | • All residents in NUDC within 15 min travel time to community facility | • Trends report |
| Provide employment opportunities within NUDC | Increase net number of jobs in NUDC | • 30% increase in employment opportunities in the NUDC | • Trends report  
• Household Travel Survey |
| Develop a sustainable transportation network | A reduced reliance on private vehicles | • Modal split between private and public transport is 45:55 | • Trends report  
• Household Travel Survey |
| | Increase in Public Transport ridership for origins and destinations in NUDC | • Public Transport trips to increase by 40% compared to 2008 levels | • Trends report  
• Household Travel Survey |
## Table 5-7: KPI for Alignment of Bulk Infrastructure Investment

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Target by 2030</th>
<th>Tool to Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a sustainable bulk infrastructure network</td>
<td>• Bulk infrastructure is provided in growth areas ahead of development demand</td>
<td>• Bulk infrastructure is extended to meet 100% of 2030 development targets</td>
<td>• MTEF</td>
</tr>
<tr>
<td></td>
<td>• Introduction of developers levy</td>
<td>• Developers levy towards the provision of bulk infrastructure is calculated and enforced by 2012</td>
<td>• Trends Report</td>
</tr>
<tr>
<td></td>
<td>• Inclusion of implementation projects on municipal, provincial and national budgets</td>
<td>• All implementation projects to be factored into MTEF</td>
<td>• MTEF</td>
</tr>
</tbody>
</table>

## Table 5-8: KPI for Alignment of Housing Interventions

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Target by 2030</th>
<th>Tool to Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro Housing programme aligns with NUDC plan</td>
<td>• Aligned metro housing programme in terms of location and timing</td>
<td>• All metro housing projects approved comply with Housing Framework plan</td>
<td>• Trends Report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Development database</td>
</tr>
</tbody>
</table>

## Table 5-9: KPI for Priority Planning Actions

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Target by 2030</th>
<th>Tool to Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritisation of Planning Action Areas</td>
<td>• Priority action areas for precinct plans identified</td>
<td>• By December 2011, the top ten priority planning areas should be indentified</td>
<td>• Development database</td>
</tr>
</tbody>
</table>

## Table 5-10: KPI for Enforcing the Urban Development Line

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Target by 2030</th>
<th>Tool to Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection of the rural corridor</td>
<td>• No new development outside of UDL</td>
<td>• 0% increase in non-rural activity in the rural corridor</td>
<td>• Development database</td>
</tr>
<tr>
<td></td>
<td>• Increase in agricultural enterprises operating in the rural corridor</td>
<td>• 50% increase in agricultural entities operating in rural corridor</td>
<td>• LED programme</td>
</tr>
<tr>
<td>Compaction of the NUDC</td>
<td>• Increase in overall gross density of the corridor</td>
<td>• Overall gross density of the corridor increases to 30du/ha</td>
<td>• Development database</td>
</tr>
<tr>
<td></td>
<td>• New areas for development are released within the corridor</td>
<td>• 80% of new developments to comply with housing density framework</td>
<td>• Town planning scheme controls</td>
</tr>
<tr>
<td>Acronyms</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ACSA</td>
<td>Airports Company of South Africa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DAEA</td>
<td>KZN Department of Agriculture and Environmental Affairs</td>
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<tr>
<td>DEA</td>
<td>National Department of Environmental Affairs</td>
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<tr>
<td>DHS</td>
<td>Department of Human Settlements</td>
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<td>D'MOSS</td>
<td>Durban Metropolitan Open Space System</td>
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<td>Development Planning and Environmental Management Unit</td>
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<td>Department of Transport</td>
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<td>Dube Trade Port</td>
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<td>DWAF</td>
<td>Department of Water Affairs and Forestry</td>
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<td>Economic Development Unit</td>
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<td>EESMP</td>
<td>Ethekwini Environmental Services Management Plan</td>
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<td>Environmental Impact Assessment</td>
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<td>Ethekwini Municipality</td>
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<td>EP&amp;CPD</td>
<td>Environmental Planning and Climate Protection Department</td>
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<td>ETA</td>
<td>Ethekwini Transport Authority</td>
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<tr>
<td>GIS</td>
<td>Geographic Information System</td>
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<td>Ha</td>
<td>Hectares</td>
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<tr>
<td>HDA</td>
<td>Housing Development Agency</td>
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<tr>
<td>ICT</td>
<td>Information Communications Technology</td>
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<tr>
<td>IDP</td>
<td>Integrated Development Plan</td>
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<td>INK</td>
<td>Inanda Ntuzuma KwaMashu</td>
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<td>IRPTN</td>
<td>Integrated Rapid Public Transport Network</td>
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<td>IWMP</td>
<td>Integrated Waste Management Plan</td>
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<td>Key Performance Indicator</td>
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<td>King Shaka International Airport</td>
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<tr>
<td>KZNLGTA</td>
<td>Department of Cooperative Governance and Traditional Affairs (Previously DLGTA)</td>
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<tr>
<td>LA</td>
<td>Local Area</td>
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<td>LAP</td>
<td>Local Area Plan</td>
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<td>LRT</td>
<td>Light Rail Transit</td>
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<td>LUMS</td>
<td>Land Use Management System</td>
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<tr>
<td>MI</td>
<td>Mega litre</td>
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</tr>
<tr>
<td>NDPG</td>
<td>Neighbourhood Development Programme Grant</td>
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<td>NMPR</td>
<td>Northern Metropolitan Planning Region</td>
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<td>NSDP</td>
<td>Northern Spatial Development Plan</td>
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<td>NUDC</td>
<td>Northern Urban Development Corridor</td>
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<tr>
<td>PGDS</td>
<td>Provincial Growth and Development Strategy</td>
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<tr>
<td>PSC</td>
<td>Project Steering Committee</td>
<td></td>
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<td>PSEDS</td>
<td>Provincial Spatial Economic Development Strategy</td>
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<td>Public Transport</td>
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<td>SDF</td>
<td>Spatial Development Framework</td>
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<tr>
<td>TBD</td>
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<tr>
<td>THD</td>
<td>Tongaat Hulett Developments</td>
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<td>UDL</td>
<td>Urban Development Line</td>
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<tr>
<td>WWTW</td>
<td>Wastewater Treatment Works</td>
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<tr>
<td>ZVI</td>
<td>Zone of Visual Influence</td>
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</tbody>
</table>
7 GLOSSARY

Glossary of Terms and Concepts

100 Year Flood line – Line to which flooding is likely to occur on a 100 year interval.

Active Open Space – Open space used for formal or informal recreation and sport purpose including urban parks, play areas, sports fields, stadiums, cycling, walking and picnicking.

