DRAFT: Otavi Structure Plan 2015- 2030

“MY CITY , MY DREAM”

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SECTION I – BACKGROUND

CHAPTER 1 – INTRODUCTION

The Otavi Town Council has decided to develop a Structure Plan for the local authority area under its jurisdiction that will assist in responsibly and sustainably guiding and managing the effects of the ever increasing pressure on the natural and man-made environment of the town. Pressure on the environment is caused by the increase in the town's population, by people's economic activities and their social interactions. Often it is difficult to make planning decisions without a long-term guidance document. The Structure Plan has the aim of guiding the planning approach adopted by Council.

1.1 PURPOSE OF THE STRUCTURE PLAN

A Structure Plan is a local strategic plan/document aimed at providing information and direction to a local authority, specifically on 5 key elements, namely the natural environment, the economy, the infrastructural set-up, the socio-economic setting and the urban environment. As such, the Plan is to guide the political and administrative leaders, engineers, investors and planners with high-level development guidelines and land-delivery policies, supported by research and informed assumptions. The aim of a Structure Plan is to provide specific development guidelines as far as land-use is concerned. These are depicted as individual precinct plans, followed by general implementation guidelines. The Structure Plan should inform the Otavi Town Council so that an integrated and holistic future-orientated planning approach can be adopted on the sustainable use of the available resources (natural and man-made), on the allocation of land for urban expansion, as well as on maximising the development potential of Otavi within a regional context.

It is not the intention of the Council to impede future development or to reduce the positive economic impact that development creates. The aim is that the envisaged development takes place in a cohesive way and to provide the basic guidelines that will ensure that future developments are sustainable by identifying potential environmental concerns or requirements well in advance. The urban environment cannot be seen in isolation from the natural and social environments as the future and stability of each component are intrinsically linked.

There are clearly a number of challenges that need to be met when developing Otavi in the future, but these challenges are not insurmountable and development can take place in a way that will have a positive impact on the socio economic conditions of people living both within the study area and beyond.

In order for the Plan to be successful, it should also be considered as a publicly-owned document, accessible to the public and consulted before planning decisions are made. Transparency in the planning process is of the utmost importance within a democratic society, and broad, grass-root public support is required for any plan of this nature to be successful.

The Structure Plan should also be a reference document for state-owned enterprises such as NamPower, Regional Electricity Distributors, NamWater, Roads Authority, Directorate of Civil Aviation, TransNamib, Telecom Namibia, as well as for local, regional and national education providers, and the various public and private health services when planning their own future developments in and around Otavi. By working together in a spirit of communication and cooperation, common goals can be achieved with the minimum of redundant work and expenditure.

It is anticipated that the Otavi Structure Plan will be considered by the National Planning Commission Secretariat (NPCS) and the Ministry of Urban and Rural Development when implementing, monitoring and evaluating the overall development framework of the Fourth National Development Plan (NDP 4).

The purpose of this document is not to provide for detailed environmental or engineering solutions, but to rather inform future studies so that developments can take place in a responsible and sustainable manner. It should be noted that some challenges with regard to development will require additional environmental and engineering solutions. However, local and detailed environmental or engineering solutions are beyond the scope of this report.

Of significant importance to the document is the fulfilment of the requirements set by the Environmental Management Act (and the regulations in support of this Act) in terms of environmental clearance certifications and approvals that must be obtained for existing and new developments. This study acknowledges the environmental conditions found in the study area and provides some high-level input on environmental management principles. Environmental clearance certification needs to be obtained by the Town Council and by investors on a project-by-project basis.

Developers will still be required to produce Environmental Impact Assessments (EIA) and Environmental Management Plans (EMP) for each individual development initiative, but the Structure Plan will provide a framework for planning and decision-making.

For monitoring and review purposes, the Plan provides guidance to the Council when preparing annual budgets and addressing the developmental needs of Otavi.

When discussing 'development' in Otavi, planners are not just describing the physical expansion of the Town, but also the improvement of the urban fabric as it exists today, which is referred to as consolidation.

1.2 LEGAL STATUS OF THE STRUCTURE PLAN

The Urban Planning Bill once enacted will require that all Villages, Towns and Municipality to draw up an urban structure plan for the areas under their jurisdiction. Built into this requirement the Namibian Planning Advisory Board (NAMPAB) and Townships Board also requires that applications submitted to these boards are to be accompanied by a structure plan so as to also guide the decision making of these two boards.

While the Structure Plan is a policy document with the purpose to guide and organise the various forms of land-use and the utilisation of the available natural and man-made resources in such a way as to optimise the living conditions of the residents of Otavi for years to come, the Town Planning Scheme, which is a statutory document, regulates and prescribes specific land-uses that are permissible on each surveyed and registered land unit with the Deeds Office and located within the area of jurisdiction of the Otavi Town Council.

