Capacity Building Guidelines in Urban and Regional Planning for Municipal Engineers and Engineering Staff within Municipalities.

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A product by:

In collaboration with:

IMESA
ABSTRACT

Urban and Regional Planning responsibilities have been assumed by newly established and existing local municipalities. Of these municipalities, many does not have the financial means to employ full-time Urban and Regional Planners to manage these responsibilities. Recognizing the need for capacity building in physical development planning at all levels, including all local-, district- and national authorities, for equipping them with a user friendly and comprehensive user guideline, the project will assist in carrying out their Urban and Regional Planning duties and associated responsibilities. The project is proposed to serve in this need although it is not aimed at training engineering staff to become Urban and Regional Planners but rather to enable them to engage with planning specialists. The purpose of this project is to provide an understanding of Urban and Regional Planning and associated practices, the policy and legislative framework that it accompanies and the implications it has for spatial development, transportation, the environment, land development and layout planning, the provision of engineering services and housing, sustainable development, statutory planning processes, etc. A basic knowledge of this will build capacity within staff working in related disciplines. The project will also inform all parties involved of the changes SPLUMA will bring and attempt to guide them through the transition from the old legislation towards an integrated approach. Thus the project will contribute to changing the face of the Municipal Engineer from an Urban and Regional Planning perspective. The interface between Urban and Regional Planners and Municipal Engineers and its staff is contextualised and formalized through this project.

Key terms:

- Urban and Regional Planning practices and principles;
- Capacity building guideline;
- Municipal engineer;
- Improved skills.
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1. INTRODUCTION AND BACKGROUND

1.1 Background

Urban and Regional Planning is included as one of the main role players in the vast multi-disciplinary sector that is the built environment. The role of Urban and Regional planning is unavoidable and integral in the success of, among others, sustainable and efficient development (Ahmadi & Toghyani, 2011:26; Schoeman, 2010). This is enhanced through the relationship between the relevant disciplines, and the understanding of the disciplines role in handling certain responsibilities.

Along with the democratisation of South Africa in 1994, the new government inherited the long list of spatial planning and development problems that was the result of failed attempts to address possible spatial planning problems and development regulations in the past. These problems included segregation, fragmented and spatial system and other problems with regards to, not only spatial problems but also economic implications (Forbes, 2011:6; Schoeman, 2010; van Wyk, 2012: 25 & 50-52).

As a result of the implementation of “wall-to-wall” municipalities after the 1994 elections in South Africa, a large amount of new municipalities were developed, such as local, district and local municipalities (Forbes, 2011:12; van Wyk, 2012:101-127). This development resulted in Urban and Regional Planning responsibilities being assumed by newly established and existing local municipalities. Of these municipalities, many do not have the financial means to employ full-time Urban and Regional Planners to manage these responsibilities (IMESA, 2009).

Recognizing the need for capacity building in physical development planning at all levels, IMESA (Institute of Municipal Engineers of Southern Africa) identified the need in all municipalities, including all local-, district- and national authorities, for equipping them with a user-friendly and comprehensive user guideline, the project will assist in carrying out their Urban and Regional Planning duties and associated responsibilities. The project is proposed to serve in this need (IMESA, 2009). Further need assessment was conducted in order to confirm the presumed need and to establish whether or not the project will be adequate and sufficient.

The document is further described by Schoeman (2014) as:

“The project consists of capacity building guidelines to empower municipal engineers and engineering staff to have a basic understanding of the theory, concepts, definitions, practices and procedures underpinning the Profession of Planning. The point of departure is not to train
engineering staff to be Urban and Regional Planners but to enable such members of staff to be able to engage with planning specialists and related applications such as spatial plans, land development applications etc."

The document will thus serve only for capacity building in urban and regional planning practice in order to enhance knowledge, effectiveness and efficiency of municipal engineers and engineering staff in engagement, participation and contribution in statutory land development applications, spatial planning and related development processes within municipalities. It is thus important to note that no formal training will be provided to the parties concerned as this document.

1.2 Purpose of the guideline

The purpose of this project is to provide an understanding of Urban and Regional Planning and associated practices (IMESA, 2009), the policy and legislative framework, that it accompanies and the implications it has for spatial development, transportation, environment, land development and layout planning, the provision of engineering services and housing, sustainable development, etc. A basic knowledge of this will build capacity with staff working in related disciplines.

The document will further enable an understanding of the processes supporting statutory planning and the content of processes documents required for the development of various categories of land applications to be submitted to all municipalities and tribunals, along with an understanding of the engineers’ responsibility regarding the scope and extent of their planning related responsibilities.

Other purposes will be to (IMESA, 2009):

- Formulate town planning and related policies;
- Brief consultants to prepare town planning schemes, structure plans, development plans and policies;
- Understand the various town planning procedures specified by the various Acts and Ordinances related to town planning;
- Adjudicate and process development applications received;
- Control development and land uses.

Furthermore, the alignment of Urban and Regional Planning within the built environment, including the reason behind the knowledge of Urban and regional Planning, etc. will be provided.
The document will largely be made available in an electronic version in order to allow continuous updates, which will decrease the aging of the document, whilst keeping to relevant to all current available data.

1.3 Aims and objectives

The primary aim of the project is to provide capacity building guidelines in Urban and Regional Planning practices in order to enhance effectiveness and efficiency of municipal engineers and engineering staff in their engagement, participation and contribution in statutory land development applications, policy compilations, spatial planning and related development processes within municipalities.

The secondary aims will:

- Explore the interface and relevance of Urban and Regional Planning in the built environment;
- Explore the interaction of Urban and Regional Planning within a multi-disciplinary environment;
- Determine, explain and provide an understanding of Urban and Regional Planning practices and the working thereof in the built environment;
- Provide an overview of the policy and legislative frameworks relevant to the goal of this document;
- Establish a framework in order to determine which information should be included in the document, thus deemed as important information regarding capacity building;
- Provide and illustrate understandable information serving as summarisations of the information determined as important and relevant to the aim of the capacity building guidelines;
- Ensure that the information provided is easily understandable and will enhance capacity building as determined by the aim of the guidelines.

The following objectives will be addressed in accordance with the aim and sub-aims of this document, the reader will:

- When facing a problem in the practitioners field, be able to refer to policies, legislation, regulations, principles, guidelines, and/or knowledge from urban and regional planning to help solve a problem in a multi-disciplinary manner;
- Be able to participate in conversation regarding Urban and Regional Planning;
- Be able to better understand the information relevant to urban and regional planning regarding statutory land development applications;
• Be able to provide adequate and accurate comments on statutory land use planning applications;
• Be able to participate in the compilation and implementation of developmental policies;
• Be able to better assist in processes regarding spatial planning and related development processes;
• Be able to refer to the document, when having questions and concerns regarding the content, related to Urban and Regional Planning problems;
• Have the capacity to substantiate their decisions regarding Urban and Regional Planning practices relevant to their specialised fields.

1.4 Urban and regional planning in the built environment

1.4.1 The need for professions in the built environment

The South African Parliament, in 1998, identified a need for the improvement of skills development. In response to this need the Sector Education Training Authorities (SETA’s) was established, each with its own clearly defined sector and sub-sectors made up of a variety of related economic activities. SETA’s are concerned with learnerships, internships, unit based skills programmes, and apprenticeships. They are also responsible for the collection of skills levies, in terms of the Skills Development Levies Act (1999), from each sector, which is then reused in the specific sector for training purposes in the form of, amongst others, grants and bursaries (Vocational, 2015).

The professions included in the built environment forms part of the Construction Education and Training Authority (CETA) (CETA, 2013).

Scarce and critical skills refer to the professions which currently, or in the future, has a scarcity of qualified and experienced people. This can be the result of skilled people not being available, known as absolute scarcity, or that there are skilled people available, but they do not meet the employment criteria, known as relative scarcity (DHET, 2014a; EDTP SETA, 2014).

Several sources are used to identify profession is identified as a scarce and critical skill, including, amongst others, the National Development Plan (2012), the New Growth Path (2010). The rankings of professions generally related to the built environment on the scarce and critical list of 2014, are as follow (DHET, 2014a):

Table 1-1: Scarce and critical skills list for some of the professions in the built environment.
<table>
<thead>
<tr>
<th>Ranking</th>
<th>Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>4</td>
<td>Quantity Surveyor</td>
</tr>
<tr>
<td>6</td>
<td>Physical and Engineering Science Technicians (Civil Engineering Technicians; Surveying or Cartographic Technicians; Town Planning technicians)</td>
</tr>
<tr>
<td>48</td>
<td>Land Surveyor</td>
</tr>
<tr>
<td>62</td>
<td>Civil Engineering Technologist</td>
</tr>
<tr>
<td>72</td>
<td>Architect</td>
</tr>
<tr>
<td>80</td>
<td>Urban and Regional Planner</td>
</tr>
</tbody>
</table>

Source: Adapted from (DHET, 2014a).

It should be noted that the list provided above was finalised by the DHET (2014b), after receiving feedback from the public on its original list. The positions mentioned above are all included in the final list, however, there is no ranking allocated to any specific profession.

1.4.2 Urban and regional planning as a profession

Urban and Regional Planning forms part of an interconnected web of several disciplines. This include the spheres of inter alia Natural Science, Engineering, Research and Development, Biological Science, Law and Legislation, Mathematics & computer science, Economics. Urban and Regional Planning also forms part of the Built Environment which in turn include the disciplines such as Architecture, Land Surveying, Urban Design, and so forth (Akbar & Rasul, 2012; Pinson, 2004; Rahmaan, 2011:182-184).

The following table illustrates the grouping of the Urban and Regional Planning domain as per interpretation on a national and international level, into several relevant sections of core professional focuses (Schoeman, 2010) meaning that there are several subsections (domains) provided under each of the identified sections (Akbar & Rasul, 2012; Pinson, 2004; Rahmaan, 2011:182-184). These sections also illustrate the vast applicability and knowledge contained in Urban and Regional Planning.

Table 1-2: Some professional focuses of the Urban and Regional Planning as per interpretation on a national and international level.

<table>
<thead>
<tr>
<th>Sections of core professional focuses</th>
<th>Domain as per interpretation on a national and international level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Planning</td>
<td>Planning systems; practices in regional spaces; role of places; strategic frameworks; forward planning; scale of regional planning; impact of migration; regional corridor and nodal development.</td>
</tr>
<tr>
<td>Urban Planning</td>
<td>Anticipating development; scale of urban planning; urban</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>regeneration and development; urban design; site planning; neighbourhood development.</td>
<td></td>
</tr>
<tr>
<td><strong>Policy and strategy formulation</strong></td>
<td>Policy interventions; multi-perspective approaches; disaster preparedness plans; input in draft of policy legislation.</td>
</tr>
<tr>
<td><strong>Land use management</strong></td>
<td>Land use management and control; regulating development; legal issues related to land use and building codes &amp; environmental regulations.</td>
</tr>
<tr>
<td><strong>Built environment</strong></td>
<td>Style of buildings; conservation of historic buildings; development of public spaces and places, location, design and layout of buildings.</td>
</tr>
<tr>
<td><strong>Land availability</strong></td>
<td>Land reservation; identification of land for development.</td>
</tr>
<tr>
<td><strong>Transportation planning</strong></td>
<td>Accessibility between places of residence, work and amenities; traffic congestion management; air pollution management; transport and land use models; transportation frameworks.</td>
</tr>
<tr>
<td><strong>Environmental Management</strong></td>
<td>Relationship between build and environment; negative impacts on natural environment; natural impacts on communities; standards of environmental quality &amp; sustainability; landscape development; legal issues related to environmental management.</td>
</tr>
<tr>
<td><strong>Social-economic and spatial development</strong></td>
<td>Social and economic status quo and forecasting; community regeneration; regional and economic development; smart growth strategies; economic development plans; development resources.</td>
</tr>
<tr>
<td><strong>Facilitation and communications</strong></td>
<td>Lead public consultation processes; education, training and capacity building; identification of community needs; community goals and vision compilation.</td>
</tr>
<tr>
<td><strong>Human settlement development</strong></td>
<td>Housing development and strategies.</td>
</tr>
<tr>
<td><strong>Rural development</strong></td>
<td>Community based development and area based planning.</td>
</tr>
<tr>
<td><strong>Feasibility studies</strong></td>
<td>Appreciation of spatial complexities; deeper underlying causes; integrated analysis.</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>Infrastructure needs; general management; implementation and enforcement strategies; determination of infrastructure and amenities capacity.</td>
</tr>
<tr>
<td><strong>Project management</strong></td>
<td>Management of programmes for planning and implementation; quality management.</td>
</tr>
<tr>
<td><strong>Management and analysis support systems</strong></td>
<td>GIS applications and techniques, modelling and system analysis.</td>
</tr>
</tbody>
</table>

Source: Adapted from (Akbar & Rasul, 2012; Greshman, 2011; Schoeman, 2010).

The inter-active disciplinary approach promoting Urban and Regional Planning and other professions in the built environment, is also important for the stakeholder involvement to be taken into consideration as this may influence the resulting sustainable development (Rahmaan, 2011:182-184; Schoeman, 2010). This includes the responsibilities of professions such as engineering which deals, in general with the transportations and traffic systems and utilities.
such as water, stormwater, sewer and electricity, to name only a few (Greshman, 2011; Lovelace, 1965). It is known that Engineers in general, deals with individual projects related to infrastructure while planners deals with these projects in their bigger application to the local planning structure and proposed development principles (Greshman, 2011).

The domain of Urban and Regional Planning can be viewed from an interface perspective with the inclusion of other disciplines (Akbar & Rasul, 2012; Pinson, 2004; Rahmaan, 2011:182-184) such as engineering, architecture, environmental management, etc. It is stated that the planning education and the interfaces within the academic and research environment, are used to form the basis for developments such as residential development (Schoeman 2013).