Aerotropolis - An urban form concept first defined by Dr. John D. Kasarda to explain how airports are becoming the central focus for urban development, a change from the traditional urban form focus around central city cores.

Brownfield Development - Development in existing developed urban areas.

Business Park Development – A development area consisting of a mix of light industrial and office development, with a trend towards larger office components as part of light industrial operations. Although a Business Park predominantly consists of light industrial, warehousing and office uses, it should also accommodate other support uses including commercial, recreation, social and high density residential components to create an environment that meets a range of employees’ needs (e.g. restaurants, shops, child care facilities, gyms/recreation centres), facilitates a more vibrant atmosphere, and allows for 24 hour use of the area, improving security and safety.

Commercial Development – Predominantly retail and office development with ancillary support land uses such as restaurants, cinemas, hotels, and public service facilities such as hospitals, libraries, government offices and service centres etc. While the focus of commercial areas is retail and office, a mix of uses including high density residential development would be appropriate; however industrial uses would not be suitable for a commercial development area.

Compaction - the redevelopment of existing properties to higher densities. May include the sub-division and development of large properties within urban areas, the construction of multi-unit developments on properties previously occupied by a single unit, or more incremental development in the form of additional or second units on existing single unit properties.

Densification – The increased use of space, both horizontally and vertically, within existing areas/properties and new developments, accompanied by an increased number of residential units and/or population thresholds. Densification has the following benefits – reduces urban sprawl, makes better use of the city’s limited resources, cuts infrastructure costs, supports public transport by increasing thresholds to make public transport viable, improves access to social and commercial facilities, employment and services, protects the environment by concentrating people in the urban environment, and makes neighbourhoods more safe by increasing surveillance. Densification is to be encouraged in areas with good access to infrastructure, social services and public transportation. Densification can be achieved through infill and/or compaction.

Density – The population or number of residential units divided by the land area where the population/residential units are situated. Gross Density is determined by dividing the total population/residential units of an identifiable town/urban/rural area/development site by the total land area of the town/urban/rural area/development site. Net Density is determined by dividing the population/residential units by the total residential land only within the town/urban/rural area/development site. This only includes access roads in the calculations.

Development Corridors - Linear systems of urban or rural land use, oriented and integrally linked to single (or multiple) forms of transportation routes/spines and are serviced by a hierarchy of nodes e.g. business, industrial, social, recreation etc. The corridors vary in type and include Rural Corridors, Urban Development Corridors (UDC) and Coastal Corridors.

Development Nodes - Clusters of mixed land use including residential which provide opportunity for mixed investment and which service surrounding urban or rural areas with respect to commercial and social services and transportation. Whilst the nodes, irrespective of hierarchy will invariably be mixed in use each of the nodes will have a primary character or role i.e. business, tourism and recreation, shopping, entertainment.

Development Phasing Line - A line located within the Urban Development Corridor (UDC) indicating the interim spatial limit to which development will be allowed to establish in accordance with infrastructure availability and capacity. This line may coincide with the UDL or it may fall within the UDL boundary.
**Development Spines** - Road and/or rail transportation routes that link various nodes, industrial opportunity areas and high density residential areas into linear urban or rural systems and form the spine to the corridor.

**Ecosystem Goods and Services** – Natural ecosystems contain resources and perform functions that provide directly or indirectly specific goods (e.g. water, wood, muthi plants, and food) and services (e.g. flood attenuation, water regulation, climate regulation, recreation space, erosion control) to society.

**Greenfield Development** – Development on previously undeveloped land, which is often rural or agricultural in nature.

**Industrial Development** – The use of land for the manufacturing, warehousing, storage, and/or the repair of goods, and related processes.

**Infill** - The development of greenfield areas within designated urban areas or within brownfield (existing urban areas) sites within designated urban areas.

**Lifestyle Options** - Clearly identifiable types of residential settlement that display varying characteristics with respect to density, building form, public space and landscape and include Urban, Suburban, Rural Agricultural and Rural Traditional.

**Local Areas** - Identifiable geographic areas within the sub-metro area which are physically and functionally connected and which display predominant and homogeneous characteristics i.e. urban, suburban or rural. Each plays an important role with respect to the achievement of the broader based growth and development objectives of the Municipality as well as ensuring that local needs are met.

**Logistics** – A business involving the planning and management of the flow of goods and services to a destination.

**Mixed Land Use** – A mix of existing or proposed compatible residential and non-residential land uses within the same area, on the same property or even within the same building. Mixed land use implies the context-appropriate intensity of land uses that should facilitate efficient public transport and a vibrant local urban environment.

**Multi-modal** – A public transport facility or site which acts as a hub for a range of modes of public transport, including rail, bus, minibus taxi, pedestrian and cycling, and which provides for the transfer from one mode of transport to another.

**Multi-purpose** – The combination of different yet compatible functions within one building or site to service a variety of social and community needs, to allow for a wider range of facilities that reinforce one another in close proximity allowing for greater access to potential users, and for more efficiency and cost-effectiveness in the provision and management of such facilities.

**Open Space System (D’MOSS)** - An interconnected and functional spatial system of open space which includes ecological assets that need to be protected and or conserved such as wetlands, grasslands, estuaries, rivers, forests, woodlands, coastal zones etc, as well as areas for recreation and sports. The system includes areas of active and passive open space.

**Passive Open Space** – Open space that is set aside for conservation purposes, and which would consist of at the very least a non-negotiable core to maintain biodiversity and ecosystem services such as Storm water management, soil maintenance and microclimatic amelioration.

**Sub-Area** – A smaller area identified within a Local Area as unique in character and identity and defined by major natural features such as river valleys and escarpments, major transport corridors (i.e. freeways or rail lines), and/or primary land use characteristics (i.e. identifiable residential, commercial or industrial area focused around economic activity and social facilities or areas of high ecological value).