1.3 PLANNING HORIZON

The Otavi Structure Plan will have a planning horizon of between 25 and 30 years. It should be noted that a Structure Plan is to be considered to be a 'live' document and as such should be reviewed and updated at least every five years. The Development Projects to be implemented however, should be

reviewed and updated on an annual base and aligned with the Capital Budged of the Local Authority.

1.4 OVERVIEW OF THE PROCESS FOLLOWED

The planning philosophy that informs the compilation of this Structure Plan is based first and foremost on fostering the idea of "place-making". At the local-level there is the need for branding, i.e. questions need to be posed about what is Otavi? What is Otavi offering locally, regionally, nationally and internationally? At the local scale, how are neighbourhoods or precincts within Otavi functioning?

The approach to planning needs to ensure that Otavi as a whole functions correctly, creating an enabling urban environment where people can live in a dignified manner, creating people-centred environments that respect the environment.

This entails that all aspects contributing to the urban environment need to be balanced without allowing one aspect to dominate, by, for example, allowing transport engineering to dictate all other spatial considerations, or allowing economic considerations to immediately override all environmental considerations.

In short, the future planning of Otavi must be undertaken for the benefit of the public at large.

The methodology followed by the consultant when preparing the Structure Plan focused on a participatory study approach where the local community of Otavi, the Otavi Town Council, the Erongo Regional Council, national and local stakeholders, as well as the private sector, were all seen as important partners in the process and involved and informed throughout the projects development.

The below-mentioned basic steps were followed when preparing the Structure Plan:

(a) An initial and informal meeting was held with the Client to introduce the Consultant's team, to provide the opportunity for any questions and for any clarifications to be made by both sides to the scope of the initial brief, the planning and design process, the objectives and expected output of the study, and for drawings and reports to be exchanged for the purpose of the initial desktop status quo analysis.

(b) National stakeholders were informed of the objective of the Study and of Stubenrauch Planning Consultants (SPC's) appointment to assist in the drafting of the Structure Plan, after which documents were exchanged.

(c) The public, national and local stakeholders were informed about the upcoming structure plan and requested to register as Interested and Affected Parties.

(d) A First Strategic Workshop, held at the offices of the Otavi Town Council, SPC presented initial findings and ideas, and the Council was able to express its aspirations for the project and any expected outcomes. The outcome of the workshop informed a further refinement of the scope of the project.

(e) Primary source documents were collated, site visits made and initial ideas explored.

(f) Existing literature relevant to Otavi was consulted, and findings from research and public engagement were fed back into the project.

(g) Local stakeholder meetings were held in Otavi with local stakeholders to discuss the future of the town, initial ideas and concepts.

(h) A public meeting was held in Otavi to introduce the concept of the structure plan and to collect ideas and proposals on what should change within the town to ensure development.

(i) National stakeholder meetings were held in Windhoek with national partners to discuss upcoming future projects; capacities and some of the concept ideas for which approval was needed from these stakeholders.

(j) Analysis of the information obtained through stakeholder consultation; literatures were done and detailed concepts were developed.

(k) An additional Strategic Workshop, held at the offices of the Otavi Town Council, SPC presented detailed design concepts and refined long term planning ideas, the Council was able to make inputs and contribute to the development of the project. The outcome of the workshop informed a further refinement of the scope of the project.

(l) The public and stakeholders were informed of the upcoming public meeting to discuss the draft concept.

(m) After consultation with the Town Council, a 'Public Scoping Exercise' was held in Otavi at which the public and any interested and affected party were invited to review the work undertaken so far, provide feedback and comment, and to raise issues they may affect the future development of Otavi. All feedback provided during the consultations were reviewed and, where appropriate, incorporated into the design process.

(n) Council and the public were given a month to scrutinise the documents which were available from the consultant and at the Town Council and to provide comments in written format to the consultant.

(o) Relevant feedback received was incorporated into the final document.

(p) Submission of the final document for concluding consideration and approval by Council was set.

(q) The Otavi Structure Plan was adopted by the Council as key policy document that.

1.5 DOCUMENT STRUCTURE

The Otavi Structure Plan consists of one document with two sections. Section I contains the relevant baseline information such as the

- history of the town;
- strategic objectives of the Council;
- the Urban and Natural Environment;
- Population projections
- Demographics and socio-economy of the town
- Spatial projections.

Section II is the Analysis and Structure Plan. This section is the heart of the Structure Plan with proposals and recommendations on the future development of the town as well as action plans for implementation of major projects.

CHAPTER 2 – DRIVERS OF URBAN GROWTH IN OTAVI

This chapter provides an overview of the main drivers of growth within the town of Otavi from the man-made to the political and natural drivers.