Urban and Regional Planning and its associated policy and legislative framework, serves as the foundation and integration between other disciplines. There is also several challenges that the current Urban and Regional Planning Domain in order to promote the interfaces between professions in human settlement development (Razaghi & Finger, 2013; Schoeman, 2013).

Figure 1-1 will illustrate not only the macro context (Schoeman, 2010) in which urban and regional planning is included within a multi-disciplinary system, but will also illustrate the close proximity of engineering and in particular "Engineering Planning". Through this figure it is clearly indicated that engineering is a fundamental and vital aspect to Urban and Regional Planning ("URP"). It is also clear that engineering will not be able to stand on its own, with no support from other disciplines. The results in an interdependent relationship between not only the two fields in question but also within the fields indicated as “Fields fundamental to URP” (Schoeman,
2010).
In review of the above mentioned it is clear that Engineering plays an integral and vital role in Urban and Regional Planning and its associated practices. It is thus important that an understanding of this profession is generated in the endeavours of those persons in Engineering and associated professions, have an understanding of what the implications of Urban and Regional Planning procedures entails as well as their impacts thereon.

The Planning Profession Act (36 of 2002) states that planning along with the planning profession can be seen as areas of expertise focused on the initiation and management of change in both the built and natural environment across a spectrum of areas, including the urban and rural areas defined on various geographic scales such as regions, sub regions, cities, towns, villages and neighbourhoods.

Specific fields for the management of constant change is needed in order to promote human development and environmental sustainability, this can be obtained through the synthesis and integration of information assisting in the preparation of strategic, policy, statutory and other development plans, included within the South African development context. These fields include (Planning Profession Act 36 of 2002):

- Land use management, allocation and regulation.

Figure 1-2: Stakeholders in sustainable development.
Source: Adapted from (ITPI, 2015; Schoeman, 2013).
• The organisation of service infrastructure, utilities, facilities and housing for human settlement.

• The co-ordination and integration of social, economic and physical sectors included in human settlement.

Planning should pursue and serve the interest of the public to benefit the present and future generations (Planning Profession Act 36 of 2002). This description of planning and the planning profession can also be seen as the definition of sustainable development.

The Planning Profession Act (36 of 2002) further provides the definition of a planner as a person exercising skills and competencies in the initiation and management of change in the built and natural environment, in order to promote environmental sustainability and human development, as provided above.

1.4.3 The professions included in the built environment

It is important to comprehend the interaction of the Urban and Regional Planner with other professions in the built environment. This substantiates the importance of skills transfer of Urban and Regional Planning practices and principles to these professions.

Section 1.4.2 indicates that there is a close relationship between Urban and Regional Planning and engineering, it includes a brief description of the correlation and linkages between Urban and Regional Planning and engineering, or specifically civil engineering. However, it is important not to gain an understanding of the relationship between Urban and Regional Planning and engineering as they cannot be considered as a stand-alone entity.

Akbar and Rasul (2012) states that civil engineering focuses on the design, construction and maintenance of the built environment, including infrastructure such as roads, bridges, sanitation systems and buildings, while Urban and Regional Planning mostly deals with the planning of infrastructure development, service delivery, land use management, community development and transport and communication planning. These professions are located within the built environment and should be considered as such.

As a result, a brief description of some of the professions included in the built environment are provided along with the regulatory body and voluntary association along with their registration categories, applicable regulatory legislation, the linkage with Urban and Regional Planning and the role in and towards to municipalities is provided in Table 1-3.
<table>
<thead>
<tr>
<th>Profession</th>
<th>Civil Engineer</th>
<th>Land Surveyor</th>
<th>Architect</th>
</tr>
</thead>
</table>
| Description             | Civil engineering can be described as the use of science and technology in an attempt to control and use the forces and materials of nature, for the advanced benefit of people. They are responsible for the design, planning, maintenance or servicing and management of projects of a very large scale. Their work include amongst others, buildings, harbours, bridges, roads, the supply of municipal services, large scale housing development. They also verify the structural integrity of buildings and constructions. A civil engineer can focus on, amongst others:  
  •  **Structural engineering:** The design of bridges, roads, towers and tunnels.  
  •  **Transportation or traffic engineering:** Includes airports, conducting traffic impact assessments, conducting traffic control.  
  •  **Geotechnical engineering:** Includes mining, excavations, foundations, soil investigations & compositions.  
  •  **Water engineering:** Includes the design of pipelines, sewerage systems, water networks.  
  •  **Environmental engineering:** Design of environmentally friendly initiatives. | Surveying is one of the oldest recorded professions and includes projects varying in size. The work of a land surveyor include both field works, such as the measurement of a terrain and pegging of beacons, and office work, including the processing of information. A land surveyor can specialise in:  
  •  **Geodetic surveying:** Focusses on providing a framework of accurately coordinated and heightened beacons, in order to generate linkages with other maps.  
  •  **Cartography:** It is usually done by photogrammetry, where the data is included on a map showing data in an easily understandable form.  
  •  **Cadastral Surveying:** Includes the surveying of land (the development of townships on farms) and buildings (the development of sectional titles) and the determining of property boundaries.  
  •  **Engineering surveying:** The measurement, setting out and monitoring or roads, tunnels, bridges and structures.  
  •  **Hydrographic/oceanographic surveying:** Concerned with mapping the marine environment including inland bodies of water, also includes the positioning at sea to indicate danger | Architecture refer to the design of the human environment, including buildings or groups of buildings and the space between buildings. Other activities of architecture include the documentation of design and the inspection of buildings and may also include:  
  •  **Landscape architecture:** The design landscapes on properties and between buildings.  
  •  **Interior architect:** Similar to the work done by interior designers, although this includes, amongst others, the design of furniture to fit in a room.  
  The size of architectural projects range from large buildings or building complexes to small additions to a single dwelling house. |
<table>
<thead>
<tr>
<th>Applicable regulatory legislation</th>
<th>Engineering Profession Act No. 46 of 2000</th>
<th>Geomatics Profession Act No. 19 of 2013</th>
<th>Architectural Profession Act No. 44 of 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory body, voluntary association and accreditation</td>
<td>The Engineering Council of South Africa (ECSA) is seen as the regulatory body to which the all engineers should be registered, in order to be able to practice as, amongst others, a professional engineer. The South African Institute of Civil Engineering (SAICE) and the Institute of Municipal Engineers of Southern Africa (IMESA) are the voluntary organisations to which civil engineers and municipal engineers can register, respectively.</td>
<td>The South African Council for Professional and Technical Surveyors (PLATO) is seen as the regulatory body to which all surveyors should be registered, in order to be able to practice as a professional or technical surveyor. The South African Geomatics Institute (SAGI) is the voluntary organisation to which surveyors can register.</td>
<td>The South African Council for the Architectural Profession (SACAP) is seen as the regulatory body to which all Architectural professionals should be registered, in order to be able to practice as a professional architect. The South African Institute of Architects (SAIA) is the voluntary organisation to which architects can register.</td>
</tr>
</tbody>
</table>
| Regulatory body and voluntary association registration categories | • **ECSA membership:** Professional Engineer; Professional Engineer Technologist; Professional Certified Engineer; Professional Engineering Technician; Candidate Engineer  
• **SAICE membership:** Honorary Fellow; Fellows; Member; Associate-; Student members  
• **IMESA membership:** Professional-; Graduate-; Student-; Associate members. | • **PLATO membership:** Professionals; Surveyors – Technologists; Technicians; Persons in training.  
• **SAGI membership:** Professional; Technologist; Survey Technician; Student. | • **SACAP membership:** Professional Architect; Professional Senior Architectural Technologist; Professional Architectural Technologist; Professional Draughtsperson; Candidate Architect; Candidate Senior Architectural Technologist; Candidate Architectural Technologist; Candidate Draughtsperson.  
• **SAIA membership:** Architect-; Life-; Honorary-; Retired-; Candidate-; Associate member. |
| Linkage to Urban and Regional Planning | Civil engineers are consulted when large scale town planning developments are proposed such as township establishments and in particular for large scale residential developments. | Land surveyors in particular, are able to submit consolidation and subdivision applications to the local authorities. These applications comply with all the necessary legislation. Land surveyors | Architects usually provide the site development plans for a rezoning or removal of restrictive title conditions application submitted to the local authority by the town planner. These |
| Role in and towards municipalities | Geological assessments are requested from civil engineers when a new township development is planned. This includes, amongst others, the composition of soils and the evaluation of possible drainage problems as a result of the gradient or slope of the proposed site. Other consultations include the assessment of the impact an increased traffic volume may have on the surrounding developments. The provision of sufficient services are also determined. | are further responsible for the development of sectional schemes. Land surveyors are consultants, often used to identify and peg property boundaries or the gradient, slope and contours of a specific site. | plans include the position of the existing and proposed development on the property. The town planners can also be seen as consultants to the architects, as they are contracted to do the planning applications on a property which will enable a certain project to continue. The collaboration between architects and town planners can result in a more integrated approach to new and continuous development in a city, especially through the use of urban design. | Civil engineers can be employed by state departments, provincial administrations, municipalities and parastatals. They are responsible for the design, development and maintenance of transport systems and the provision of adequate and sustainable municipal services to the community. Civil engineers need to provide comments on all town planning applications submitted to the municipalities including an indication of whether the existing or proposed services will be able to provide in the need of the development. They also need to approve the building plans submitted by architects. | Several land surveyors are employed by state departments, provincial administrations, municipalities and parastatals. In these positions, they are responsible for mostly engineering surveying such as the determination and upgrading of roads as well as the pegging of developments such as new townships. Surveyors also manage the subdivision and consolidation applications and the Surveyor General Diagrams involved therein. They may also be required to approve the drawings of new township developments in order for it to be submitted to the Surveyor General of each province. | The building plans drawn by architects, need to be submitted to the local authority relevant to the property. These plans need to be approved by the Municipal Architect, Town Planner and the Engineering department, prior to the commencement of construction. A Municipal Architect or building inspector need to conduct inspections for each phase of construction. This is to ensure that all developments are up to standard and complies with the necessary regulations. | 

1.5 A need for the guideline

Supporting research conducted, determined that there is indeed a need for this guideline. Questionnaires were circulated, by hand, at the IMESA Conference 2014. The survey was used to determine the current level of skills and knowledge of municipal engineers in Urban and Regional Planning and related fields as well as the expectations and experience from the related professions towards each other. The questionnaires contained three (3) sections, including quantitative and qualitative questions.

A total of 817 delegates were registered to attend the conference of which 140 feedbacks were received during the conference time frame from 28-31 October 2014. From this, 71 (55.9%) of the participants indicated that they are of the opinion the Municipal Engineers of South Africa do not have sufficient working knowledge of the domain of Urban and Regional Planning. In addition, 118 (93.7%) of the participants are of the opinion that it is necessary to broaden the understanding of Urban and Regional Planning under Municipal Engineers (Figure 1-3).

![Open ended questions - Section B](image)

**Figure 1-3: Open ended questions - Section B.**
Source: Own synthesis from IMESA Conference 2014 Questionnaires.

Figure 1-4 substantiates the above mentioned through the low levels of average knowledge determined through the surveys.
Figure 1-5 illustrates the level of knowledge relating to the private and public sectors as indicated during the IMESA Conference 2014 survey. Although it is expected that the average level of knowledge for Baseline knowledge should generally be much higher for the public sector than for the private sector, it is evident that it is not the case. Engineers in the private sector do not generally deal directly with Urban and Regional Planning, thus it is expected that their average Output driven knowledge is higher than that of Baseline knowledge. In contrast the engineers in the public sectors are required to provide opinions and comments on most of the Town planning applications received by the municipalities, as well as policies and legislation rolled out by the municipalities and governmental departments. As a result they are expected to have a much higher average level of Baseline knowledge with a very small difference between the averages of that of Output driven knowledge, resulting in the confirmation of the need for a project such as the Capacity Building Guidelines.

Figure 1-4: Total level of knowledge per topic.
Source: Own synthesis from IMESA Conference 2014 Questionnaires.
Figure 1-6: Average level of knowledge for private vs public sectors. 
Source: Own synthesis from IMESA Conference 2014 Questionnaires.

Figure 1-6 illustrates the average level of knowledge per group of years’ experience by participants. Included in this figure is the amount of responses received for each group, ensuring better interpretation of the results obtained. Even though several of the participants indicated that they are of the opinion. That engineers with more experience will have a greater knowledge regarding Urban and Regional Planning, the results of the survey indicated that the engineers with less experience do indeed have the greatest average level of knowledge followed by those with the most amount of experience, this however can be attributed to the

Figure 1-5: Level of knowledge for years’ experience. 
Source: Own synthesis from IMESA Conference 2014 Questionnaires.
amount of responses received per years’ experience group. The cause of this can be either the result of engineers having to conduct Urban and Regional Planning related responsibilities or that they have received a more comprehensive tertiary education. Again the need for the programme is stressed.

Through this research along it became evident that there is indeed an alarming need for this guideline.

1.6 Contents of this guideline

Several policies and legislation included under Urban and Regional Planning, is provided and discussed in brief; the environmental interface with the inclusion of a summary of all regulations related thereto; guidelines in handling the legal practices, existing spatial development and land use management related thereto; guidelines on transportation planning and other sectoral plans as well as the requirements and regulations included; housing provision guidelines; and town planning regulations and summarised guidelines which will enable the reader to provide comments and assist with such applications. Illustrations and tables will be included to enable a better understanding of the document and the data included.