**Sustainability** – In the context of land development, sustainability implies that the life cycle costs of land development and its likely side effects on the environment, community, and the economy need to be understood and taken into account to sustain its benefits, while minimising or mitigating any likely negative impacts.

**Upgrade** – In the context of public housing development refers to the redevelopment of an informal settlement area to provide new residential units and associated services to the same standard as greenfields public housing development.
Urban Development Line - A line demarcating the extent to which urban development will be permitted to establish in the urban development corridor in the long term. As such it also demarcates those areas that are to be protected and developed as rural and agricultural areas. The line has been drawn to include expansion areas for future growth and which are adjacent to existing urban areas.
REFERENCES


City of Tshwane (2007) Spatial Development Strategy 2010 And Beyond


Development Facilitation Act, 1995


SSI (2009) Economic Situation Assessment: Northern Urban Development Corridor, October


SSI (2010) Local Area Plans: Northern Urban Development Corridor: Towards a Spatial Concept for the NUDC, April.


White Paper on Spatial Planning and Land Use Management, 2001

### A. NUDC ROAD IMPROVEMENT PROJECTS

<table>
<thead>
<tr>
<th>Nr</th>
<th>Project Description</th>
<th>Responsibility</th>
<th>Programme Expenditure in R Million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td>inside NUDC study area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>New major road MR577 (Dumisani Makhaye Drive) from KwaDabeka to Duffs Rd</td>
<td>KDOT</td>
<td>450</td>
</tr>
<tr>
<td>B</td>
<td>D403 Ext - Inanda to R102 Verulam</td>
<td>ETA</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>M28 - Inanda Dam to Hazelmere Dam</td>
<td>ETA</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>Nandi Dr - Chris Hani Road (North Coast Road) to Malandela Rd (2+2 Lanes)</td>
<td>ETA</td>
<td>30</td>
</tr>
<tr>
<td>E</td>
<td>Chris Hani Road (North Coast Road) (R102) Upgrade - Verulam to Phoenix</td>
<td>ETA</td>
<td>25</td>
</tr>
<tr>
<td>F</td>
<td>Chris Hani Road (North Coast Road) through Mt Edgecombe</td>
<td>ETA</td>
<td>15</td>
</tr>
<tr>
<td>G</td>
<td>Umhlanga Rocks Dr/Kenneth Kaunda (Northway) Intersection</td>
<td>ETA</td>
<td>5</td>
</tr>
<tr>
<td>H</td>
<td>Improved connections from Newlands W. Dr. (M23) to MR577 (Dumisani Makhaye Drive)</td>
<td>ETA</td>
<td>5</td>
</tr>
<tr>
<td>I</td>
<td>Inanda Rd (M21) at NPC factory</td>
<td>ETA</td>
<td>40</td>
</tr>
<tr>
<td>J</td>
<td>N2 (Mt Edgecombe i/c to Sibaya i/c)</td>
<td>SANRAL</td>
<td>1</td>
</tr>
<tr>
<td>K</td>
<td>N2/Cornubia interchange</td>
<td>SANRAL</td>
<td>30</td>
</tr>
<tr>
<td>L</td>
<td>N2 widening (Sibaya to La Mercy)</td>
<td>SANRAL</td>
<td>80</td>
</tr>
<tr>
<td>M</td>
<td>R102/Phoenix Highway interchange upgrade</td>
<td>ETA</td>
<td>7</td>
</tr>
<tr>
<td>N</td>
<td>Cornubia Arterial from Phoenix Highway to Cornubia i/c</td>
<td>ETA</td>
<td>100</td>
</tr>
<tr>
<td>O</td>
<td>Inanda Rd (M21)</td>
<td>ETA</td>
<td>5</td>
</tr>
<tr>
<td>P</td>
<td>R102 (Tongaat to Verulam)</td>
<td>ETA</td>
<td>20</td>
</tr>
<tr>
<td>Q</td>
<td>La Mercy i/c on N2 freeway with link to R102 (KSIA and iDube Trade Port)</td>
<td>SANRAL</td>
<td>40</td>
</tr>
<tr>
<td>V</td>
<td>M41 upgrade between N2/Mt Edgecombe i/c to R102 i/c</td>
<td>KDOT</td>
<td>40</td>
</tr>
<tr>
<td>W</td>
<td>N2 (Inanda Rd i/c - Umgeni Rd i/c)</td>
<td>SANRAL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>outside NUDC study area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Realignment M4 (between Umdloti and Ballito)</td>
<td>ETA</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>N2 Ballito Interchange upgrade</td>
<td>SANRAL</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>N2 Salt Rock Interchange (signalization)</td>
<td>SANRAL</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>M41 (Umhlanga Rocks Dr to M4)</td>
<td>ETA</td>
<td>10</td>
</tr>
</tbody>
</table>
Figure 9-1: Transport Road and Rail Infrastructure Upgrades
B. DEVELOPMENT CHECKLIST

**Purpose:**
(1) To guide the municipality’s assessment of development proposals/applications
(2) To guide the development sector as it plans for and designs new developments.

### A. RESPONSE TO LUM PRINCIPLES

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>YES</th>
<th>NO</th>
<th>PARTIALLY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. SUSTAINABILITY</strong></td>
<td>Yes</td>
<td>No</td>
<td>Partially</td>
</tr>
<tr>
<td>Does the development align with national, provincial and municipal policy and legislation?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development promote the protection, enhancement and management of the natural environment in the interests of long term sustainability?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development proposal consider and respond to its life cycle costs and its impacts on environment, community and the economy, such that these costs and impacts are mitigated and minimised?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will the development maintain and enhance the viability of the existing community? Will it result in the establishment of a viable new community?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with national, provincial and municipal policy and legislation?</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### 2. EQUALITY

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>YES</th>
<th>NO</th>
<th>PARTIALLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will the benefits and opportunities flowing from this development benefit previously disadvantaged communities and areas, particularly in close proximity to the development site?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3. EFFICIENCY

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>YES</th>
<th>NO</th>
<th>PARTIALLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will the development result in compact human settlement and development?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development contribute to the integration of living and working environments?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the development optimise the use of existing resources, e.g. bulk infrastructure, roads, transportation and social facilities?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the development align with the fiscal, institutional and administrative means of the municipality?</td>
<td></td>
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</tr>
</tbody>
</table>