2.1 HISTORY OF THE TOWN

The town of Otavi is a former railway town. The German colonial forces did not pay much attention to the Otavi area until they realised the mining potential of the Otavi area, for copper and iron. As soon as the German colonial forces realised the mineral resources in the area they declared the area "German property". They copper and iron was excavated and transported with ox-wagon to Swakopmund, which was a difficult process. In 1903 the Otavi Minen und Eisenbahn Gesellschaft (Otavi Mining and Railway Company) started with construction of a railway line from Otavi through Otjiwarongo, Otavi to Swakopmund. The rail line was completed in 1906.

In 1915, the Union of South Africa, under British rule, moved into Namibia and by 9 July 1915 they conquered the German colonial forces and signed a peace treaty at Khorab (just outside the town of Otavi) (Wild Africa Travel, 2015).

Otavifontein (fountain) is the source of freshwater for the town of Otavi. Otavifontein is situated 8km east of town at the foot of the Otavi Mountains. In 1875 HW Wilmer and CC Thomas established themselves at the fountains and built a house and started some gardens. In 1895 the German Governor, Leutwein, visited the fountains and decided to develop the fountains into a halfway stop between Outjo and Grootfontein. As such a small group of German troops were stationed here (Republikein, 2014). In 1900 Otavifontein were transferred to Otavi-Minen-und Eisenbahn-Gesellschaft (O.M.E.G) and by 1912 the farm was one of the most successful farm in the north due to the large scale irrigation taking place on the farm. Till today the farm is known for its large scale irrigation (Republikein, 2014).

Today Otavi is known as one of the towns within the "maize triangle". The maize triangle comprises of the areas of land in between Otavi, Grootfontein and Tsumeb and refers to the high productivity of cultivation that takes place in this area. Today, except for cultivation and cattle farming, the area is also known for its trophy hunting, proximity to the Hoba meteorite the Dragon's Breath Caves and the Oshikoto Lake.

2.2 ADMINISTRATION OF THE TOWN

Otavi is a fully autonomous Town Council administered through the Local Authorities Act of 1992 (Act 23 of 1992). According to the Local Authorities Act an area declared by the Minister of Urban and Rural Development as a Town is governed by an elected town council. In 2004 the town was downgraded to a Village Council, but was re-instated in 2010 as a Town Council.

The Otavi Town Council has since administered the infrastructure, has serviced land and made property available under freehold ownership. The Local Authority boundary of Otavi was expanded in October 2012 to include a number of commercial farms (see figure 1) surrounding the town of Otavi. The Otavi Local Authority boundary now measures approximately 41,818 hectare in extent of which the majority of land is privately owned farm land. The Otavi Town Council has a town planning scheme in place that is to regulate the land uses within the town and its local authority area.

Development in Otavi has taken place but has not been in accordance with any overall master plan or overriding planning philosophy. Planning has taken place on a piecemeal basis, with many planning decisions being made in an *ad hoc* manner.

Otavi town falls within the Otavi Constituency which includes the urban area of Otavi and the rest of the constituency comprises of commercial farms. The town of Otavi comprising of some 517 hectares (built up area) is governed by the Otavi Town Council while the surrounding rural areas (farm land) is governed by the Otjozondjupa Regional Council. The total population of the Otavi Constituency in 2011 was 12,488 (NSA, 2014) of which the town of Otavi had a population of 5,242 in 2011 (NSA, 2014)

The Figure below summarises the functions and powers of the local authorities as provided by the Local Authorities Act.

FIGURE 1: POWERS OF LOCAL AUTHORITIES IN TERMS OF THE LOCAL AUTHORITIES ACT

All Local Authorities	**Towns and Municipalities**	**Municipalities**
• Water supply • Cemeteries • Sewerage and drainage • Streets and public places • Markets • Refuse disposal • Pounds • Bands and orchestras • Beautification of local areas • Promotion of tourism • Power to accept donations from sources inside Namibia • Power to buy and sell land and buildings • Power to set fees for services provided • Power to operate farms on town lands	• Supply electricity and gas • Dipping tanks • Ambulance services • Fire brigades • Construct and maintain community buildings and structures • Power to buy and sell property other than land and buildings	• Public transport • Quarries • Housing schemes • Museums and libraries • Abattoirs • Aerodromes • Plant nurseries • Parking areas • Railway sidings • Traffic services • Bursaries • Storage of perishable goods • Power to confer honours for services to community • Power to enter into joint business ventures • Power to privatise functions and services