The changes, as a result of the Spatial Planning and Land Use Management Act (SPLUMA) (Act No. 16 of 2013), is included in the document. This will enable the relevant parties to make a transition from the old legislation towards an integrated approach as proposed by the Act and will form an important focus of the document, as it will have a large influence in the town planning applications and its associated processes. SPLUMA commenced on 01 July 2015, with implications on various municipalities. The municipalities however, are granted with a transitioning period in which they are to prepare specified by-laws. An overview of the generalised by-laws is included in an attempt to explain the processes it includes. Up until the new policies for each municipality or province have been developed, the existing processes will be used, if it is not in contradiction with SPLUMA, or has been repealed.

Figure 1-7 illustrates the topics discussed in the document.
The interaction between Urban and Regional Planning and Engineering forms an integral part of this document, as it will be attempted to not only guide the engineer needing to deal with town planning applications, but also the town planner to understand the role of the engineer in the applications they present. The document includes a summarisation of what the role of the engineer will be regarding the particular topic, as well as whom he/she can contact for assistance, what resources (documents) and practitioner can be consulted, the processes that need to be followed, etc. It will typically be presented in a table similar to the following, with accompanying explanations where processes should be explained.

Figure 1-7: Project contents.
Source: Own synthesis.

...
2. POLICY AND LEGISLATIVE FRAMEWORK

2.1 Chapter contents and brief description

2.1.1 Background

Planning legislation in South Africa largely contributes its origins to the ruling party, the National Party (NP) whom in 1948 gave rise to apartheid or separated development between races. As a result they made plans for development and Town Planners was responsible for the implementation of these plans. In 1960 the Decentralisation Policy came into effect, which kept non-white residents in the rural areas and out of the cities which restricted the growth of the major cities at that time.

The first national plan was implemented in 1975 which also lead to the implementation of National Planning as sub-category of Urban and Regional Planning. As a result wall-to-wall municipalities was established. This meant that the areas between urban areas was also now included under the local municipalities. All regional planning legislation was also implemented since 2000. Some of the current policies, entities, National Plans, etc. are the product of the assistance of the BRICS (Brazil, Russia, India, China, South Africa) group.

Urban and Regional Planners deals with a comprehensive web of policies and legislation across all spheres of government, in order to conduct their work. It is thus important to comprehend the interaction of these policies and legislation, as it may have a great influence on the processes used.

2.1.1.2 Legislative framework

Figure 2-1 illustrates the relevant legislation that influences spatial development and land use and as a result the development in South Africa. Various legislation have been put in place since the 1950’s with some of these legislation being phased out as new legislation is designed to take its place while others have recently been repealed by SPLUMA (2013). These legislation are responsible for the development of policies and guide development as such. Other specialised legislation are included in the appropriate chapters. The relevant legislation are briefly discussed in the Source Document.
2.1.1.3 Policy framework

Figure 2-2 illustrates the relevant policies that have an influence on development in South Africa, however, this does not include policies such as the Spatial Development Frameworks (SDFs) on all levels as these are included in Chapter 3. Other specialised policies are included in the appropriate chapters. The relevant policies are briefly discussed in the Source Document.

2.1.1.4 Integration of policies and legislation

The interface between spatial planning, transportation planning and environmental management, are promoted through the Spatial Planning and Land Use Management Act (16 of 2013) (SPLUMA), which includes (Schoeman, 2015):

- Development principles and norms and standards;
- Intergovernmental support;
- Spatial Development Frameworks (SDF’s);
- National Spatial Development Framework (NSDF);
- Provincial Spatial Development Framework (PSDF);
- Regional Development Framework (RSDF);
- Municipal Development Framework (MSDF);
- Land Use Management (LUM);
- Land Development Management (LDM);
- Municipal Land Use Plans (MLUP);
- Statutory Planning (SP).

Figure 2-3 provides a brief overview of the interaction between the private and public sector and the associated policies and legislation frameworks.
Figure 2-1: General legislative framework - flow chart.

Source: Own synthesis (Schoeman, 2015; Van Wyk, 2012:645-687).
Figure 2-2: General policy framework - flow chart.
Source: Own synthesis (Schoeman, 2015; Van Wyk, 2012:645-687).
Figure 2-3: Interaction between private and public sector and associated policies and legislation.
Source: Adapted from (Schoeman, 2015).
2.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

Table 2-1: Important knowledge to take note of - General policy and legislative framework.

<table>
<thead>
<tr>
<th>Concept</th>
<th>General policy and legislative framework</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process to follow</strong></td>
<td>Each policy and legislation has its own process for either the development thereof or for the review and implementation of a newer module. The source document includes the relevant processes where applicable, such as the processes for SPLUMA (2013).</td>
</tr>
<tr>
<td><strong>The role of the Engineer</strong></td>
<td>It is the responsibility of the municipal engineer to assist in the implementation of these policies and legislations and should adhere to the regulations and requirements stipulated therein.</td>
</tr>
<tr>
<td><strong>What is important to know</strong></td>
<td>The general policies and legislative framework has an influence on the development, it is thus important to know the role of each applicable policy and legislation and the impact it has on development.</td>
</tr>
<tr>
<td><strong>How it should be implemented</strong></td>
<td>These policies and legislations are implemented through each municipality, either by policies formulated in terms of the regulations of legislation, or by their by-laws developed as a response to the national policies.</td>
</tr>
<tr>
<td><strong>Consultants to contact for assistance</strong></td>
<td>Town Planner; Land Surveyor; Attorney; Consulting Engineers; Environmentalists; Government Departments, to name a few. These consultants, and others, can make significant contributions and should be consulted.</td>
</tr>
<tr>
<td><strong>Resources to consult</strong></td>
<td>Policy and legislative documentation and by-laws such as the Town Planning Scheme, SDF, IDP, LUMS, ITP, environmental guidelines.</td>
</tr>
</tbody>
</table>

Source: Own synthesis.
3. SPATIAL DEVELOPMENT

3 Heading 1 won’t print. Don’t delete – doing so will lead to incorrect numbering.

This chapter consists of five (5) sections, including spatial development, layout planning and design, township establishment, township related issues and planning and development administration. These sections are included in the same chapter as they play an integral part in urban and regional planning and in each other. In essence, building and construction management are implemented to guide and to maintain the various town planning applications and the strategic framework responsible for guiding development.

3.1 Spatial development

3.1.1 Chapter contents and brief description

This section includes the various spatial development initiatives, such as the processes and requirements of each by-law (SDF, IDP and LUMS). It further includes a description of the regulatory framework of spatial development and land use management. The legal practices are also included and briefly discussed.

3.1.1.1 Regulatory framework in spatial development

The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) and Sustainable Human Settlement Planning: Resource Book (2008) should be consulted as this provides guidelines for development which can be used alongside the regulatory framework in spatial development. The combination of these resources will ensure sustainable and sufficient growth and development in all areas, if implemented correctly.

The Town Planning and Township Ordinance (Ordinance 15 of 1986) and the Spatial Planning and Land Use Management Act (16 of 2013) should be viewed in conjunction with each other as these legislation provides support for one another. The Town Planning and Township Ordinance (Ordinance 15 of 1986) provides the backbone for the development and implementation of the Spatial Planning and Land Use Management Act (16 of 2013). This section provides a brief description to these important documents and references are made to it throughout the document.

(a) Town planning schemes and zoning

The Town Planning Scheme can be described as the legal regulation of potential land use through the reserving of specific properties for certain land use types. As a result the Town
Planning Scheme is used for the management of the use of land, the activities on each property, the height restrictions, density, surface floor area and parking requirements on each individual property within the boundaries to which the Town Planning Scheme is allocated. This also means that one Local Municipality can use several Town Planning Schemes within the Municipal boundary of that particular municipality. The Town Planning Scheme makes provision for all uses permitted and restricted with the several zonings present in the Municipal boundary.

Included in this chapter is the definition and descriptions of these restrictions and guidelines included in the town planning schemes, such as the building lines of a property, property requirements, the coverage, density and floor area ratio (FAR).

Once SPLUMA (2013) has been fully implemented a Land Use Management Scheme will be used instead of the town planning scheme.

(b) Property characteristics

This section includes the various types of ownerships and the application and types of servitudes that can be used on properties. Title deeds are also explained with the identification of the most important aspects that should be considered, such as the deed of transfer number, whether or not a bond is registered on the property and the owner, size and description of the property.

3.1.1.2 Land use management in spatial development

Development tribunals must consider the applicable integrated development plans, including spatial development frameworks and urban development boundaries, when determining applications for the grant or alteration of land use rights.

Town planning schemes, Spatial Development Frameworks (SDFs), Land Use Management Schemes (LUMS) and other spatial initiatives can be used to guide land uses in its applicable area. This can be implemented at national, provincial, district or local level. Each erf is linked to a specific zoning as prescribed in the relevant Town Planning Scheme or Land Use Management Schemes, although they may not necessarily be connected to the relevant Spatial Development Framework (SDF) as it works on a neighbourhood plan and not on each specific erf. Streets are included in the planning for zoning allocation.

Chapter 5 of SPLUMA (2013) provides guidelines in the management of land uses through the use of a LUMS. It further provides, amongst others the purpose, contents, revision period and implementation thereof.
A LUMS should be reviewed and monitored in order to achieve consistency in the SDF, as a result it should be reviewed at least every five (5) years. Amendments can be made to the LUMS through rezoning applications or the changing of municipal boundaries.

The LUMS should promote economic growth, social inclusion, efficient land development and minimal impact on public health, the environment and natural resources. It should also include scheme regulations that provides procedures and conditions related to the use and development of land in all areas, a map which indicates the zoning of the municipal area and a register of all amendments made to the scheme.

Various other aspects should be included in a LUMS, this section provides a brief description of these aspects along with the processes that should be followed during the compilation and implementation of a LUMS. The general process is included in the figure below.

![Figure 3-1: Steps included in compiling a LUMS.](source: Own synthesis (SPLUMA, 2013).

### 3.1.1.3 Existing spatial development

(a) Current Spatial Planning in South Africa

Spatial planning is technical in nature although it relies on participation from stakeholders. It consists of a spatial orientation to support existing policies with limited interventions in order to address historical spatial deficiencies. Planning is now focused on needs within informal
settlements. Formalisation is implemented in areas responsible for the establishment of fragmentation. This does not only apply to urban spatial systems but are also exists in rural areas. Planning documents, policies and guidelines for normalisation and integration of spatial planning exists in an attempt to guide development away from fragmentation. Application thereof are either restricted or used as spatial ‘recipes’, instead as guidelines for planning.

Various policies and legislation guided spatial development in South Africa, different by-laws are used to specifically guide development on a national, provincial, district and regional scale, this include die IDP, LIMS, SDF, Spatial Development Initiatives (SDI), 1999 and national initiatives such as the National Spatial Development Perspective (NSDP), 2002/2006. This section includes ‘n brief description of the bylaws, including the processes and information related to specifically IDPs and SDFs.

(b) Migration, urbanisation and counter-urbanisation

Migration and urbanisation plays a major role in spatial development as this places pressure on the existing and available municipal infrastructure and development potential. These phenomenon should be addresses as soon as possible through the use of the above mentioned by-laws and building control. Counter-urbanisation and polarisation should also be addresses through the above mentioned by-laws.

These concepts can be understood as:

- Migration is any permanent or semi-permanent change in location. Spatial transfer from one social unit or neighbourhood which strains or ruptures previous social bonds. No limit is placed on the distance of migration or whether it is forced or free will migration (Internal or external migration). Exclude continued movement of migration workers and a vacation. Includes point of origin, migration streams and a destination (National Geographic, 2005).

- Urbanisation is the process through which the proportion of people living in towns and cities increase. The increase of the number of people is a result of people migrating from rural to urban areas (Collins, 2001).

3.1.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Spatial development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to</td>
<td>Each policy and legislation has its own process for either the development thereof or for the review and implementation of a newer module. The source</td>
</tr>
</tbody>
</table>
The role of the Engineer

It is the responsibility of the municipal engineer to assist in the implementation of these policies and legislations and should adhere to the regulations and requirements stipulated therein.

What is important to know

The general policies and legislative framework has an influence on the development, it is thus important to know the role of each applicable policy and legislation and the impact it has on development.

How it should be implemented

These policies and legislations are implemented through each municipality, either by policies formulated in terms of the regulations of legislation, or by their by-laws developed as a response to the national policies.

Consultants to contact for assistance

Town Planner; Land Surveyor; Attorney; Consulting Engineers; Environmentalists; Government Departments, to name a few. These consultants, and others, can make significant contributions and should be consulted.

Resources to consult

Policy and legislative documentation and by-laws such as the Town Planning Scheme, SDF, IDP, LUMS, ITP, environmental guidelines. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) and Sustainable Human Settlement Planning: Resource Book (2008) should also be consulted.

Source: Own synthesis.

3.2 Layout planning and design

3.2.1 Chapter contents and brief description

This section makes specific references to the design requirements for, specifically, township establishments, although it can be applied to all town planning developments. Reference is made to the Guidelines for the provision of engineering services and amenities in residential township development, 1994 (GESRT) and Chapter 2 and 5 of the Guidelines for Human Settlement Planning and Design, 2000 (Redbook). Various other concepts are included in this section, such as (Behrens & Watson, 1996:10; CSIR, 1994):

- **Considerations in layout planning:** This includes the consideration of land use, movement networks, pedestrian movement, traffic volumes, safety, conservation and heritage, visual impact, geological environment and the manner in which it is implemented. The influence of poor layout planning can play a big role in the market and potential growth of the properties affected.

- **Concerns in layout planning:** The satisfaction of human needs and an improvement of the human conditions; the establishment of a sustainable relationship between urban settlements and their surrounding environment; promote the most efficient use of available resources.

- **Principles in layout planning:** Place making - The making of unique places; Scale - The scaling of urban environments to human dimensions; Access - The maximisation of access from the greatest number of people; Opportunity - The creation of economic opportunities;
Efficiency - The efficient use of limited resources; Choice - The maximisation of choices available to communities.