### 4. INTEGRATION

<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>YES</th>
<th>NO</th>
<th>PARTIALLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the development respond and contribute to the correction of the historically distorted spatial patterns of development in the city?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the development contribute to the optimum use of existing infrastructure in excess of existing needs?</td>
<td></td>
<td></td>
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<tr>
<td>Does the development promote efficient, functional and integrated settlements?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the development contribute to the provision of residential and employment opportunities in close proximity to, or integrated with, one another?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development promote racial integration?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development promote mixed use settlements?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. ALIGNMENT WITH CITY SPATIAL POLICY AND PLANS</td>
<td>Yes</td>
<td>No</td>
<td>Partially</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>1. NORTHERN SPATIAL DEVELOPMENT PLAN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the vision and goals of the Northern Spatial Development Plan?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the spatial concept for the Northern Region of the municipal area?</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>2. RELEVANT LOCAL AREA PLAN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the vision and goals of the relevant Local Area Plan?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Does the development align with the LAP’s Environmental Framework?</td>
<td></td>
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<tr>
<td>Does the development align with the LAP’s Movement and Circulation Framework?</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Does the development align with the LAP’s Land Use Framework?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Does the development align with the LAP’s Housing and Density Framework?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the LAP’s Landscape and Built Form Framework?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the directives contained in the relevant Sub-Area tables?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the Land Use Management Guidelines, as appropriate for the specific development proposed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the LAP’s Implementation Plan, in terms of the phasing of development in the local area?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the development align with the LAP’s Implementation Plan, in terms of the infrastructure services provision in the local area?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. GATED ESTATE GUIDELINES

Large scale gated or enclosed developments or areas (whether residential or office/business park in nature) that take on the form of enclosed mini-suburbs generally have a detrimental impact on city form, connectivity and mobility. They do not achieve the intentions of the principle of integration and therefore should not be encouraged. Proposals for extensive gated estates should be redesigned to restrict their scale and impact, and to ensure that the structural access network (i.e. the system of routes and linkages that ensure general mobility for pedestrians, cyclists and motorists) is not compromised, and that they respond positively to their surrounding context.

The following approach should be taken with regard to proposals for gated estates:

- The size of such proposed developments or areas should be broken up into smaller parcels (as illustrated below) and embedded within the existing urban fabric to ensure they do not fragment neighbourhoods or undermine attempts to spatially integrate areas.

![Diagram of gated community complex reducing mobility through an area and gated community complex broken up into smaller parcels, with public roads in between]

- A gated development or area may not be of such a scale or located in an area where the following services, infrastructure and amenities (together with supporting infrastructure such as pump stations, reservoirs etc) would be located within its boundaries (subject to detailed engineering investigations):
  - Class 4 roads and higher, mobility, public transport or strategic routes;
  - Bulk or main water and sewer lines;
  - Bulk or main storm water channels and drainage systems;
  - Bulk or main electricity transmission lines/cables and major substations;
  - Regional or higher order social and economic/commercial infrastructure facilities that serve the broader community (i.e. schools, stadiums and other public buildings);
  - Regional/district parks, nature/riverine areas or extensive open spaces that are part of the city’s open space system, and which should be accessible to the public;
  - Declared heritage areas and resources.

- In addition to not being located on main routes or roads, gated developments may not be located where they would disrupt the continuity of important movement links or desire lines, such that it would cause an additional pedestrian detour around the complex of more than 20 minutes walking time (based on an average speed of 20 minutes/km).

- Residential gated developments or areas in existing communities should not be developed next to one another in order to avoid create large enclaves of wealth. Rather a gentle grading of housing (and income) types would facilitate spatial integration.

- Where gated estates are permitted, the location of multiple gated estates should be discouraged in order to avoid a monotonous and bland urban environment (caused by extensive perimeter walls and fences, and similar architectural design). Individual gated complexes should be interspersed with other built forms/housing typologies to create more variety, a richer urban fabric and more diverse living environments (refer to diagram below).

- A gated development may not result in an unacceptable adverse impact to adjacent communities (whether in relation to amenity, traffic patterns etc), or prejudice further cost effective urban development of the surrounding area in future.

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19 Adapted from City of Cape Town Gated Development Policy, 2007. All diagrams are sourced from this document.
i. Gated Development Layout

- The internal layout of gated estates is also fundamental to their impact on the community, and the following criteria should be adhered to:

- Subdivision plans for gated developments should avoid creating a ‘canyon effect’ through backing complexes directly onto main and access roads and enclosing them with high solid walls. Instead, gated estates should be buffered from main or access roads by means of single residential (or other smaller scale) sites in between, leaving only the width of the entrance road exposed from the main road (see illustration top right).

- In cases where this cannot be achieved, the ‘canyon effect’ should be minimised by breaking up the impact of continuous development along the perimeter edge into smaller pockets interspersed with open space right up to the boundary, with any fencing or walls being permeable. Such an edge interface should be further limited to a maximum of two sides of the development, the remaining sides not having a road frontage at all (see illustration, bottom right).
Internal street, site and open space layout should be designed to facilitate community ownership and surveillance of public areas and space. For example, sites should be orientated towards open spaces instead of backing onto them, with visually permeable fencing and pedestrian entrances being encouraged (as illustrated below).

A gated estate proposal is considered unacceptable if it compromises the continuity of biodiversity networks or ecological corridors (and hence species mobility) or the open space network in the surrounding community (as illustrated below).

Large parking areas acting a buffer between public roads and adjacent buildings should be discouraged as they create ‘dead’ edges to the street. Parking areas should be broken up into smaller pockets that are evenly distributed throughout the complex.

The layout of the estate should relate to the surrounding area and context such that it is possible to fully reintegrate it with the surrounding urban pattern without negative impacts on the existing spatial grid and movement routes (as illustrated below).

ii. Visual Impact of Gated Estates

The design of gated estates should adhere to the following criteria:

To ensure contextually appropriate, sympathetic design and maximum passive surveillance, high walls (either internally or externally) should be avoided. Any wall, fence or other form on enclosure, must be visually permeable for at least 50% of its length (as illustrated below). Continuous blank walls facing onto public streets and spaces are therefore not permitted.
- Buildings within gated complexes should seek to create direct relationships with adjacent public streets and spaces. This will maximise opportunities for passive surveillance, create active interfaces, and promote activity and interaction. This should be achieved by orientating interfaces (i.e. placement of windows, doorways and verandahs) onto boundary edges and abutting public roads, open spaces and pedestrian routes as far as possible. Impersonal building interfaces (i.e. blank walls), excessive setback distances, on-human scale buildings and the creation of hiding spaces should be avoided (see illustration below).