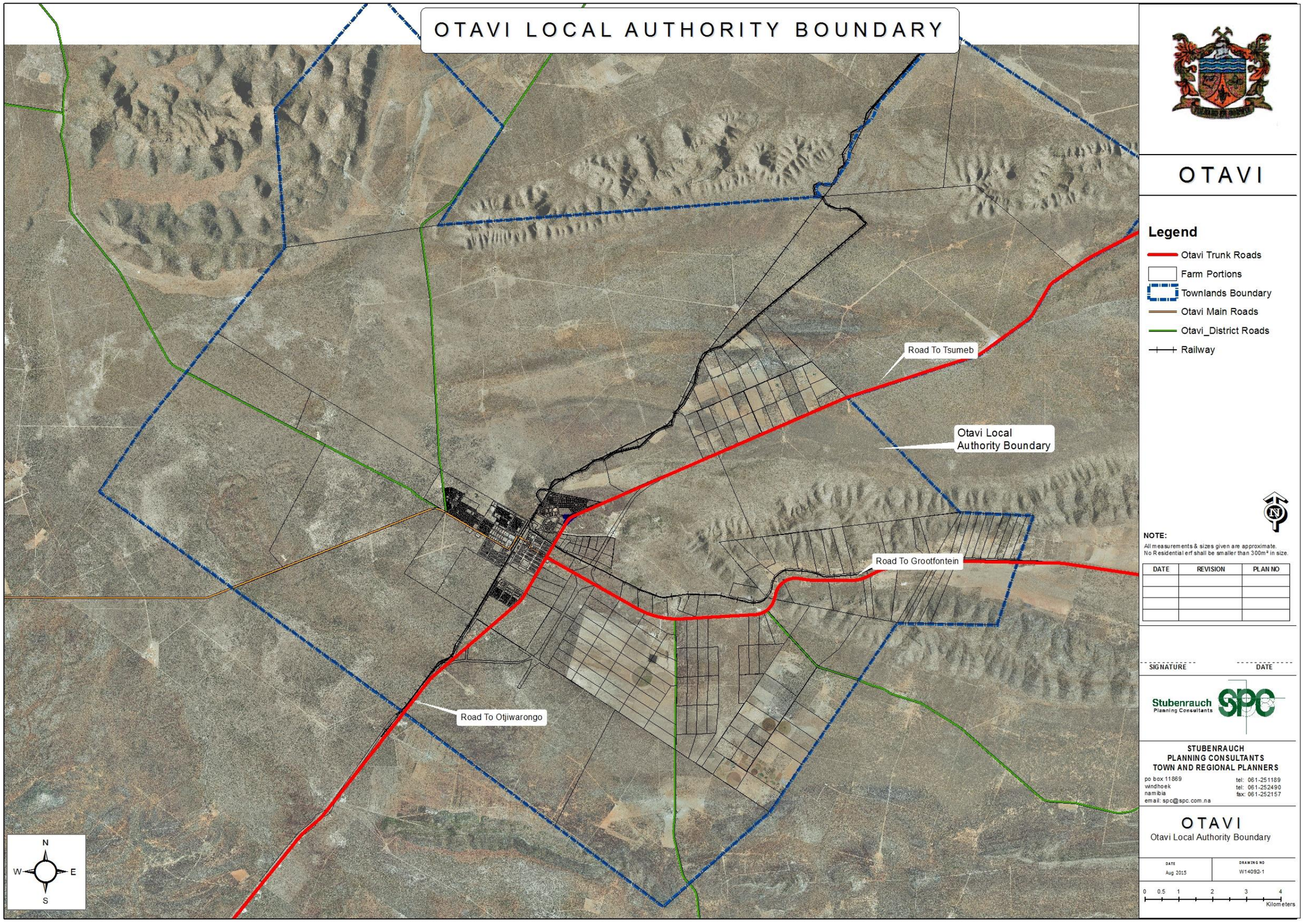


FIGURE 2
LOCAL

AUTHORITY
BOUNDARY
OF OTAVI

2.3 KEY DRIVERS OF URBAN GROWTH

The key drivers section attempts to broadly identify the aspects that drive development and the economy of the town, the informants and constraints within the town and townlands scale.

Namib Mills and NDF

Namib Mills has a mill in Otavi that mills mahangu and maize as well as having a sugar packing plant. Namib Mills employs a large segment of the population in town.

NDF base is situated north-east of the town centre. Namib Mills and NDF is one of the largest employers in the town of Otavi.

Transportation corridors and accessibility

Otavi is excellent located on the T-junction with two major transport corridors – to the north and to the north-east of Namibia. This locality puts Otavi in the excellent position to start thinking about providing logistical services to these corridors – both rail and road.

- The Trans-Cunene Corridor links the harbour of Walvis Bay with Lubango in Angola – passing through Otavi to Tsumeb and the north.
- The Trans-Zambezi Corridor links the harbour of Walvis Bay with the DRC and Zimbabwe – passing through Otavi to Grootfontein, Rundu and SADC.