### 3.2.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the *Source Document* for more information where needed.

Table 3-2: Important knowledge to take note of - Layout planning and design.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Layout planning and design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>• The analysis of the physical, socio-economic, financial and regulatory context;</td>
</tr>
<tr>
<td></td>
<td>• The conversion of normative concerns into guiding layout planning principles, expressed as a set of written statements, and the identification of their implications for spatial relationships, expressed as a set of acontextual concept diagrams;</td>
</tr>
<tr>
<td></td>
<td>• The quantification of needs into a programme of required facility, amenity and infrastructure investments;</td>
</tr>
<tr>
<td></td>
<td>• Bringing together context analysis, guiding layout planning concepts and programme, in order to form concept plans at a range of scales;</td>
</tr>
<tr>
<td></td>
<td>• Attaching widths, lengths and areas to these lines drawn on concept plans, to form more detailed plans.</td>
</tr>
</tbody>
</table>

| The role of the Engineer     | It is the responsibility of the municipal engineer to provide comments on all town planning applications. These comments should include aspects such as: |
|------------------------------|• Roads (maintenance and provision thereof);                                                  |
|                              |• Stormwater (possible impact);                                                               |
|                              |• Water & sanitation and electricity (sufficiency of capacity for proposed development); etc. |
|                              |Consideration should be made to aspects including inter alia bulk- and internal services, cost effectiveness, development contributions. |

| What is important to know    | Not all town planning applications are the same; circumstances and applicable legislation differ; SDF’s, LUMS and other policies should be consulted for each application and should not be seen as blue prints as some are adaptable and can be changed. The aspect of urban fragmentation should be considered for each application as it influences its validity. |

| How it should be implemented | The housing shortage in South Africa is well known and a lot of the policies of each municipality, such as the SDF, promotes infill development. However, in many cases town planning applications with the specific aim at providing higher density housing, the problem regarding the availability of services usually prevents the provision of housing. |
|------------------------------|Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. Engineering contributions should be explained in greater detail as the developers and owners are not educated in understanding the difference in green- and brown field developments and the difference in |
contributions.

### Consultants to contact for assistance

Town Planner; Land Surveyor; Attorney; Architects; Landscape Architect; Quantity Surveyor; Consulting Engineers; Environmentalists; Government Departments; Urban Designers; Project manager and banks these consultants, and others, can make significant contributions and should be consulted.

### Resources to consult

Policy and legislative documentation including Town Planning Scheme; SDF; IDP; LUMS; ITP; environmental guidelines; SABS Standards; the Housing Act; PIE Act; Rental Housing Act; Social Housing act; the white paper on housing; BNG; National housing code; Housing Sector Plans and policies by the local authorities. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) and Sustainable Human Settlement Planning: Resource Book (2008) should also be consulted.

Source: Own synthesis (Behrens & Watson, 1996:4-5).

### 3.3 Township establishment

#### 3.3.1 Chapter contents and brief description

Section 96 of the Town Planning and Township Ordinance, Ordinance 15 of 1986 is used to regulate township establishment. It defines a town as ‘any land laid out or subdivided or developed as sites for residential, business or industrial purposes or similar purposes where such sites are arranged in such a manner as to be intersected or connected by or to abut on any street, and a site or a street shall for the purposes of this definition include a right of way or any site or street which has not been surveyed or which is only notional in character’.

This section includes the establishment of new townships with the inclusion of the difference and application of the use of a township establishment and a sectional title schemes (Table 3-3). Further included is the process of such application and the documents to be included.

**Table 3-3: Distinguishing between township establishment and sectional title schemes.**

<table>
<thead>
<tr>
<th>Definition</th>
<th>Township establishment</th>
<th>Sectional title schemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Township establishment is used to redevelop farm portions or agricultural holdings into individual erven/plots/stands/sites. The property will as a result no longer be used for agriculture purposes nor will it obtain a farm description. The erven can be sold as separate entities thus enabling a developer to develop the erven of the township in a similar manner of erven included in existing townships.</td>
<td>To provide for the division of buildings into sections and common property and for the acquisition of separate ownership in sections coupled with joint ownership in common property; the control of certain incidents attaching to separate ownership in sections and joint ownership in common property; the transfer of ownership of sections and the registration of sectional mortgage bonds over, and real rights in, section; the conferring and registration of rights in, and the disposal of, common property; the establishment of bodies corporate to</td>
<td></td>
</tr>
</tbody>
</table>
control common property and for that purpose to apply rules; and the establishment of a sectional titles regulation board; and to provide for incidental matters.

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>• More than one erf/plot/site/stand;</td>
<td>• Individual ownership of a selection such as a flat or commercial unit;</td>
</tr>
<tr>
<td>• More than one owner;</td>
<td>• Joint ownership of the common parts of the Sectional Title Scheme;</td>
</tr>
<tr>
<td>• More than one use;</td>
<td>• Members of a managing body consisting of all the Sectional owners (similar to a body corporate).</td>
</tr>
<tr>
<td>• Agricultural land that is redeveloped;</td>
<td></td>
</tr>
<tr>
<td>• Common parts of the township is owned by the body corporate or the managing body.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examples</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>The redevelopment of land into individual residential, industrial or commercial properties</td>
<td>To be developed on erven included in an existing residential township and is usually in the form of a town house complex.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consultants responsible for development</th>
<th>Consultants responsible for development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town planner; environmental consultants; consulting engineers; land surveyor; architect and attorney.</td>
<td>Land surveyor; architect and attorney.</td>
</tr>
</tbody>
</table>

Source: Own synthesis (Practice Group, 2015; Sectional Title Act (95 of 1986); Town Planning and Township Ordinance, Ordinance 15 of 1986; Van der Merwe & du Plessis, 2004:222).

The section further includes the detailed processes related to and documentation required for a township establishment process. The development guidelines for layout planning should also be considered and is included in this chapter.

### 3.3.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the *Source Document* for more information where needed.

**Table 3-4: Important knowledge to take note of - Township establishment.**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Township establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>A township establishment process is fairly complicated and various documentation may be required from different consultants. After the submission of the application to the local authority and relevant state departments, a report should be compiled which includes the comments received from all relevant parties. The application will now be considered by the local authority. If the application are to be approved it should be proclaimed in the provincial gazette, and will also include the informing of the Registrar of Deeds and the Surveyor General Office. However, if objections</td>
</tr>
</tbody>
</table>
were received against the application, a tribunal hearing will be arranged during which the application will be reconsidered by independent parties.

| The role of the Engineer | It is the responsibility of the municipal engineer to provide comments on all town planning applications. These comments should include aspects such as:
| | • Roads (maintenance and provision thereof);
| | • Stormwater (possible impact);
| | • Water & sanitation and electricity (sufficiency of capacity for proposed development); etc.
| | Consideration should be made to aspects including inter alia bulk- and internal services, cost effectiveness, development contributions. |

| What is important to know | Not all town planning applications are the same; circumstances and applicable legislation differ; SDF’s, LUMS and other policies should be consulted for each application and should not be seen as blue prints as some are adaptable and can be changed. The aspect of urban fragmentation should be considered for each application as it influences its validity. |

| How it should be implemented | The housing shortage in South Africa is well known and a lot of the policies of each municipality, such as the SDF, promotes infill development. However, in many cases town planning applications with the specific aim at providing higher density housing, the problem regarding the availability of services usually prevents the provision of housing. Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. Engineering contributions should be explained in greater detail as the developers and owners are not educated in understanding the difference in green- and brown field developments and the difference in contributions. |

| Consultants to contact for assistance | Town Planner; Land Surveyor; Attorney; Architects; Landscape Architect; Quantity Surveyor; Consulting Engineers; Environmentalists; Government Departments; Urban Designers; Project manager and banks these consultants, and others, can make significant contributions and should be consulted. |

| Resources to consult | Policy and legislative documentation including Town Planning Scheme; SDF; IDP; LUMS; ITP; environmental guidelines; SABS Standards; the Housing Act; PIE Act; Rental Housing Act; Social Housing act; the white paper on housing; BNG; National housing code; Housing Sector Plans and policies by the local authorities. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) and Sustainable Human Settlement Planning: Resource Book (2008) should also be consulted. |

Source: Own synthesis (Town Planning and Township Ordinance, Ordinance 15 of 1986).

3.4 Township related issues

3.4.1 Chapter contents and brief description

This section includes the various town planning application, including the processes of each and the documentation to be submitted along with the application. It further includes a description of
the procedures and aspects to consider during the evaluation of the application. The appeals and objection process is also included and briefly discussed.

3.4.1.1 Generic components of town planning applications

Regulations 35 to 39 of the Town Planning and Township Ordinance, Ordinance 15 of 1986, Ordinance 15 of 1986, Section 6(1) of the Division of Land Ordinance 20 of 1986 and Agricultural Land Act, 1970 (Act 70 of 1970) stipulates that each town planning application should contain a collection of basic documents, such as the title deed, zoning certificate, land use surveys and surrounding zoning, power of attorney, mortgage bond details, motivational memorandum and application form, to name a few.

Various policy documents of all spheres of government should be consulted and considered prior to the compilation of an application. Applicable policy documents should be used in order to provide substantiation for the proposed land use and application. These documents include, amongst other, the Town Planning Scheme, SDF, IDP and LUMS.

Each type of application has its own advertisement regulated through relevant legislation including Town Planning and Township Ordinance, Ordinance 15 of 1986, Ordinance 15 of 1986, Section 6(1) of the Division of Land Ordinance 20 of 1986, Agricultural Land Act, 1970 (Act 70 of 1970) and SPLUMA (2013). It is important to note the format and wording of each notice including site- and newspaper notices, the timespan and period of the placement of the advertisements and the number of placements. The different notices will be discussed in more detail under the relevant application section, due to each application having its own notice format.

3.4.1.2 Consolidation and/or subdivision applications

(a) Consolidation and subdivision within a township

- Consolidation of two (2) or more properties, within an approved township, is regulated by Section 92 (1)(a) and (2)(c) of Town Planning and Township Ordinance, Ordinance 15 of 1986. Section 25(2) of the ordinance also states that if the application is not approved within sixty (60) days after receiving acknowledgement from the municipality, it can be presumed that the application was successful and that it has been approved.

- Subdivision of a property into two (2) or more portions, within an approved township, is regulated by Section 92 (1)(b) of the Town Planning and Township Ordinance, Ordinance 15 of 1986.

(b) Subdivision of agricultural land
• **Act 70 of 1970**: piloted by the Department of Agriculture - applicable in instances where land is still subject to the stipulations of the relevant act.

• **Ordinance applications (Section 6(1) of the Division of Land Ordinance 20 of 1986)**: mainly applies to land located in the area of jurisdiction of a local authority prior to 1994.

Each application includes its own process regulated by the relevant legislation. Figure 3-2 illustrates the generic components of these applications. For more information on details of this process see the *Source document*.

The following documentation should accompanies the application: Division plan; Motivating memorandum; Power of attorney and Copy of title deeds.

### 3.4.1.3 Building line relaxation / servitude abolishment

(a) **Building line relaxation.**

In general a building line or street building line can be relaxed through the removal of the restrictive condition prescribed in the Title Deed, however, some town planning schemes makes provision for the relaxation of building lines through a consent use application, or the local authority will give permission that, if the property is a corner property, one (1) of its street building lines are reprieved.

(b) **Servitude abolishment**

![Figure 3-2: Generic processes for consolidation and subdivision applications. Source: Own synthesis (Town Planning and Township Ordinance, Ordinance 15 of 1986).](image-url)
Servitudes can be cancelled / terminated by the registration of an abandonment in land record, extinctive prescription, merger, permanent impossibility to exercise the servitude and the death of the holder of a personal servitude. In a permanent merger (notarial tie) of the dominant and servient land, both registered and unregistered servitudes should only revive on separation if they are expressly reconstituted. A reference to the notarial deed containing the servitude alone, should not be considered as sufficient (Van der Merwe & du Plessis, 2004:228).

Public servitudes can’t be extinguished or cancelled by non-user or extinctive prescription, although they are terminated if the exercise of the servitude had been precluded by the land owner without the objection form the prescriptive period (Van der Merwe & du Plessis, 2004:229).

3.4.1.4 Consent use applications

The Town Planning Scheme relevant to the property on which the Consent Use is proposed, makes provision for certain uses of the property as secondary rights which can only be obtained with special permission and written consent from the Local Authority. These rights are indicated in the fourth (4th) column of the Town Planning Scheme’s Zoning tables. Section 23(3)(a) states that the use and development of land may be changed only with the consent of the municipality.

The Title Deed of the property should also be viewed as this may prohibit certain uses that may be indicated in the Town Planning Scheme. If restrictions are included in the Title Deed to the property, a Removal of Restrictive conditions should be conducted along with the request for special consent.

Consent use applications may include special consent for a second dwelling unit, crèche, place of public worship, place of instruction, social halls and wedding or function venues, to name a few.
The following documentation should be included in the application: Application form; Motivating memorandum; Title deed(s); Power of attorney; Bondholder's Consent (if applicable); Locality Plan; Zoning certificate; Proposed Site Development Plan.

### 3.4.1.5 Rezoning applications

Rezoning applications is described as amendments made to the town planning scheme or LUMS applicable to the area in question. Amendment schemes numbers refer to the amendments made to the town planning scheme, the new zoning of the property will thus be indicated with the accompanying number indicated on the scheme maps, this can thus be cross-referenced to the application made and the conditions of approval can thus be provided for any future enquiries. The same applies to annexure numbers are obtained in the same manner as an amendment scheme. This indicates specific developments on a property, this however, is not needed for all rezoning applications.