- The above should be considered and applied at the SDP/Building Plan stage.

- Structures and architectural features at entrances to gated developments and areas must be appropriately scale, and in proportion to its surroundings. Large, visually dominant gates/gateways and guardhouses reinforce negative qualities of seclusion and elitism, and do not support the principles of spatial, visual and social integration.
D. BULK WATER & SANITATION INFRASTRUCTURE REPORT

D.1 Introduction and Background

The Northern Urban Development Corridor, as identified in the Northern Spatial Development Plan, is a vital part of the emerging national logistics platform that will generate exciting opportunities for growth and development within the country, within the province of KwaZulu-Natal and within the eThekwini Municipality.

The NUDC contains a suite of major structuring elements, concepts and policies which respond to the abovementioned context and role, but also represent a bold spatial intervention response to the inequitable and unsustainable development pattern of the northern metropolitan area of the eThekwini Municipality. The municipality wished to translate these spatial planning policies into more detailed proposals that will accurately inform infrastructure strategies and investment, that will direct and guide private sector development and that will prioritise actions for implementation.

Based on current and projected future land-use within the NUDC, this report investigates the options for capacities and sequencing of bulk water and sanitation infrastructure requirements for both the ultimate development capacity of the northern sub-metropolitan area and the 2030 interim planning horizon.

D.2 Approach and Methodology

The approach and methodology adopted in order to investigate the options for infrastructure requirements was to develop an accurate spatial distribution of existing water demands and wastewater flows in the various catchments by applying unit flow rates to the population projections and to the proposed land-use for each of the planning polygons. Using these demands and flows, the infrastructure requirements in terms of existing and future capacities for both wastewater treatment works, on a per-catchment basis, and bulk water storage facilities have been determined.

D.2.1 Water Demand and Wastewater Flow Generation

General

The point consumers shape file (a spatial representation of the water consumers on the municipal COINS billing system) was used to facilitate the calibration of the existing wastewater flows.

In order to calibrate the flow model, it was necessary to know which consumers in the billing system discharge wastewater to the treatment works. The reticulated area of each catchment was determined using the existing sewer pipes dataset and consumer points falling within these reticulated areas were assumed to contribute towards the measured flows at the works.

A calibration factor, i.e. the ratio of the sum of the COINS water consumption in the reticulated areas to the measured wastewater flow at the works was determined. This calibration factor was applied to the existing developed wastewater-contributing areas to obtain an accurate spatial distribution of existing wastewater flows.

It is noted that in those areas that have sewerage reticulation, no distinction is made between the volume of water consumed in a household and the volume of wastewater generated by that household, i.e. 100% of water entering a household is assumed to enter the wastewater system. This assumption has the effect that the quantities calculated for future water demand and wastewater generation are equal.

However, in terms of water storage capacity, the water demand figures have been increased by 20% to account for water losses between the reservoir and the consumers’ meters.

Unit Flow Rates

“Unit Flow Rate” for water demands is the:

- litres of water consumed per dwelling unit per day for residential developments, or
- litres of water consumed per hectare per day for non-residential developments.

“Unit Flow Rate” for wastewater flows generation is the:
- litres of wastewater generated per dwelling unit per day for residential developments, or
- litres of wastewater generated per hectare per day for non-residential developments.

The unit flow rates used in the generation of future water demand and wastewater generation are tabled below (Table D-1):

**Table D-1: Unit Flow Rates used in the Generation of Future Water Demand & Wastewater Generation**

<table>
<thead>
<tr>
<th>Land-use Type</th>
<th>Unit Flow Rate</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Residential</td>
<td>350</td>
<td>litres per dwelling unit per day</td>
</tr>
<tr>
<td>Residential - Low Income</td>
<td>350</td>
<td>litres per dwelling unit per day</td>
</tr>
<tr>
<td>Residential - Medium Income</td>
<td>750</td>
<td>litres per dwelling unit per day</td>
</tr>
<tr>
<td>Residential - High Income</td>
<td>1 000</td>
<td>litres per dwelling unit per day</td>
</tr>
<tr>
<td>Mixed Use</td>
<td>15 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Office Park</td>
<td>15 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Business Park</td>
<td>15 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Trade zone</td>
<td>15 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Commercial</td>
<td>20 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Airport</td>
<td>20 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Airport Support Zone</td>
<td>20 000</td>
<td>litres per hectare per day</td>
</tr>
<tr>
<td>Industry</td>
<td>25 000</td>
<td>litres per hectare per day</td>
</tr>
</tbody>
</table>

**Development of the Ultimate Scenario Water Demands & Wastewater Flows Generation Model**

The NUDC town planning team prepared a GIS-based spatial development dataset. This dataset had its origins as the Northern Spatial Development Plan compiled by Framework Planning at Ethekwini Municipality. Various attributes (in particular, development densities) had been modified by the NUDC planning team. This dataset was used for the calculation of ultimate scenario water demands and wastewater flows generation.

For residential land-use polygons, the following attributes were used to calculate the ultimate number of dwelling units per polygon:

- Area of the polygon in Hectares;
- Developable Area of the polygon; and
- Proposed Ultimate Density of Dwelling Units in the polygon

The number of current dwelling units was subtracted from the ultimate dwelling unit figure to give the anticipated increase in dwelling units per polygon between 2010 and the ultimate development. Unit Flow Rates, as detailed in Table D-1, were assigned to each of the residential land-use polygons, taking into account the anticipated income levels of the residents occupying these developments.

The increase in water demands / wastewater flows generation between 2010 and the ultimate development was then calculated by multiplying the increase in dwelling units per polygon by the unit flow rate specific to each polygon.