Unfortunately the town of Otavi receives little benefit from the passing trade. The Fourway Filling Station on the outskirts of town receives most of the traffic that stop for fuel purchase and refreshments.

The proposed railway line from Grootfontein to Rundu through Zambezi to SADC countries will create much needed opportunities for towns situated along this corridor. The logistics potential of Otavi should not be underestimated, being on the cross-roads between two major transport corridors.

Farming Community and inter-regional support

Otavi is surrounded by a large farming community, which plays an important role in the economy of the town. Unfortunately due to the slow growth of the town and the proximity to larger regional centres such as Tsumeb, Grootfontein and Otjiwarongo and a relatively low population (buy-power), the larger businesses are not investing in Otavi, but rather in the larger regional centres.

However, the surrounding commercial hinterland buying-power should not be underestimated. The business area in Otavi has seen some investment in the last year or so. The surrounding maize triangle also supports a number of important tourism attractions that also attracts a number of tourists a year.

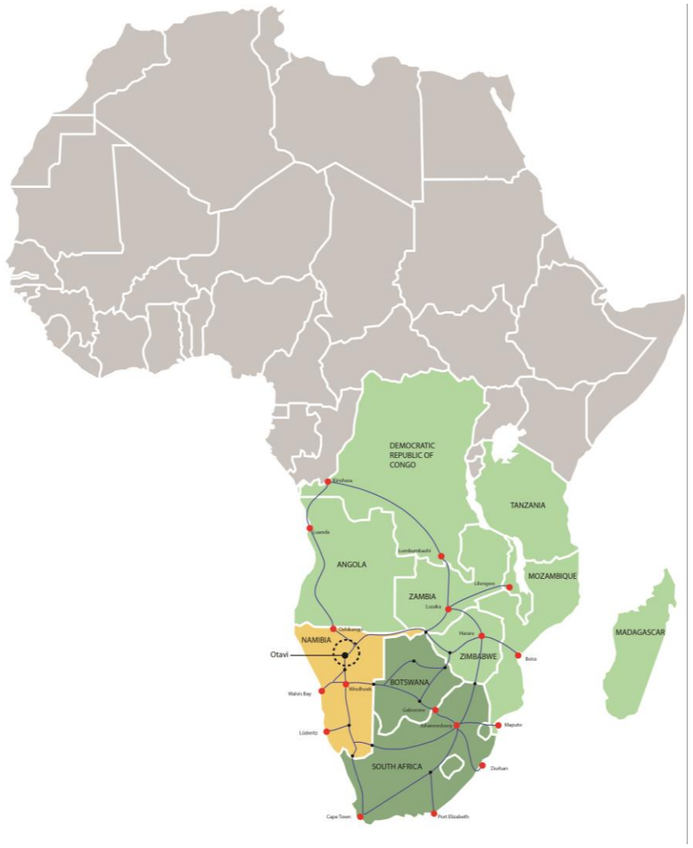


FIGURE 3: OTAVI IN RELATION TO REGIONAL TRADE

B2 Gold and Ohorongo Cement

B2Gold is a newly establish gold mine between Otavi and Otjiwarongo. Unfortunately the majority of the employees and workforce reside either at the mine or in Otjiwarongo.

Ohorongo Cement is situated about 17km north-east of Otavi, on the road to Tsumeb and is the only cement factory in Namibia. Unfortunately most of the workforce and management of the factory resides at Tsumeb.

Private empty land

Perhaps the biggest constraint on town scale is the large private ownership of erven within town. The problem is not the ownership, but rather the absenteeism of the owners which leads to large areas of town being vacant.

Services and sewage works

The sewage ponds to the west of Khoaeb are old and not fenced posing a health risk for humans and livestock. Most of the services network in town consists of old asbestos pipes that need replacement. Water leakage is a major contributor to water loss in the town due to old pipes.

Railway and Trunk road restrictions

The railway line, the Trunk Road and the proclaimed bypass are all manmade features that restrict development; connectivity and integration. The town will grow towards to the east and west and these features makes integration difficult. Both the railway line and the B1 Trunk road has access restrictions and building line restrictions that also plays a role in the development of the town.

The proclaimed bypass has also been planned over the existing NDF base, which is problematic as the road cannot be constructed over the base. Another question is whether a bypass is an economic feasible option for a small town such as Otavi that also relies on passing traffic for economic benefits.

Lack of developed open space

Khoaeb Proper, Extension 1 and 2 are densely populated areas. There are no recreational or open spaces within these two areas. The public open spaces that existed were closed down for urban infill development.