In the case of a rezoning alone, the applications is made in terms of Section 56 of the Town-Planning and Township Ordinance, 15 of 1986 or Section 28 of SPLUMA (2013).
The following documentation should be included in the application: Application form; Map 3; Proposed scheme clauses; Motivating memorandum; Title deed(s); Power of attorney; Bondholder’s Consent (if applicable); Locality Plan; Existing Land-uses; Existing Zoning; Zoning certificate; Proposed Site Development Plan.

### 3.4.1.6 Removal/amendment of restrictive title conditions

Application is submitted in terms of Section 47 of SPLUMA (2013). The application is used when there is conditions in the title deed to the property that needs to be amended or removed in order to allow the proposed development, giving that it is in line with the strategic by-laws of the municipality. The application can be submitted along with a rezoning application or as an application on its own to relax a building line, for example. The same process applicable to a rezoning application, should be followed for this application.

The following documentation should be included in the application: Application form; Motivating memorandum; Title deed(s); Power of attorney; Bondholder’s Consent (if applicable); Locality Plan; Zoning certificate; Proposed Site Development Plan.

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**Figure 3-4: Generic processes for rezoning applications.**

Source: Own synthesis (Town Planning and Township Ordinance, Ordinance 15 of 1986).
3.4.1.7 Professional inputs that may be required

Various inputs may be required to complete the process of a town planning application and to collect all the information that may be required. This includes, amongst others, services reports, geotechnical surveys/investigations, traffic impact studies (TPI), environmental authorisation or environmental impact assessments (EIA) and inputs from external and internal departments. Once all the required comments and documentation has been received the application is ‘ready for report’.

3.4.1.8 Evaluation of land use applications

All town planning applications submitted to the relevant authority are to be evaluated before approving or declining the application. This includes various criterion such as the evaluation of the applications of development principles and the motivation given in terms of the guidelines provided in Chapter 2 of SPLUMA (2013). The alignment with the strategic guidelines and developmental objectives of the municipality should also be considered.

3.4.1.9 Appeals and objections against applications

Appeals or objections against a proposed development can be submitted, in writing, either to the authorised agent of the owner (the applicant) or to the town planning department of the local municipality. These objections should be considered and the objectors should be informed of the tribunal hearing that will take place as a response thereto.

3.4.1.10 Notarial connections between properties

For time immemorial registrars of deeds have been registering notarial tie-agreements which have the status of a personal servitude, and are capable of being registered under the provisions of Section 65 of the Deeds Registries Act 47 of 1937.

The notarial tie-agreement must be entered into between the owner or owners of the land being notorially tied and the person enforcing the tie-agreement. The enforcer could be the local authority, bank or any person or entity who would derive benefit from the properties being tied.

3.4.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.
### Table 3-5: Important knowledge to take note of - Township related issues.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Township related issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The role of the Engineer</strong></td>
<td>It is the responsibility of the municipal engineer to provide comments on all town planning applications. These comments should include aspects such as; • Roads (maintenance and provision thereof); • Stormwater (possible impact); • Water &amp; sanitation and electricity (sufficiency of capacity for proposed development); etc. Consideration should be made to aspects including <em>inter alia</em> bulk- and internal services, cost effectiveness, development contributions.</td>
</tr>
<tr>
<td><strong>What is important to know</strong></td>
<td>Not all town planning applications are the same; circumstances and applicable legislation differ; SDF’s, LUMS and other policies should be consulted for each application and should not be seen as blue prints as some are adaptable and can be changed; illegal developments may warrant the proposed development even though the municipal documentation does not necessarily support the application completely. The aspect of urban</td>
</tr>
</tbody>
</table>
fragmentation should be considered for each application as it influences its validity.

| How it should be implemented | It is good to provide consequent and rigid comments on applications, it prevents the establishment of presidents, however if the proposed development does not necessarily comply with the policy documents, it should be considered with greater diligence. Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. Engineering contributions should be explained in greater detail as the developers and owners are not educated in understanding the difference in green- and brown field developments and the difference in contributions. |
| Consultants to contact for assistance | Town Planner; Land Surveyor; Attorney; Consulting Engineers; Environmentalists; Government Departments; etc. these consultants, and others, can make significant contributions and should be consulted. |
| Resources to consult | Policy and legislative documentation including inter alia Town Planning Scheme, SDF, IDP, LUMS, ITP, environmental guidelines. |

Source: Own synthesis (SPLUMA, 2013; Town Planning and Township Ordinance, Ordinance 15 of 1986).

3.5 Planning and development administration

3.5.1 Chapter contents and brief description

MSG (2015) states that ‘Development Administration is about projects, programs, policies and ideas which are focused at development of a nation, with the point of view of socio-economic and socio-political development of society in general, carried out by talented and skilled bureaucrats’. Sapru (2002:80) substantiates this definition.

3.5.1.1 Contents of a development administration model

There are four (4) elements of a development administration model, including (MSG, 2015):

- Rejecting the status quo and moving towards change while being results orientated with every development function having a defined objective;
- Planning plays an integral role as this is used to develop a framework of resources and time allocated for each proposed development and the function thereof;
- Innovation will contribute to the dynamic nature of the model and will encourage new and improved methods of achieving the objectives;
- Focusing on planning for the people and with the people as this is a people-centred model which should empower the society as a whole and not be profit driven.
3.5.1.2 Understanding development administration

Development administration consist of two (2) concepts, including (MSG, 2015; Sapru, 2002:82):

- **Development administration:** Finding a means to optimally use available resources such as scarce material or human resources, while ensuring the new means for development gains prominence. This include:
  
  - Innovative planning at all levels;
  - Base-line development is very important and the development of human capital as a resource;
  - The establishment of constant and rapid change in the society can be achieved by viewing politics and administration together;
  - The freedom of administrative machinery to encourage and express ideas and views for the effective and efficient use of natural resources.

- **Administrative development:** The empowerment of administration encourages effective development administration. Administrative development should sustain the pleasures of developmental activities and bring about the change needed in the administrative framework, thus moving from the traditionalist approach towards a more socio-economic and political approach to development. This includes:
  
  - The development and improvement of decision making capabilities;
  - The development of skills ad specialization in the personnel to enable them the resolve complex issues;
  - Changing the administrative approach through the encouragement of the importance of training and effective use of technology;
  - The creating of leaders from bureaucrats for the promotion of development initiatives.

Development goals can be achieved through proper planning, the optimum use of resources, employing skilled personnel, accepting accountability in both words and actions, self-reliance and placing an emphasis on technology. Simultaneously, bureaucracy, innovativeness, build capabilities, integrity and decentralized decision making should be developed (MSG, 2015; Sapru, 2002:82-87).

3.5.1.3 The correlation between planning and development administration

Planning administration includes duties such as the maintenance of by-laws, clerical services, managing of the property and application database, amongst others (Whitby, 2015). This also includes many of the work done by private urban and regional planning practices in statutory planning duties. Planning administration is thus dependent on the development initiatives and
goals set out through the administration of development. This section further discusses the correlation in the *Source Document*.

### 3.5.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the *Source Document* for more information where needed.

**Table 3-6: Important knowledge to take note of - Planning and development administration.**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Planning and development administration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process to follow</strong></td>
<td>Each development administrative initiative will have its own process such as the development of an LED or IDP. This is in turn regulated by SPLUMA (2013) and other applicable legislation as previously mentioned in the chapter.</td>
</tr>
<tr>
<td><strong>The role of the Engineer</strong></td>
<td>The engineer will have more responsibility in planning administration, although they can be consulted to contribute to the development administration. The proposed initiatives, goals and objectives can guide the provision and expansion of services and the may also encourage development in the community which will require more assistance from the engineer.</td>
</tr>
<tr>
<td><strong>What is important to know</strong></td>
<td>Development administration entails the formulation of developmental initiatives, objectives and goals through the improvement of the personnel involved, using sustainable development initiatives and focussing on the residents of the area and not aiming at generating a profit.</td>
</tr>
<tr>
<td><strong>How it should be implemented</strong></td>
<td>The development initiatives are implemented through each municipality, either by policies formulated in terms of the regulations of legislation, or by their by-laws developed as a response to the national policies and the development goals.</td>
</tr>
<tr>
<td><strong>Consultants to contact for assistance</strong></td>
<td>Town Planner; Consulting Engineers; Ward councillors; Government Departments, to name a few. These consultants, and others, can make significant contributions and should be consulted.</td>
</tr>
<tr>
<td><strong>Resources to consult</strong></td>
<td>Policy and legislative documentation and by-laws such as the IDP and LED.</td>
</tr>
</tbody>
</table>

Source: Own synthesis.
4. HUMAN SETTLEMENT DEVELOPMENT AND BUILDING CONTROL

4.1 Human settlement development

4.1.1 Chapter contents and brief description

Taking in to consideration the large amount of informal settlements and the housing shortage present in South Africa, it is important to co-ordinate the responsibilities and workings of both the Planning Departments and the Engineering departments in an attempt to improve human settlement development and especially housing provision. This chapter will provide a better insight on the concept of human settlement development.

4.1.1.1 Policy and legislative framework

Human settlement development is regulated by a variety of policies and legislation, housing institutions and international initiatives such as the UN-Habitat Agenda along with the Millennium Development Goals (MDGs) and the newly formalised 2030 Agenda for Sustainable Development. These policies, legislation and initiatives guide the provision of human settlement in South Africa (Millennium Project, 2006; The New York Times, 2015; Thwaites, 2015; UN DESA, 2015a; UN News Centre, 2015).

(a) Human settlement legislative framework (Primary legislation)

Figure 4-1 illustrates some of the important housing legislation including Housing Act 107 of 1997 (amended by Acts 28 and 60 of 1990; Act 4 of 2001) (Housing Act); Bill of Rights in Chapter 2 of the Constitution, section 26 (1996); Prevention of Illegal Eviction from and Unlawful Occupation of Land Act 19 of 1995 (PIE Act); Rental Housing Act 50 of 1999 (amended by Act 43 of 2007) (Rental Housing Act); National Norms and Standards for the Construction of Stand Alone Residential Dwellings Financed through National Housing Programmes (April
2007) (National Norms and Standards) and the Social Housing Act of 2008 (Social Housing Act) (Tissington, 2011).

(b) Human settlement policy framework

Figure 4-2 illustrates the two (2) relevant housing policies include the Housing Atlas (2006), the White Paper on Housing (1994) and the Breaking New Ground (2004) policies (Tissington, 2011).

(c) National Housing Code (2000, revised in 2009)

Figure 4-3 illustrates the National Housing Code and it’s consistent with the Housing Act and emphasizes the underlying policy principles, guidelines and norm as well as standards which apply to the National Housing Programmes. The Housing Code binds the local and governmental spheres. It also includes the National Housing programmes with subsections

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**Figure 4-1:** Human settlement development legislation - flow chart.

Source: Own synthesis (Tissington, 2011).
including qualifying criteria for housing subsidy programmes (Tissington, 2011).
Figure 4.3: Human settlement development policies - flow chart.
Source: Own synthesis (Tissington, 2011).

Figure 4.2: National housing programmes - flow chart.
Source: Own synthesis (Tissington, 2011).
4.1.1.2 Key concepts of human settlement development

It is important to understand the concept of human settlement development and specifically housing provision including all it entails such as the various types of housing available and the correlation to their proposed zonings and the key concepts included under housing provision. Reference is also made to the various professions involved in human settlement development along with their role therein. The types of ownership, including sectional-title and full-title ownerships, is also included (Opperman, 2015:10-12).

4.1.1.3 South African housing situation

The housing situation in South Africa is briefly described with the inclusion of the change in the policy and legislative framework, the proposed norms and standards for affordable housing, objectives for integrated human settlement and current challenges faced in housing delivery.

Housing development is further discussed through the brief description of the process thereof, the provision of housing in informal settlements, the possible risks that may arise and the management thereof.

4.1.1.4 Development guidelines

Specific reference is made to the Guidelines for Human Settlement Planning and Design, 2000 (Redbook) as this gives a good guideline for the development of integrated human settlements including the combination of specific land uses and the norms and standards for service delivery and layout designs (CSIR, 2006).

4.1.1.5 Case study

A case study is discussed in brief to provide a practical example of human settlement development and housing deliver.

4.1.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

Table 4-1: Important knowledge to take note of - Human settlement development.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Human settlement development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>Human settlement development includes various processes that can be followed for the provision thereof. These processes cannot be generalise as</td>
</tr>
</tbody>
</table>
they rely on the situation they are implemented to guide the process. In general the processes should be viewed and aligned with the local municipalities IDP and include:

- **Housing procurement procedures**: in terms of the National Housing Code which must be read in conjunction with the MFMA;
- **Quality control**: which is linked primarily to the work of the national Home Builders Registration Council and overlaps with procurement and project management aspects of the housing development process;
- **Project management**: which is primarily based on the subsidy mechanism rules which include the phases of development, milestones and payment indicators;
- **Waiting lists and subsidy allocations**: Subsidy allocations and approvals, conditional sale of land and deeds of sale are project based whilst waiting lists are queuing mechanisms or can be used as demand databases. The latter may be important in informing the housing demand in terms of the Housing Chapter.

### The role of the Engineer

Persons who ensure that buildings and services are delivered according to national and provincial standards, without the “stamp of approval” from these persons, building can come to a complete halt, is also responsible for the building of roads, bridges, water and energy systems and needs to maintain infrastructure etc. The municipal engineer is also responsible for the provision of services and the guidance of housing developments within the capacity provided by the local authority.

### What is important to know

The South African housing policy and the development of housing is the result of significantly complex shifts in state policy. The provision of housing, particularly low-cost housing, has been a major focus of the South African government in the post-apartheid era, with urban areas taking priority in this regard.

Human settlement development is a vast concept and consists of various principle which forms part of the intricate process of human settlement development. Some of these concepts include housing as a basic right; housing as a process of enablement; Housing as a process of enablement; Housing as a people driven process; it is not isolated projects but rather integrated housing; it is an instrument for sustainable development; it should form part of the natural environment; provide a quality living environment.