For non-residential land-use polygons (i.e. commercial, industrial, office park, etc.), the following attributes were used to calculate the ultimate number of hectares available for development in each polygon:

- Area of the polygon in Hectares; and
- Developable Area of the polygon;

The total number of hectares of current development per polygon were calculated using attributes:

- Area of the polygon in Hectares;
- Developable Area of the polygon; and
- Current Development of the polygon.
The total number of hectares of current development were subtracted from the ultimate number of hectares available for development to give the anticipated increase in hectares per polygon between 2010 and the ultimate scenario development. Unit Flow Rates, as detailed in Table D-1, were assigned to each of the non-residential land-use polygons.

The increase in water demand / wastewater generation between 2010 and the ultimate development was calculated by multiplying the increase in hectares per polygon by the unit flow rate specific to each polygon.

Note:
Whilst the scope of the NUDC Study is the corridor between the N2 and the agricultural hinterland straddling the R102, it was necessary, from a wastewater perspective, to include areas outside the corridor falling in the catchments of the wastewater treatment works servicing the corridor areas. To this end the following areas were included in the calculations of ultimate water demands and wastewater flows generation:

- the coastal strip (the areas east of the N2 falling in the catchments of the Tongaat, Genazzano, Umdloti and Umhlanga wastewater treatment works); and
- the large area draining to Northern Wastewater Treatment Works but not falling within the Study area,

The ultimate wastewater flows generation per treatment works catchment is detailed in Table D-2. The ultimate water demands for the NUDC study area are detailed in Table D-4.

**Development of 2030 Water Demands & Wastewater Flows Generation**
The land-use proposals based on the planning input were used to develop the water demands and wastewater flow figures for the 2030 planning horizon and the projected additional requirements for bulk water supply and storage and wastewater treatment capacity will be dependent on achieving or servicing said proposed land-use proposals

The water and wastewater infrastructure team had input into the spatial distribution of the proposed 2030 development. The primary purpose of this input was to encourage development of land-use progressively away from existing or new wastewater infrastructure to optimise capital infrastructure investment.

Refer to Figure D-1 for a representation of the anticipated spatial distribution of water demands/wastewater flows generation for the 2030 scenario.
a) The increase in dwelling units and hectares of non-residential development areas was calculated between 2010 and 2030;

b) The 2030 hectare development for non-residential land-use ($H_{2030}$) was calculated in the following manner:

$$H_{2030} = \frac{E_{2030}}{E_{\text{Ultimate}}} \times H_{\text{Ultimate}}$$

where

$$E_{2030} = \text{No of People Employed in the polygon in 2030}$$
$$E_{\text{Ultimate}} = \text{No of People Employed at Ultimate Development}$$
$$H_{\text{Ultimate}} = \text{Ultimate Developed Hectares in the polygon}$$

c) Whilst the 2030 development of the coastal strip was included in the dataset provided by the planning team, the 2030 development of the remainder of the Northern Wastewater Treatment Works catchment was not. In order to provide an indication of the total anticipated increase in wastewater flows at these works by 2030 (i.e. from development within the NUDC Study Area and from development in the areas outside of the Study Area), development data was sourced from the Consumer Unit Model currently under development by the Municipality’s Procurement and Infrastructure cluster.

d) Officials from Ethekwini Water and Sanitation Services have noted that there are many instances (particularly in the KwaMashu Wastewater Treatment Works catchment) where formal dwelling units in areas that have previously been provided with sewerage reticulation have not connected into the sewerage system. It is difficult to quantify the numbers of units where this situation exists and even more difficult to predict the timing of their future connection into the system. Added to this is the backlog in the provision of reticulation of currently-developed but as yet non-reticulated areas.

Based on known water demands from the COINS billing system, a desktop investigation was undertaken to attempt to quantify the possible increase in wastewater flows in the KwaMashu Works’ catchment by 2030 as a result of non-connected households either connecting into existing systems or being provided with new sewerage reticulation systems and then connecting into these systems.

For the INK area falling in the KwaMashu Catchment:

- Domestic Consumers in COINS: 37 810
- Associated Water Consumption: 16 300 kl/day
- Estimated average Domestic Consumption: 430 l/day
- No. of Households in Consumer Unit Dataset: 108 000
- 108 000 Households @ 430 litres/day = 46 400 kl/day

Therefore, it can be estimated that there is a potential ultimate scenario increase in wastewater treatment capacity required at the KwaMashu Works of 46 400 – 16 300 = 30 100kl/day, or 30Ml/day if all households in the catchment were connected into the system.

Notwithstanding, it is assumed that the number of existing households will decrease from 108 000 to 90 000 in the ultimate scenario due to de-densification and that these 90 000 households will be provided with sewerage reticulation over the next 40 years (based on the current emphasis in providing interim sanitation to informal settlements that will contribute to the lengthening of the time period of the backlog programme for the provision of sewerage reticulation).

It could therefore be assumed that, in 2030, an additional 45 000 households x 430 litres/household/day could require an increase in capacity at the works of 13Ml/day. It is noted that this figure should be used with an amount of caution and it is recommended that in-depth analysis of the KwaMashu catchment be undertaken to improve this estimate.

The 2030 wastewater generation per treatment works catchment is detailed in Table D-2.

The 2030 water demand for the NUDC study area is detailed in Table D-4.
### D.3 Wastewater

#### D.3.1 Wastewater Generation per Catchment

Table D-2 summarises the Status Quo, 2030 and Ultimate loadings and capacity requirements in each of the wastewater treatment systems.