Large townlands

The Otavi Town is surrounded by large areas of agriculture zoned land. The townlands of Otavi has been expanded by a large margin, but the main constraint is even though the townlands were expanded, the Council only owns a small part of the townlands. As Council is currently the driving force for development in Otavi, this means that the Council will have to purchase adjacent farms in order to expand the town. Reluctance of farmers to sell and high land prices will be a limiting factor on development.

Natural sensitive areas

The Otavi Mountains to the east are a sensitive area in terms of the scenic value and ecological sensitivity. The mountains also create a vista into town when entering from the east. To the east of town are a number of intensive agriculture farms where cultivation of crops takes place. The Otavi spring to the east of town is an important source of water for the town and care must be taken not to pollute this valuable source.

The wind direction as identified by stakeholders is predominantly from the east and south-easterly.

Small economic and tax base – the economy of the town is very much reliant on the surrounding commercial farms, Namib Mills and to some degree Ohorongo Cement and B2Gold. The town itself has a small and relatively poor economic and tax base, which means that the income for the Town Council is relatively, low.

Local Authority land in Otavi is almost fully utilised. The majority of land within the townlands of Otavi is privately owned land. This then either leaves the Council with either having to buy these privately owned land at large expense or to wait for development from the owners. As Council is to be the main driver of development in town, this leaves the Council with a predicament as it does not have the land for development. Private development in the town is slow, which also contributes to the slow development of the town.

Topography of the townlands – the topography of the wider townlands are will have an impact on the typed of development to take place within town. These challenges are not unsurmountable and planning will have to take into account these informants.

Administration of the town took a step back in 2003 when the municipal office building burned down and all the records of the town were lost. Claims of fraud and mismanagement of the town at that stage resulted in the downgrading of the town council to a village council in 2004. Apart from financial issues, the town also has large scale poverty; poor basic services such as tarred roads and working sewage system. Due to the proximity to larger regional centres such as Tsumeb, Grootfontein and Otjiwarongo, this does hamper the development of larger scale developments.

Unemployment and affordability is a major challenge in town. Due to the high level of unemployment, not many of the residents can afford housing, even if it is part of the built-together project. This poses a problem for Council when providing housing especially if the residents can't afford the affordable housing being created. This means that the Council will have to heavily subsidise these housing, putting the Council in financial difficulty.

The town is also located in an area with some well-known attractions such as:

The ***Hoba meteorite*** is one of the largest known meteorites on earth and a national monument in 1955.

The ***Dragon's Breath Cave*** is the largest non-subglacial underground lake in the world and was declared a national monument in 1967. It is situated approximately 53km north-east of the town of Otavi within the maize triangle. The dolomite rocks that make up most of the Otavi Mountains contains a high amount of limestone, which dissolves quite easily and thereby large areas within the mountains are hollowed out to form caves. The ***Ghaub Caves*** (overhead the Dragon's Breath) is a series of chambers and passages that are reached by climbing into a small hole in the surface of the mountains (Wild Africa Travel, 2015).

Khorab memorial, just outside the town of Otavi, commemorates the peach treaty that was signed between the German Colonial troops and the Union of South Africa on 9 July 1915.

Otjikoto Lake is some 80km north of Otavi and is a sinkhole lake that was created by a collapsing karst lake. The lake is 102metres in diameter and its depth is underdetermined. In June 1915, the German troops dumped war materials in the lake before surrendering to the Union of South Africa troops.

Etosha National Park was proclaimed as a game reserve in 1907 and spans an area of 22,270km^2. Namutoni, one of the overnight camps in the Etosha National Park is situated about 160km north-west of the town of Otavi.

The expansion of the Local Authority area of Otavi to include a large number of farms is an advantage to the Town Council. If the Council can manage to work together with the owners of these farms and encourage farmers to develop their farms, then Otavi can become an important node within the maize triangle.