### How it should be implemented

The housing shortage in South Africa is well known and a lot of the policies of each municipality, such as the SDF, promotes infill development. However, in many cases town planning applications with the specific aim at providing higher density housing, the problem regarding the availability of services usually prevents the provision of housing.

Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. Engineering contributions should be explained in greater detail as the developers and owners are not educated in understanding the difference in green- and brown field developments and the difference in contributions.

### Consultants to contact for assistance

Town Planner; Land Surveyor; Attorney; Architects; Landscape Architect; Quantity Surveyor; Consulting Engineers; Environmentalists; Government Departments; Urban Designers; Project manager and banks these consultants, and others, can make significant contributions and should be
Policy and legislative documentation including Town Planning Scheme; SDF; IDP; LUMS; ITP; environmental guidelines; SABS Standards; the Housing Act; PIE Act; Rental Housing Act; Social Housing act; the white paper on housing; BNG; National housing code; Housing Sector Plans and policies by the local authorities. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) and Sustainable Human Settlement Planning: Resource Book (2008) should also be consulted.

Source: Own synthesis (Department of Human Settlement, 2009:24, 29-30; Department of Housing, 2008:85).

4.2 Building and construction management control

4.2.1 Chapter contents and brief description

Building and construction management control are responsible for administering and overseeing the implementation of technical regulations and compulsory specifications stipulated in the National Building Regulations and Standards Act (103 of 1977), compiled by the National Regulator for Compulsory Specifications (NRCS), it is also guided by the National Regulator for Compulsory Specifications Act (5 of 2008) previously known as the SABS 10400. It can thus be understood that the local authority has the obligation to ensure that all developments meet the minimum standards proscribed and to intervene if they don’t comply (Opperman, 2015:3-19).

4.2.1.1 Policy and legislative framework

This section further includes a brief discussion of the relevant legislative framework applicable, this is illustrated in Figure 4-4.
4.2.1.2 Correlation between building control and planning

It should be noted that town planning schemes, and thus Land Use Management Schemes (LUMS) and Spatial Development Frameworks (SDF’s), have a major influence in building control as they are used to guide effective planning and building of urban areas with the allocation of appropriate land uses. It can thus be understood that building control ensures the proper quality of buildings and that they meet the minimum requirements, it can also be used to control land uses and determine if the current uses are legally obtained or not. The Building Control Officer (BCO) can be consulted to determine whether a town planning application complies with the relevant legislation (Opperman, 2015:6).

The section further includes the correlation between building control and town planning controls which includes the various town planning application types, the various housing typologies and ownership categories.
4.2.1.3 Correlation between building control and construction management

Construction management can be understood as the management of development, conservation and the improvement of the built environment. It is exercised at a variety of levels on the project site to the corporate organisations of the industry, clients and society. Construction management further embraces the entire construction value from the commencement of the project with the inclusion of recycling and a commitment to encourage sustainable construction. It also incorporates a wide variety of specialist services (Bale, 2010:4). The chapter further explores the correlation of construction management to building control.

4.2.1.4 Roles and responsibilities of the Building Control Officer (BCO) and Building Inspector

Also included in this section is the role and responsibilities of the BCO and the department, including (Opperman, 2015:19-21):

- **Submission of building plans for approval**: It is the responsibility of the building control office to accept or reject building plans within thirty (30) days for buildings with an area smaller than 500m² and sixty (60) days for buildings with an area larger than 500m². A comprehensive explanation with recommendations for alterations should be provided in cases where plans are rejected.

- **Documents to be provided to the department**: Various documents should be provided to the department, whether it is for comments on town planning applications or the submission of building plans. These documentations include the title deed to the property, application forms from the local authority and drawings. The latter include Site Development Plans (SDP), layout drawings and drainage installation drawings, to name a few.

- **Supporting documents that may be requested**: The department may request an engineering certificate, an approved SDP, comments from other departments such as engineering services and a competency certificate of the draftsmen or architect responsible for the drawings.

The building inspector is responsible for inspecting buildings and determining if it is in line with the requirements of the abovementioned regulations, and also to stop unauthorised building work. A building under construction should be inspected at least three (3) times including the checking of trenches for foundations, the drainage installation and the checking of the final building. It may be requested that more inspections should be scheduled depending on the complexity of the development or other requirements by the department (Opperman, 2015:31-32).

This section should be viewed alongside the standards provided in Chapter 3, 5 and 6.
4.2.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

Table 4-2: Important knowledge to take note of - Building and construction management control.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Building and construction management control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>The processes of building and construction management control include the approval of building plans and the inspection of buildings under construction (as described above). If the local authority is made aware of illegal land uses on a property, the BCO is requested to do an inspection, this may lead to the council informing the owner to either stop the use or legalise it through either a town planning application or the submission of new building plans. The building and construction management control department are requested to comment on all town planning applications which also requires site inspections in some cases.</td>
</tr>
<tr>
<td>The role of the Engineer</td>
<td>The engineer is firstly responsible for the provision of comments on whether or not the engineering services will be sufficient for the proposed development, after which these will be used to inform the BCO. Secondly, the engineer will be requested to review the building plans submitted for approval, they will review the plans and determine if the buildings are in line with the requirements.</td>
</tr>
<tr>
<td>What is important to know</td>
<td>Building and construction management control include the responsibility of inspecting buildings and determining if it is in line with the requirements of the abovementioned regulations, and also to stop unauthorised building work.</td>
</tr>
<tr>
<td>How it should be implemented</td>
<td>The relevant legislation stipulates that the local authorities should maintain control of building activities. This is carried out by the BCO or the building inspector. Building and construction management control should be done in accordance with the town planning policies and bylaws of the local authority in order to guide development. The engineering department will also play an integral role as they need to provide comments on building plans, for example.</td>
</tr>
<tr>
<td>Consultants to contact for assistance</td>
<td>Building Control Officer; Building Inspector; Town Planner; Land Surveyor; Consulting Engineers; Environmentalists; Government Departments; these consultants, and others, can make significant contributions and should be consulted.</td>
</tr>
<tr>
<td>Resources to consult</td>
<td>Policy and legislative documentation including Town Planning Scheme; SDF; IDP; LUMS; ITP; environmental guidelines; SABS Standards. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) should also be consulted.</td>
</tr>
</tbody>
</table>

Source: Own synthesis (Opperman, 2015:19-32).
5. TRANSPORTATION, SECTORAL PLANS AND ENGINEERING SERVICES

This chapter consists of three (3) sections, including transport and other sectoral plans and provision of engineering services. These sections are included in the same chapter as they play an integral part in urban and regional planning and in each other.

5.1 Transportation

5.1.1 Chapter contents and brief description

Wessel (2012) states that transportation provision is focussed on ‘the act of moving something from one place to another’ this is substantiated by Estefani (2013). It is thus important to include infrastructure or accommodation such as terminals or ports, vehicles or modes of transportation, a source of energy such as fuel, an operator or driver and supporting services enabling transport to occur safely (Estefani, 2013).

5.1.1.1 Developmental interface

The interface between spatial planning, transportation planning and environmental management, are promoted through the National Land Transport Transition Act (22 of 2000) (NLTTA) and the National Land Transport Act (5 of 2009) (NLTA), which includes (Schoeman, 2015):

- General principles for transportation planning;
- **Types of transportation plans:** Integrated Transport Plans (ITPs); Freight Transport Plans (FTP); Public Transport Plans (PTP’s); Commuter rail plans (CRP); Transportation plans and changes in land use and public transport infrastructure and services;
- **Provisions on transportation planning:** National Land Transport Strategic Framework (NLTSF); Provincial Land Transport Frameworks (PLTF);
- Rationalization of public transport services (RATPLANS);
- Transport Impact Studies (TIS’s);
- Traffic Impact Assessments (TIA’s).
5.1.1.2 Policy and legislative framework
Various policies, legislation and regulations are utilised in an attempt to improve and maintain transportation and the influence it has on the built environment as a whole. This section includes brief descriptions of the policies and legislations included in the following figures. Figure 5-1 provides a brief illustration of the legislative framework concerned. Figure 5-2 illustrates some of the policy framework included in transportation.
Figure 5-2: Transportation policy framework - flow chart.
Source: Own synthesis (Schoeman, 2015).
The National Transportation Master Plan (2050) (NATMAP) is also briefly described in this section as there is cross-references made to it in other national policies such as the National Development Plan (2012) (NDP), the New Growth Path (2010) (NGP), the National Spatial Development Perspective (2003 and 2006) (NSDP) and the Spatial Development Initiatives (SDI) (1995).

NATMAP (2005) serves as a master plan for developed from the proposals for an Integrated National Transport Plan. The plan was developed to identify and resolve the problems resulting from socio-economic development strategies etc. It furthermore, motivates a prioritised program for interventions to upgrade the transportation system in South Africa. The project makes provision for continued upgrading, innovation, changes in the environmental and economic aspects of sustainable transportation whilst enabling government strategies, growth, development and integration within the national spatial system. It further consists of four (4) phases, including an inventory and data analysis phase, future vision and forecast phase, forward planning phase and an action for agenda phase.

Transportation is guided through all the relevant policies mentioned above including various provincial and local policies, such as Integrated Transport Plans (ITP), Spatial Development Frameworks (SDF), Integrated Development Plans (IDP) and Local Economic Development (LED).

Various references are made to the requirements and standards provided in the Guidelines for Human Settlement Planning and Design, 2006 (Redbook). This includes references to improve pedestrian movement and catering for the various modes of transport, such as vehicle transport, public transport through the use of busses and rail transport for both people and cargo.

The interface between land use and transportation plays a major role and transport development as this includes the achievement of sustainability (see Chapter 7). The coordination between land uses can be used to reduce traffic movement and increase the use of public transport and thus lead to the reduction of travel time between the various land uses (Pacione, 2009:266). The correlation between transportation and urban form is unavoidable as is the relationship between transportation and sustainable urban development (Pacione, 2009:264).

5.1.1.3 Development and implementation of the Gautrain as a high speed transportation method

The development and implementation of the Gautrain as a high speed transportation method is discussed as a chase study for the integration between land uses and transportation as well as
the improvement of linkages between the various nodes in Gauteng. The Gautrain creates a connection between PTA, JHB and O.R. Tambo International Airport (ORTIA), which is one of the Spatial Development Initiatives (SDIs) or Blue IQ of the Gauteng Government. According to the Gauteng SDI, the Gautrain will stimulate development in specific areas of the province with high economic growth potential, thus creating employment opportunities. This project promotes public transport and prioritise it over private transportation, according to the national Government’s stated policy (Bohlweki Environmental (Pty) Ltd, 2002).

5.1.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

Table 5-1: Important knowledge to take note of - Transport and other sectoral plans.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>The following can be seen as a generalised process for transportation provision:</td>
</tr>
<tr>
<td></td>
<td>1. Establish vision and goals through liaising with the public and stakeholders;</td>
</tr>
<tr>
<td></td>
<td>2. Alternate improvement strategies through the monitoring of existing conditions and the comparison to the transportation performance foals;</td>
</tr>
<tr>
<td></td>
<td>3. Evaluation and prioritisation of strategies through the estimation of future population and employment growth, including projected land uses, redevelopments and proposed corridor developments as a result of growth;</td>
</tr>
<tr>
<td></td>
<td>4. Development of transportation plan including the identification of current and projected transportation needs through the development of performance measures and targets;</td>
</tr>
<tr>
<td></td>
<td>5. Development of transportation improvement programmes and strategies along with the analysis of their trade-offs through the use of detailed planning studies;</td>
</tr>
<tr>
<td></td>
<td>6. Project development including long term plans and short term programs focused on capital improvement, management and operational strategies for moving people and goods;</td>
</tr>
<tr>
<td></td>
<td>7. Systems operations (implementation) including the development of a financial plan in an attempt to secure sufficient revenues that cover the costs of implementation strategies to ensure ongoing maintenance and operation;</td>
</tr>
<tr>
<td></td>
<td>8. Monitoring system performance (data) through the estimation of the impact of recommended improvements on the transportation system and its impact on the achievement of performance goals, the estimation of the impact of the economy and environmental quality and air quality.</td>
</tr>
<tr>
<td>The role of</td>
<td>They focus on traffic operations of roads, streets and highways as well as their networks, terminals, neighbouring lands and relationship with all modes</td>
</tr>
</tbody>
</table>
**the Engineer**

of transport. They also focus on the planning and geometric design of the above mentioned thereby attaining safe, efficient and convenient movements of people and/or goods. As well as the evaluation of plans, proposal drafting and make changes where and when needed. They analyse schematics and engineering data, offer recommendations for traffic and driving policies, design transportation systems and analyse the effects of transport in urban areas. They may have to oversee plans with contractors and determine the overall costs of the projects.

**What is important to know**

Transportation consist of:

- **Transportation engineering**: Transportation engineering is the safe movement of people and/or goods, it also includes the major types of transportation such as water and pipeline, highway, rail- and subway and air transportation. Like traffic engineers, transport engineers are also very similar to civil engineers, but they do the designing of the major types of transportation systems they also supervise the construction and repair of these systems.

- **Traffic engineering**: Traffic engineers do the design and supervise the construction of roads and streets, thereby easing traffic congestion and movement. They also do the designing of pedestrian walkways, highways, study traffic statistics and the environmental aspects that will influence the transportation of people and/or goods. They plan new roads and traffic patterns. These engineers are very similar to civil engineers, but they focus more on the amount of traffic that has an influence on the way transportation systems are planned and designed.

- **Transportation planning**: The application of transportation planning techniques is the operation, provision and management of facilities and services for any modes of transport to achieve safe, faster, comfortable, convenience, economic and environmental suitable movement of people and/or goods. These techniques can also be used to predict future travel demand and ensuring adequate facilities and services to provide in these demands.