**Table D-2: Wastewater Treatment Works Loading & Capacity – Status Quo, 2030 Scenario and Ultimate Scenario**

<table>
<thead>
<tr>
<th>Wastewater Treatment Catchment</th>
<th>Wastewater Treatment Works</th>
<th>2010 Status Quo (ML/day)</th>
<th>2030 Scenario (Anticipated ML/day) Load (Increase on 2010 Load)</th>
<th>Additional Capacity Required Load (Increase on 2010 Load)</th>
<th>Ultimate Scenario (Anticipated ML/day)</th>
<th>Additional Capacity Required (over Status Quo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongati</td>
<td>Tongaat Central</td>
<td>11</td>
<td>7</td>
<td>28 / (21)</td>
<td>17</td>
<td>81 / (74)</td>
</tr>
<tr>
<td>Mdloti</td>
<td>Verulam</td>
<td>12</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Umdloti (Existing)</td>
<td>2.3</td>
<td>1.6</td>
<td>24 / (15)</td>
<td>12 (1)</td>
<td>66 / (57)</td>
</tr>
<tr>
<td></td>
<td>Genazzano</td>
<td>1.7</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Mdloti (Regional)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>16</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohlanga</td>
<td>Phoenix</td>
<td>25</td>
<td>23</td>
<td>57 / (34)</td>
<td>25</td>
<td>81 / (58)</td>
</tr>
<tr>
<td></td>
<td>Umhlanga</td>
<td>7</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Umgeni</td>
<td>KwaMashu</td>
<td>59</td>
<td>67</td>
<td>94 / (14+13) (4)</td>
<td>35</td>
<td>100 / (20+13) (4)</td>
</tr>
<tr>
<td></td>
<td>Northern</td>
<td>58</td>
<td>54</td>
<td>72 / (15+3) (5)</td>
<td>14</td>
<td>99 / (45)</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>117</td>
<td>121</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Both Genazzano and the existing Umdloti Works will be decommissioned when the new Mdloti Regional Works is commissioned in the short to medium term, hence, additional Capacity Required = 24 – (16 – 2.3 – 1.7) = 12ML/day.
2. Assumes that the existing 12ML/day Verulam Works is decommissioned in the long term.
3. Assumes that the existing 7ML/day Umhlanga Works is decommissioned in the long term.
4. 14ML/day from New Development & Densification, 13ML/day from provision of sewer reticulation to existing households.
5. 15ML/day from NUDC Study Area, 3ML/day from remainder of the Northern Works’ catchment.
D.3.2 Commentary on Planning of Wastewater Treatment Works (Incorporating Environmental Reserve Issues):

a) Tongaat Central Works
- The current capacity is 11ML/day
- The works needs to be expanded to 28ML/day to accommodate the anticipated 2030 flows.
- The design of an 11ML/day upgrade/extension is currently underway.
- Ultimately the works needs to be expanded to 81ML/day to accommodate the anticipated flows. eThekwini Water and Sanitation Services officials have indicated that a works of this size could be accommodated on the existing treatment works site. It is recommended that this be further investigated.
- The maximum volume of treated effluent discharge permitted in the Tongathi River Estuary is 50ML/day (based on the Rapid Reserve Determination Study). The ultimate loading of 81ML/day would indicate that a solution would need to be found to deal with the 31ML/day of excess flows generated in the catchment. eThekwini Water and Sanitation Services officials have indicated that the north Durban areas will be the focus of intensive recycling of wastewater to potable water standards and it is envisaged that, although no recycling facility is envisaged at Tongaat Central in the short to medium term, the excess 31ML/day effluent will be ultimately be accommodated at a potable water recycling facility, either in the catchment or by being transferred south to a recycling facility for direct re-use.

b) Genazzano Works
- The current capacity is 1.7ML/day
- The works will be decommissioned when the new Mdloti Regional Works is commissioned. A new Pump station (or series of Pump stations) will need to be constructed, sections of existing rising mains will need to be reversed and a section of new rising main will need to be constructed to transfer these flows to the new regional works.

c) Umdloti Works
- The current capacity is 2.3ML/day
- The works will be decommissioned when the new Mdloti Regional Works is commissioned. A new Pump station and rising main will need to be constructed to transfer these flows to the new regional works.

d) Verulam Works
- The current capacity is 12 ML/day
- Further to an undertaking given to the community, this works will not be expanded beyond it’s current capacity of 12ML/day.
- In the long term, the works may be decommissioned and these flows will be transferred to the proposed new Mdloti Regional Works.

e) Proposed new Mdloti Regional Works
- If the existing 12ML/day Verulam Works remains operational, the new Mdloti Regional Works will be required to accommodate 12ML/day in 2030.
- Should the Verulam Works be de-commissioned within the 2030 planning horizon, the 12 ML/day capacity will need to be provided at the new Mdloti Regional Works.
- If the existing 12ML/day Verulam Works remains operational, the new Mdloti Regional Works will ultimately be required to accommodate 54ML/day.
- Should the Verulam Works only be decommissioned in the long term, the new Mdloti Regional Works will require a capacity of 66 ML/day to accommodate the anticipated ultimate flows.
- The maximum volume of treated effluent discharge permitted in the Mdloti River Estuary is 53ML/day (based on the Rapid Reserve Determination Study). The ultimate loading of 66ML/day would indicate the excess 31ML/day effluent will ultimately be accommodated at a potable water recycling facility, either in the catchment or by being transferred south to a recycling facility.

f) Phoenix & Umhlanga Works
- The current combined capacity of both the works is 32ML/day. The 7ML/day capacity of the Umhlanga works will not be increased due to environmental constraints.
- The Phoenix Works will need to be expanded to 50ML/day to accommodate the anticipated 2030 flows. A 25ML/day upgrade is currently being planned for the works, raising the capacity to 50ML/day.
- It has been mooted that the Umhlanga Works may be decommissioned in the long term. If so, the Phoenix Works will require an ultimate capacity of 81ML/day.
to accommodate the anticipated ultimate flows. Land surrounding the existing Phoenix Works would need to be required in order to accommodate the upgrading to a works of this size.

- The existing treated effluent pumping scheme at Phoenix Works has capacity to pump 40Ml/day of treated effluent into the Umhlangane/Mgeni catchment. Whilst the capacity of this scheme potentially could be exceeded (even by 2030), it is unlikely that this will occur as a potable water recycling facility is planned for the Phoenix area as soon as 2014.

g) KwaMashu Works
- The current capacity is 59Ml/day and the current loading is 67Ml/day, i.e. the works is currently overloaded.
- The works needs to be expanded to 94Ml/day to accommodate the anticipated 2030 flows.
- The works needs to be expanded to 100Ml/day to accommodate the anticipated ultimate flows.
- A potable water recycling facility is planned for this area as soon as 2016

h) Northern Works
- The current capacity is 58Ml/day and the current loading is 54Ml/day.
- The works needs to be expanded to 72Ml/day to accommodate the anticipated 2030 flows.
- The works needs to be expanded to 99Ml/day to accommodate the anticipated ultimate flows.
- A potable water recycling facility is planned for this area as soon as 2016.

Refer Figure D-2 and Figure D-3 showing the spatial distribution and required facilities of the wastewater treatment facilities for the 2030 and ultimate scenarios respectively.