2.4 CONCLUSION

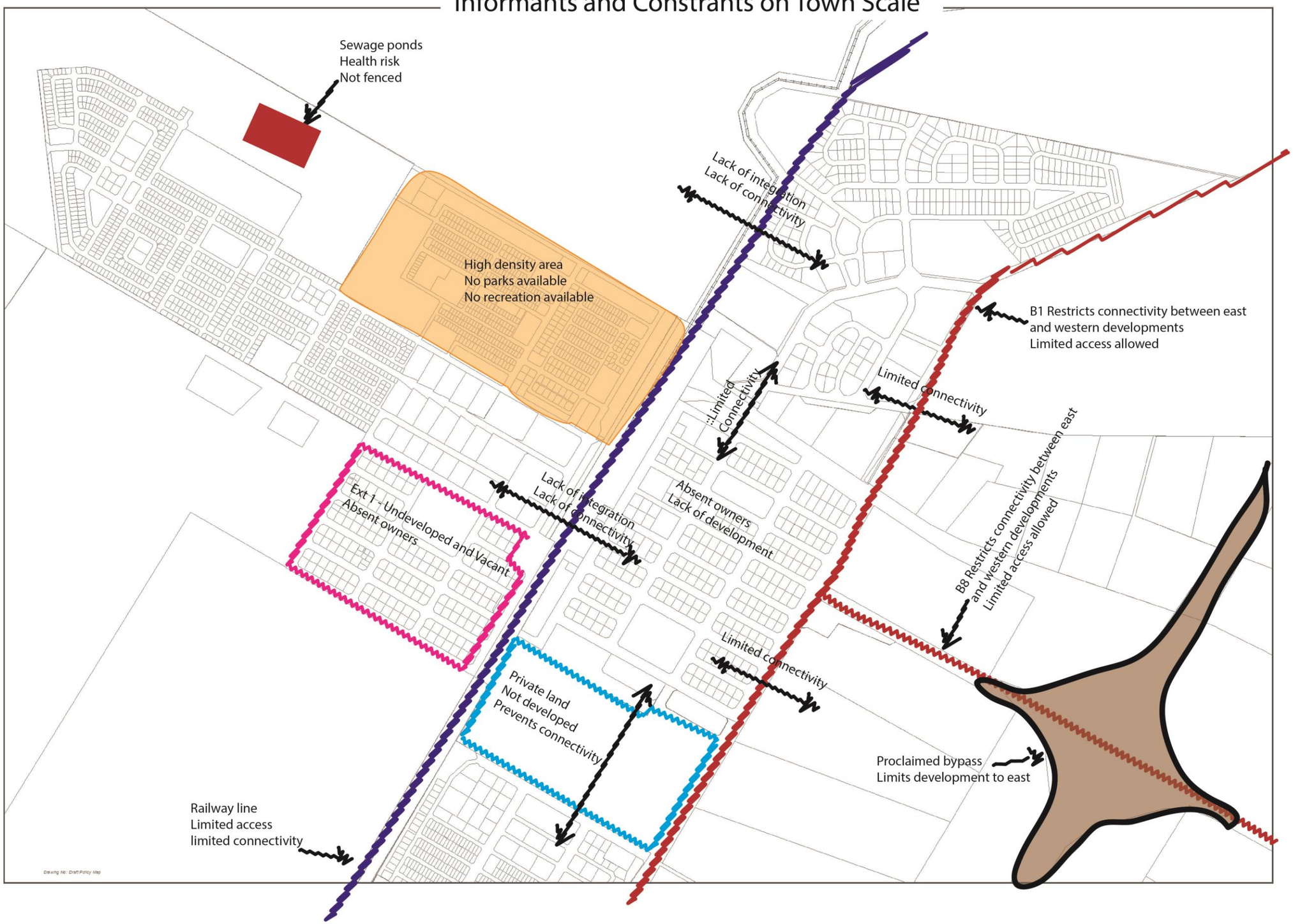
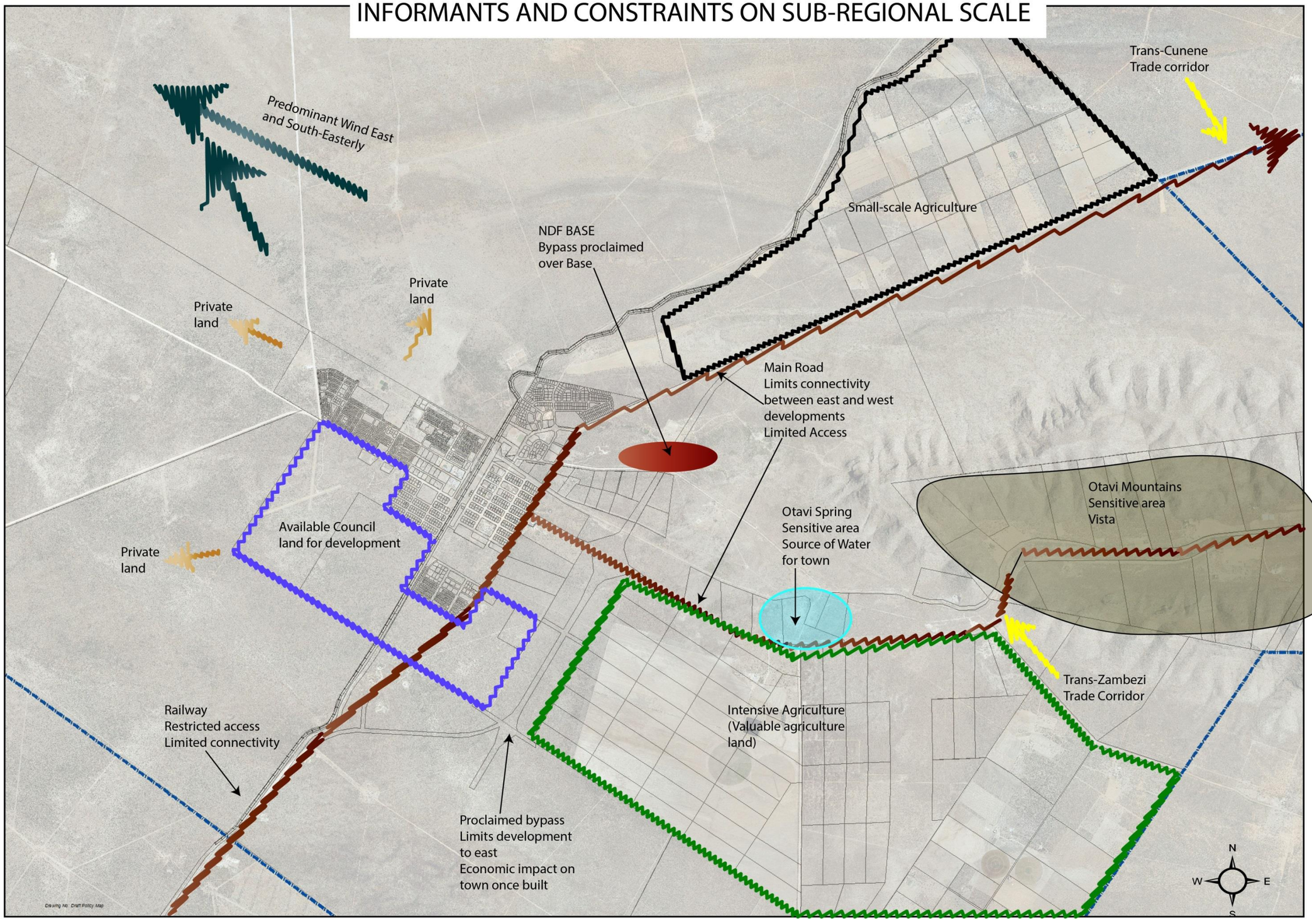