Each of these aspects plays a role in the provision of transportation and the infrastructure needed to provide in the needs of the expanding urban environment.

**How it should be implemented**

The municipal engineer is responsible for the provision of comments on town planning applications, relating to the provision of roads and the requirements of the proposed development and the impact that might have on the existing transportation infrastructure. If the information provided is not sufficient the engineer may request a traffic study to be completed by a consulting engineer.

**Consultants to contact for assistance**

Town Planner; Land Surveyor; Attorney; Consulting Engineers (Traffic engineers); Environmentalists and Government Departments these consultants, and others, can make significant contributions and should be consulted.

**Resources to consult**

Policy and legislative documentation including Town Planning Scheme; SDF; IDP; LUMS; ITP; environmental guidelines; SABS Standards. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) should also be consulted.

Source: Own synthesis (ADOT, s.a.; Transportation Planning Capacity Building Program, 2015:6-7; UNSW, 2015?a).
5.2 Sectoral Plans

5.2.1 Integrated Transport Plan (ITP)

The ITP is generally prepared by the planning authorities in compliance with the National Land Transport Act (5 of 2009). The ITP can be prepared in various forms such as (National Land Transport Act (5 of 2009)):

- **Comprehensive Integrated Transport Plan (CITP):** Includes a long term component, such as a long term vision and objectives for the transport system in the region, and a strategy for the development of the transport system in the region with its set of objectives. It is compiled by the metropolitan municipalities and all major municipalities and should comply with SPLUMA (2013) regulations and other applicable provincial legislation;

- **District Integrated Transport Plan (DITP):** To be prepared by all district municipalities and if the local municipality prepared a CITP, it should be incorporated to the DITP;

- **Local Integrated Transport Plan (LITP):** The LITP should be prepared by all local municipalities.

The ITP should include preliminary and detailed design of projects to be completed as part of the action plan of the ITP. This can include infrastructure and services and would be undertaken by the relevant authority or agency responsible for the execution of the work. This also includes the preparation of public transport plans and the transport register. The ITP should be prepared by all municipalities every five (5) years with annual updates made to it and works in collaboration with the SDFs and IDPs (National Land Transport Act (5 of 2009)).

5.2.2 Water Services Development Plan (2012) (WSDP)

The WSDP is regulated through the Constitution of South Africa, Act 109 of 1996 alongside the Municipal Structures Act (117 of 1198), the Municipal Systems Act (32 of 2000) and the Water Services Act (108 of 1997). The WSDP is prepared by a water services authority which is described as all municipalities. They are responsible for ensuring access to water for all residents of the community and ensuring efficient affordable, economical and sustainable access to water services (Department of Water and Sanitation, 2014).

This section includes the detail regarding the contents of each WSDP such as the size and distribution of the population of the area in question, the existing water services and the time frame for the plan and the relevant implementation programme for the five (5) year period for which the plan is relevant (Water Services Act (108 of 1997)).
5.2.3 Housing Sector Plan (HSP)

The development of a HSP is stipulated in Section 9(1) of the National Housing Act (107 of 1997) which states that each municipality, as part of the IDP process, should take the necessary steps to ensure that the residents within the municipality have adequate housing on a progressive basis through the establishment of housing delivery goals and the identification of suitable land for housing development including the planning, facilitation, initiation and co-ordination of housing development (National Housing Act (107 of 1997)).

Figure 5-3 illustrates the contents and process involved in the development of the HSP.

Source: Own synthesis (Tissington, 2011).

Figure 5-3 illustrates the contents and process involved in the development of the HSP.

5.2.4 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.
Table 5-2: Important knowledge to take note of - Transport and other sectoral plans.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Sectoral plans</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process to follow</strong></td>
<td>Each sectoral plan has its own process determined by the relevant legislation. This is illustrated and described in the source document.</td>
</tr>
<tr>
<td><strong>The role of the Engineer</strong></td>
<td>The engineer will be requested to submit inputs in the development of the sectoral plans. They are also partially responsible for the implementation and execution of the sectoral plans in the provision of engineering services and transport provision, amongst others.</td>
</tr>
<tr>
<td><strong>How it should be implemented</strong></td>
<td>Each sectoral plan are to be implemented by each relevant department. Service delivery, transportation and housing delivery should comply with the objectives and vision included in the sectoral plans.</td>
</tr>
<tr>
<td><strong>Consultants to contact for assistance</strong></td>
<td>Town Planner; Land Surveyor; Consulting Engineers; Environmentalists; Government Departments; these consultants, and others, can make significant contributions and should be consulted.</td>
</tr>
<tr>
<td><strong>Resources to consult</strong></td>
<td>Policy and legislative documentation including; SDF; IDP; LUMS; ITP; environmental guidelines.</td>
</tr>
</tbody>
</table>

Source: Own synthesis.

5.3 Provision of engineering services

5.3.1 Chapter contents and brief description

This section focuses on the provision of engineering services, such as water, sewer and electricity, amongst others. These services can be provided to individual erven through the use of “mid-block” services provision or “mid-street” services provision. The provision of bulk services should also be considered as this is applicable to large developments such as township establishments.

5.3.1.1 Development guidelines and services design

The Guidelines for the provision of engineering services and amenities in residential township development, 1994 (GESRT) and the Guidelines for Human Settlement Planning and Design, 2000 (Redbook) provides detailed descriptions of the standards and development guidelines regarding the provision of engineering services. This is also briefly discussed and illustrated in the section and includes, amongst others, the sizes of pipes needed for sewerage and water in accordance with the SABS standards. Engineering services should also be provided in terms of Section 49 of SPLUMA (2013) and the various Strategic Infrastructure Projects (SIP) identified by the Presidential Infrastructure Coordinating Commission (PICC) (Dambuza, 2013).
Numerous factors influence the relative cost of internal service provision, thus making it impossible to provide an exact cost. Although the factors that influence cost are often specific to individual service technologies, in general, they can have a great influence on the service costs. The following factors cause the typical internal service provision costs to vary, and include (Behrens & Watson, 1996:237-244):

- **Site conditions**: Context specific site conditions have a significant influence on the cost of service provision. These conditions include topography, soil type, water table, climate and vegetation;
- **Delivery system**: The manner in which services are delivered influences the cost of provision, thus construction methods and project phase are important to consider;
- **Design standards**: The specifications and standards applied in infrastructure design have a significant influence on the cost of service provision. The design capacity, lifespan and materials are of particular importance;
- **Geometric layout**: The geometric layout of an urban settlement influences the total cost of service provision, including residential density, road an block alignment, reticulation networks;
- **Miscellaneous factors**: Include the economic and business climate, security and other risks and monopoly conditions.

**5.3.1.2 Levels of services to be provided**

Municipal services each have a minimum level at which they should be provided to the community, including (Department of Provincial and Local Government, 2005):

- **Water**: A basic water supply facility is described as the infrastructure needed to supply twenty five (25) litres of potable water per person per day within two hundred (200) metres from the household and with a minimum flow of ten (10) litres per minute or six thousand (6000) litres of potable water supplied per formal connection per month.
- **Sanitation**: A basic sanitation facility is described as the infrastructure needed to provide a safe, reliable, private, protected (from weather), ventilated, keeping smells to the minimum, easy to clean and minimising risks of the spread of sanitation-related diseases and the appropriate treatment and/or the removal of human waste and wastewater.
- **Roads**: The basic service level for roads is described as an all-weather access within five hundred (500) metres from the dwelling house.
- **Stormwater**: The basic service level is described as open channels along the road.
- **Solid waste disposal**: Refuse removal services should take place at least once a week.

**5.3.1.3 Service Level Agreements**

This section also includes Service Level Agreements (SLAs) which is used to underline the level of service to be provided from each service provider and the intended consumers. It can
address areas such as the availability of services and the responsibilities of the parties involved, while identifying key areas such as targets and minimum level of services to be achieved (SLA Template, s.a.). A set of criteria or objectives should also be included to determine the service levels that can be whether or not the objectives have been met (Michalsons, 2015).

5.3.1.4 Formalization of informal settlements and case study

This entails the provision of public spatial structures to guide new development. The problem in informal settlements is the provision of a public spatial structure to provide relief from overcrowding thus creating public gathering places and guiding public and private investment and improving the movement systems. In “greenfields”, housing and economic development takes place in and infill development method including spatial structure (upgrading projects, the negotiated relocation of residents and economic activities can possibly be necessary for spatial structure) consistent with the settlement making process (Department of housing, 2005:39).

Formalization of informal settlements consist of five (5) phases, including (GESRT, 1994):

- **Pre-phase:**
  - **Outcomes:** Creation of a proper project plan;
  - **Tasks:** Determine the available funding for the project; create a timeline and detailed schedule; create an estimated budget for the project.

- **Phase 1:** Development of basic cadastral data for the area;
  - **Outcomes:** Determination and identification of the development area;
  - **Tasks:** Arial photographs; Ortho photos; contour maps with 1 meter contours; ground control points; trigonometry beacons should be collected.

- **Phase 2:** Land-use survey
  - **Outcomes:** Current existing land-use survey and need determination of residents;
  - **Tasks:** Conduction of land-use surveys; determine what is already provided in the local municipality’s SDF; determine levels of current services in the area through thorough ground studies and site analysis; conduct community participation meetings for the determination of needs.

- **Phase 3:** Settlement planning
  - **Outcomes:** Proposed settlement plan with the identification of plots, streets and the provision of housing;
  - **Tasks:** Creation of final plans in co-operation with the municipality with the help of community participation meetings; promote certain responsibilities and skills under the residents; Compilation of detailed settlement plans including roads, water and electricity
networks, housing, etc.; Determination of principles applicable for the specific project; Conduct all necessary environmental studies.

- **Total**: Duration, costs and final outcomes of the project
  - **Outcomes**: Total formalization of the area;
  - **Tasks**: Create a final plan with final road networks, electricity cables and networks, water pipelines and sewage systems, numbered and formalized plot identification; Provision of proper low income (high density) housing; Provide in all the needs of the community and the needs identified in the provincial SDF, local municipality’s SDF and its IDP.

### 5.3.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the *Source Document* for more information where needed.

**Table 5-3: Important knowledge to take note of - Provision of engineering services.**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Provision of engineering services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Process to follow</strong></td>
<td>The following can be seen as the general service delivery life cycle:</td>
</tr>
<tr>
<td></td>
<td><strong>1. Phase 1 - Policy</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>National</strong>: Development of infrastructure policy and the setting of standards for development systems; Development of sector policies, norms and standards;</td>
</tr>
<tr>
<td></td>
<td>• <strong>Local</strong>: Service provision policies and bylaws; Sector policies for free basic services.</td>
</tr>
<tr>
<td></td>
<td><strong>2. Phase 2 - Planning</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>National</strong>: Development of frameworks for National Spatial Development Perspectives (NSDP); Macro sector planning;</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provincial</strong>: Provincial Growth and Development Strategies (PGDS); Provincial Sector Plans;</td>
</tr>
<tr>
<td></td>
<td>• <strong>Local</strong>: Includes the IDP; Local sector plans; Project pre-feasibility and feasibility studies and business plans;</td>
</tr>
<tr>
<td></td>
<td><strong>3. Phase 3 - Implementation</strong></td>
</tr>
<tr>
<td></td>
<td>• <strong>National</strong>: Municipal infrastructure programme management, collaboration, mobilising support and monitoring; Monitor the implementation of norms and standards and collaboration around support;</td>
</tr>
<tr>
<td></td>
<td>• <strong>Provincial</strong>: Monitoring implementation of infrastructure policy, standards and norms and the delivery systems and mobilising with co-ordinating support;</td>
</tr>
<tr>
<td></td>
<td>• <strong>Local</strong>: Infrastructure delivery systems put in place and project management; Technical department including water and roads to oversee project implementation; project cycle including the implementation of technical norms and standards;</td>
</tr>
</tbody>
</table>
### 4. Phase 4 – Service provision

- **National**: Regulating and overseeing systems and procedures, sectoral norms and standards;
- **Provincial**: Systems and procedures support; services provision support; services provision support and intervention;
- **Local**: Regulating and overseeing sectoral norms and standards; and service provision.

#### The role of the Engineer

It is the responsibility of the municipal engineer to provide comments on all town planning applications. These comments should include aspects such as:

- Roads (maintenance and provision thereof);
- Stormwater (possible impact);
- Water & sanitation and electricity (sufficiency of capacity for proposed development); etc.
- Consideration should be made to aspects including *inter alia* bulk- and internal services, cost effectiveness, development contributions.

#### What is important to know

Not all town planning applications are the same; circumstances and applicable legislation differ; SDF’s, LUMS and other policies should be consulted for each application and should not be seen as blue prints as some are adaptable and can be changed; illegal developments may warrant the proposed development even though the municipal documentation does not necessarily support the application completely.

#### How it should be implemented

It is good to provide consequent and rigid comments on applications, it prevents the establishment of presidents, however if the proposed development does not necessarily comply with the policy documents, it should be considered with greater diligence. Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. Engineering contributions should be explained in greater detail as the developers and owners are not educated in understanding the difference in green- and brown field developments and the difference in contributions.

#### Consultants to contact for assistance

Town Planner; Land Surveyor; Consulting Engineers; Government Departments; these consultants, and others, can make significant contributions and should be consulted.

#### Resources to consult

Policy and legislative documentation including SDF; IDP; LUMS; ITP; SIP; Section 49 of SPLUMA (2013); environmental guidelines; SABS Standards. The Guidelines for the provision of engineering services and amenities in residential township development, 1994 (GESRT), the Guidelines for Human Settlement Planning and Design, 2000 (Redbook), Municipal Infrastructure: Roles and responsibilities by the Department of Provincial and Local Government and The Municipal Infrastructure Grand: Basic Level of Services and Unit Costs: A guide for municipalities should also be consulted.