Figure D-2: Wastewater - Schematic Showing Required Interventions for 2030 Scenario
D.3.3 Wastewater Infrastructure Costs

A summary of the projected costs for bulk infrastructure for the collection and treatment of the wastewater generated in the 2030 and ultimate scenarios are shown in Table D-3, below.

Table D-3: Anticipated Wastewater Bulk Infrastructure Costs for the 2030 and Ultimate Scenarios

<table>
<thead>
<tr>
<th>Wastewater Treatment System</th>
<th>Infrastructure Component</th>
<th>Infrastructure Cost (2010 R million)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scenario 2030</td>
<td>Scenario Ultimate (1)</td>
</tr>
<tr>
<td>Tongati</td>
<td>Treatment Capacity</td>
<td>170</td>
</tr>
<tr>
<td></td>
<td>Gravity Trunks</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Pump stations &amp; Rising Mains</td>
<td>15</td>
</tr>
<tr>
<td>Mdloti</td>
<td>Treatment Capacity</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Gravity Trunks</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Pump stations &amp; Rising Mains</td>
<td>15</td>
</tr>
<tr>
<td>Ohlanga</td>
<td>Treatment Capacity</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>Gravity Trunks</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Pump stations &amp; Rising Mains</td>
<td>0</td>
</tr>
<tr>
<td>Umgeni</td>
<td>Treatment Capacity</td>
<td>490</td>
</tr>
<tr>
<td></td>
<td>Gravity Trunks</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Pump stations &amp; Rising Mains</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1140</td>
</tr>
</tbody>
</table>

(1) The costs for the ultimate scenario infrastructure include the 2030 costs.
D.4 Water

D.4.1 Water Demand and Water Storage Requirements

Table D-4 summarises the 2030 and Ultimate water demands in the Local Area Plan areas.

Table D-4: 2030 & Ultimate Scenario Water Demand

<table>
<thead>
<tr>
<th>LAP Area</th>
<th>2030</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongaat / Dube Trade Port</td>
<td>32</td>
<td>80</td>
</tr>
<tr>
<td>Verulam / Cornubia</td>
<td>34</td>
<td>65</td>
</tr>
<tr>
<td>Phoenix / INK</td>
<td>30</td>
<td>83</td>
</tr>
<tr>
<td>Other Areas outside of LAPs</td>
<td>17</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>113</td>
<td>255</td>
</tr>
</tbody>
</table>

Table D-5 summarises the 2030 and Ultimate water storage requirements.

Table D-5: 2030 & Ultimate Scenario Storage Requirements

<table>
<thead>
<tr>
<th>MI/day</th>
<th>2030</th>
<th>Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>113</td>
<td>255</td>
</tr>
<tr>
<td>Allowance for losses (1)</td>
<td>22</td>
<td>50</td>
</tr>
<tr>
<td>Additional Storage Capacity Required (2)</td>
<td>270</td>
<td>610</td>
</tr>
</tbody>
</table>

(1) The Average Daily Water Demand has been increased by 20% to account for water loss.
(2) Storage capacity is based on 48 hours storage of average daily demand plus the allowance for losses.

D.4.2 Commentary on Planning of Bulk Water Requirements in LAP Areas:

a) Tongaat / Dube Trade Port

- New reservoir storage capacity of 77MI will be required to accommodate the anticipated additional 32MI/day average daily water demand in 2030.
- In the 2030 planning horizon, major storage is to be provided at Inyaninga.
- The upgrading of the bulk supply system from Hazelmere Water Treatment Works will be required. This includes for the raising of the dam wall and extensions to the water treatment works, by others.
- In the ultimate scenario, it is envisaged that the Hazelmere Dam will become redundant due to siltation and potable water will be provided from the Thukela River through a new system, by others.

b) Verulam / Cornubia

- New reservoir storage capacity of 82MI will be required to accommodate the anticipated additional 34MI/day water demand in 2030.
- In the 2030 planning horizon, major storage is to be provided at Blackburn, Trenance, Waterloo and Mdloti.
- In the 2030 planning horizon, the bulk supply pipelines are included in the Northern Aqueduct system currently being planned and implemented. Future requirements are dependent on planning of recycling of wastewater to potable water standards and a proposed desalination plant at Mdloti.

Refer Figure D-4 and Figure D-5 showing the storage capacity requirements and bulk transfer arrangements for the 2030 and ultimate scenarios respectively.

c) Phoenix / INK

- New reservoir storage capacity of 41MI will be required to accommodate the anticipated additional 17MI/day water demand in 2030.
- In the 2030 planning horizon, major storage is to be provided at Etafuleni, Congo, Ohlanga and Phoenix P1.
- In the 2030 planning horizon, the bulk supply pipelines are included in the Northern Aqueduct system currently being planned and implemented. Future requirements are dependent on planning of recycling of wastewater to potable water standards and a proposed desalination plant at Mdloti.

Refer Figure D-4 and Figure D-5 showing the storage capacity requirements and bulk transfer arrangements for the 2030 and ultimate scenarios respectively.
### D.4.3 Water Infrastructure Costs

The projected costs for bulk infrastructure for the supply and storage of anticipated water demand in the 2030 and ultimate scenarios are shown in Table 6, below.

**Table D-6: Anticipated Water Bulk Infrastructure Costs for the 2030 and Ultimate Scenario**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Infrastructure</th>
<th>Cost (2010 Rm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2030</strong></td>
<td><strong>Aqueducts:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New from Thukela supply to Tongaat &amp; from Hazelmere to Tongaat</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td><strong>Reservoirs:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>270Ml Capacity</td>
<td>340</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong></td>
<td>480</td>
</tr>
<tr>
<td><strong>Ultimate</strong></td>
<td><strong>Aqueducts:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Augment Northern Aqueduct to Cornubia / Blackburn</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>New from Thukela supply to Tongaat</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>New pumps and pipeline from Mdloti to Waterloo</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td><strong>Reservoirs:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>610Ml Capacity</td>
<td>760</td>
</tr>
<tr>
<td></td>
<td>Desalination at Umdloti – 100Ml/day</td>
<td>1 000</td>
</tr>
<tr>
<td></td>
<td><strong>Total:</strong></td>
<td>2 225</td>
</tr>
</tbody>
</table>