Source: Own synthesis (Department of Provincial and Local Government; 2006:6-7).
6. ENVIRONMENTAL MANAGEMENT AND DEVELOPMENTAL INTERFACE

6.1 Chapter contents and brief description

Environmental management is concerned with the people and their needs, while serving their physical, psychological, developmental, cultural and social interests equitably. Development should be socially, environmentally and economically sustainable, and sustainable development, environmental health, environmental management, to name a few, requires the consideration of certain factors (National Environmental Management Act (NEMA) 107 of 1998).

6.1.1 Developmental interface

The interface between spatial planning, transportation planning and environmental management, are promoted through NEMA (1998) and includes (Schoeman, 2015):

- General objectives;
- Environmental Implementation Plans (EIP’s);
- Environmental Management Plans (EMP’s);
- Integrated Environmental Management (IEM);
- Environmental Impact Assessments (EIA’s);
- Environmental Authorizations (EA’s);
- Strategic Environmental Assessments (SEA’s);
- Environmental Management Programme (EMP’s);
- Monitoring and Performance Assessment (M&PA’s);
- Mine Closure Plans (MCP’s).

6.1.2 Policy and legislative framework

Various policies, legislation and regulations are utilised in an attempt to improve and maintain environmental management and the influence of human development thereon. Figure 6-1 provides a brief illustration of the legislative framework concerned. Figure 6-2 illustrates some of the policy framework included in environmental management.
Figure 6-1: Environmental legislative framework – flow chart.

Source: Own synthesis (Schoeman, 2015).
Figure 6-2: Environmental policy framework – flow chart.
Source: Own synthesis (Schoeman, 2015).
6.1.3 Environmental considerations

This chapter further includes brief descriptions of geographical, geological, ecological, hydrological and climatic considerations. These considerations and their effects play a role in urban development and they should be evaluated with certain measures should be taken as urban development includes land use and planning decisions from a neighbourhood scale to an individual erf scale (Gocmez et al., 2006:1).

The current land use, forest area, agricultural area, wetlands and possible landslide areas along with the geological compositions of the intended site should, amongst others, be considered when planning a new development. As a result, careful consideration should be given to (Department of Housing, 2000:261-271; Gocmez et al., 2006:2-6; Moreno, 2012:338; Pacione, 2009:3):

- **Geographical considerations** include the socio-economical and physical environment and can have an influence on both cities and the economy. It attempts to explain the distribution of towns and cities and socio-spatial similarities and differences included. It consists of, amongst others, the population density, migration tendencies, demographic distributions, technological changes varying in the geographical scales they apply to;

- **Geological considerations** include the composition of the ground, soil types, ground instabilities such as soil creep should be monitored, contours and the resulting slope of the property concerned and other features on the site that might influence drainage. The possibility of erosion should be considered as well as mitigating actions to prevent such occurrences. Seismic activity, dolomite, mining activities and radioactivity should be identified as this greatly influences the proposed developments;

- **Ecological considerations** include the protection of biodiversity amongst the fauna and flora present on the proposed site. This includes the protection of the habitat of endangered species;

- **Hydrological considerations** include rivers, wetlands, ground water, water tables, stormwater runoff areas and sewerage spills, amongst others. These considerations are important as they can possibly influence the proposed development especially with superficial water tables or when the development is proposed on flood plains such as within the flood lines (above the 1:50-year flood line);

- **Climatic considerations** include seasonal changes in averages of precipitation (rainfall) and temperatures and wind direction. The orientation of development should carefully be considered as this can allow for more solar energy gained and improve natural heating and cooling of developments which in turn improves the impact on the environment and the lessen the reliance on electricity. For example living areas such as lounges and bedrooms should face north as this allows large amounts of sun in winter times and the inverse during the summer.

Sustainable development also plays a major role in environmental management as this can contribute to the improvement of climatic considerations and the usage of the environment in its
entirety. These environmental considerations can be mitigated through the use of local layout planning strategies (Department of Housing, 2000:260).

6.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Environmental management and developmental interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process to follow</td>
<td>The processes for environmental management differs from municipality to municipality, however, these policies are regulated by a variety of legislation which prescribes processes for the geographical, geological, ecological, hydrological and climatic considerations. For example, prior to an industrial development, an Environmental Impact Assessment might be required by the local authority.</td>
</tr>
<tr>
<td>The role of the Engineer</td>
<td>Engineering consultants, such as environmental engineers, mostly conduct the investigations required for the various reports and processes. It is the responsibility of the municipal engineer to use these documentations in provide comments on all town planning applications which will affect future roads and service delivery. They can further require adaptations to the original layout planning where the original design does not take the environment into consideration.</td>
</tr>
<tr>
<td>What is important to know</td>
<td>Environmental management consist of various aspects that should be considered with each development as this may have an influence on either the construction of foundations or an impact on the electricity usage of a development if climatic circumstances are not considered, for example. In order to promote sustainable development, these considerations need to be kept in mind.</td>
</tr>
<tr>
<td>How it should be implemented</td>
<td>Engineering comments should be provided in the required timeframe, the delay in the provision thereof, causes a ripple effect in the delay regarding the completion of the applications, resulting in a bottle-neck effect in all municipal departments. If the engineering department requires certain documentation not prescribed in the requirements by the town planning department, the consultant should be informed as soon as possible and provided with a reason as to the requirements, in order to improve the process of developments. It should be best if the engineering department can coordinate with other departments as to their requirements, this will allow consultants to correctly inform their clients and to complete the process in the minimum amount of time needed before a decision is made.</td>
</tr>
<tr>
<td>Consultants to contact for assistance</td>
<td>Town Planners; Geologists; Geographers; Geological engineers; Consulting Engineers; Environmentalists; Sociologists; Lawyers; Government Departments; etc. these consultants, and others, can make significant contributions and should be consulted.</td>
</tr>
<tr>
<td>Resources to consult</td>
<td>Policy and legislative documentation including, amongst others, Town Planning Schemes, SDF, IDP, LUMS, ITP and environmental guidelines. SPLUMA Section 7, 12, 14, 21, 24, 25, 42 and 54 includes some development principles where the environmental impact should be</td>
</tr>
</tbody>
</table>
considered. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) should also be consulted.

Source: Own synthesis (Department of Housing, 2000:261-271; Gocmez et al., 2006:4; SPLUMA, 2013).
7. SUSTAINABLE DEVELOPMENT

7.1 Chapter contents and brief description

7.1.1 Background

Sustainable development can be described as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Dixon & Pretorius, 2001:2; SAEP, 2006:1; Sustainable Development Information, s.a.; Pacione, 2009:186 & 683).

Sustainable development as a concept, relates to the relationship between economic growth and prosperity, social inclusion and environmental sustainability (Asefa, 2005:2). This is also known as the three (3) dimensions of sustainable development (Thwaites, 2015). The term was first used by the World Commission for Environment and Development in 1987. However, the various interpretations of the term has limit its potential to be used as a useful guide for development policy (Asefa, 2005:2; Dixon & Pretorius, 2001:2).

7.1.2 The impact of economic policy on sustainability

The chapter further discusses the impact of economic policy on sustainability as well as the impact of transportation which includes the location of work, home and leisure activities along with the usage of various modes of transport and the impact that might have on achieving sustainability.

7.1.3 The impact of transportation on sustainable development

Promoters of sustainable urban development recommends the use of public transport and a more comprehensive approach to planning which will in turn acknowledge the fundamental relationship between transport and the urban form. A common view of sustainable urban development is that greater mixed-use and higher density developments can contribute to the solution to urban transport problems, as well as the integration between transport considerations and land use planning which is aimed at enabling individuals to sustain their mobility while making use of less vehicle trips (Pacione, 2009:276).
7.1.4 Planning for sustainable urban development

Planning for sustainability is also included with reference made to urban sustainability which can be viewed through five (5) dimensions, including (Pacione, 2009: 606-608) economic sustainability; social sustainability; natural sustainability; physical sustainability and political sustainability. The linkage between the dimensions is illustrated in the following image.

7.1.5 Resilience and its relationship to sustainability

Sustainability should not be viewed as a standalone concept as resilience also plays a large role in achieving sustainability. The concept of resilience is rooted in ecology, but has an influence in a variety of fields including human geography and urban theory, to name a few. It refers to the ability to ‘bounce back’ from adversity and the ability to achieve a state that is better than the original. In terms of communities, it can be a verification of the resourcefulness and capacity of the community to mobilise in times of shocks and stress (GGLN, 2014:11).

7.1.6 United Nations (UN) sustainable development goals

On 25 September 2015 the 2030 Agenda for Sustainable Development along with its seventeen (17) goals and one hundred and sixty nine (169) goals was formally adopted and will be
implemented during the following fifteen (15) years. This replaces the successful Millennium Development Goals (MDGs) adopted in 2000 and aims to build on the existing building blocks the MDGs achieved over the past fifteen (15) years. The new goals will focus on wiping out poverty, fighting inequality and addressing climate change, they are more ambitious and meant to apply to all countries and not only developing countries such as the MDGs. These goals can also be seen as universal, integrated and a transformative vision for a better world (The New York Times, 2015; Thwaites, 2015; UN DESA, 2015a; UN News Centre, 2015).

These goals should form the backbone for the agendas and policies formulated by all countries not only developing countries as determined by the previous MDGs and should be implemented from January 2016 (Thwaites, 2015; UN DESA, 2015a).

### Figure 7-2: 2030 Agenda for Sustainable Development Goals.


from January 2016 (Thwaites, 2015; UN DESA, 2015a).

#### 7.1.7 Policy and legislative framework

South Africa currently mainly uses the National Framework for Sustainable Development (NFSD), 2008 and the National Strategy for Sustainable Development and Action Plan (NSSD 1) (2011-2014) to guide sustainable development. The former attempts to address the gaps in sustainable development through the provision of a broad framework intended to serve as a basis for the development of a national strategy and action plan (Department of Environmental Affairs and Tourism, 2008:6).
The latter builds on the NFSD (2008) along with other initiatives launched by the business sector, government, NGO’s, civil society, academia and other key role players in an attempt to address the sustainability issues of South Africa. It provides an understanding of sustainable development and attempts to provide an explanation for the routes taken. It includes an action plan and indicators used to assess the implementation and performance of the strategy (Department of Environmental Affairs and Tourism, 2011:6).


7.1.8 Challenges of sustainable development

Achieving sustainable development includes various challenges such as enhancing systems for integrated planning and implementation; sustaining the ecosystems and usage of natural resources efficiently; moving towards a green economy; building sustainable communities; responding effectively to climate change.

7.1.9 Making human settlements and cities sustainable

The integration of urban planning, transport systems, water, sanitation, waste management, disaster risk reduction, access to information, education and capacity-building can ensure the sustainability of cities. This can result in the improved promotion of economically, socially and environmentally sustainable societies and can be supported by universal access to basic services, housing and mobility (UN DESA, 2015b).

7.2 Important knowledge to take note of

The following table should be viewed as a brief description of the concept at hand and should not be seen as a summary of the entire chapter. See the Source Document for more information where needed.

Table 7-1: Important knowledge to take note of - Sustainable development.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Sustainable Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of the Engineer</td>
<td>• Contributing to the development of a sustainable society for both the present and the future;</td>
</tr>
<tr>
<td></td>
<td>• Applying professional and responsible judgements while taking the leadership role;</td>
</tr>
<tr>
<td></td>
<td>• Doing more than just complying with legislation and codes;</td>
</tr>
</tbody>
</table>
- Using available resources effectively and efficiently;
- Seeking multiple views in an attempt to solve sustainable challenges;
- Managing risks to minimise adverse impacts on both people and the environment.

| What is important to know | The goal of sustainability is not the essential element of market capitalism and will possible encounter oppositions for embedded interests. Sustainable urban development embraces not only the environmental issues, but relies on the implementation of pollution taxes and the promotion of technical developments in an attempt to reduce the energy consumption of cars and production processes. In addition, sustainable development aims to develop and maintain prosperous social, economic and ecological systems. These systems are interlinked as human development often depends on services of eco-systems, such as clean water, food production and fuel, for the generation of wealth and the maintenance of security. The inverse is also true, as humans tend to transform eco-systems into more or less desirable conditions. If the human action result in the eco-systems being unable to provide these services, it will impact human livelihoods, vulnerability and security resulting in the loss of resilience. |
| How it should be implemented | Sustainable development is implemented through various strategic plans implemented in all spheres of government, public entities, civil society, organised labour and business. These documentation should be viewed in collaboration with the international initiatives. |
| Consultants to contact for assistance | Amongst others, Town Planner; Consulting Engineers; Environmentalists; Government Departments. These consultants, and others, can make significant contributions and should be consulted. |
| Resources to consult | Policy and legislative documentation including the 2030 Agenda for Sustainable Development Goals, NFSD (2008), NSSD 1 (2011-2014), Medium-term Strategic Framework (MTSF) 2009–2014, the Ten-year Innovation Plan, the revised Industrial Policy Action Plan for 2010/11–2012/13 (IPAP2), the revised Integrated Resource Plan (IRP2) and New Growth Path (NGP). SPLUMA Section 7(b) promotes sustainability through the use of spatial planning and land use management systems. The Guidelines for Human Settlement Planning and Design, 2000 (Redbook) should also be consulted. |

8. CONCLUSION

This document is a summary of the much needed project initiated by the Institute for Municipal Engineers of South Africa (IMESA). It will contribute to reducing the need for capacity building amongst municipal engineers and engineering staff in Urban and Regional Planning.

It is important that this document should not be used on its own as it only provides a summary and brief guidelines for the information included in the *Source document*. It is thus vital to view the sources identified along with the *Source document* in order to gain a better understanding of the concepts included and referred to.
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