FIGURE 4 INFORMANTS AND CONSTRAINTS ON TOWN SCALE

INFORMANTS AND CONSTRAINTS ON SUB-REGIONAL SCALE



CHAPTER 3 – NATIONAL AND LOCAL STRATEGIES

Planning needs to take into account national, regional and local strategies. Namibia has two excellent national strategies which are to drive development, the Vision 2030 and NDP 4.

3.1 VISION 2030

Vision 2030 drives for the creation of enabling environments through sustainable development. Vision 2030 prescribes the following objectives for urban areas:

- Healthy, self-sufficient rural populations and reduced rates of rural-to-urban migration
- Well planned, well managed, clean safe and aesthetically pleasing urban areas
- Recreation facilities (parks, monuments, museums etc) available in cities
- Equitable access to land and essential services
- Opportunities for innovative and sustainable employment
- Pro-active, citizens with high levels of civic pride, involved in decision-making.

Vision 2030 further cautions against lack of planning which paves the way for environmental degradation; urbanisation that spills over into sensitive areas or areas that could be useful for agriculture purposes and the loss of green spaces; uncontrolled urban sprawl and informal areas and poor waste and hazardous waste control.

Vision 2030 encourages responsible architecture that takes the environment into account when designing; making towns cycling friendly to reduce traffic congestion and mitigate effects of Global warming and well managed, effective and environmental friendly waste management.

3.2 NDP 4

NDP 4 has adopted three overarching goals, namely (i) high and sustained economic growth, (ii) employment creation and (iii) increased income equality. To reach these goals, basic economic development enablers are put in place, including an enabling environment, improved education, skills management and health, to assist in addressing extreme poverty, and upgrade the public infrastructure to reach Vision 2030.

NDP4 has identified key focal areas to create the momentum necessary for high economic growth: (i) logistics, (ii) tourism, (iii) manufacturing and (iv) agriculture.

(i) Logistics: Namibia is to establish itself as a regional leader in logistics and distribution.
(ii) Tourism: Namibia is to become a leading tourist destination on the continent
(iii) Manufacturing: Namibia is to increase the contribution of general manufacturing by 50% and should have identified upstream and down-stream economic activities in the mineral sector
(iv) Agriculture: Agriculture production to increase and result in agriculture experiencing average real growth of 4% per annum.

NDP 4 also proposes that municipalities along the corridor routes should make land available for upgrading and developing state-of-the area storage facilities and that the perception of these towns should be changed to reflect their increasing importance as major regional distribution centres (Republic of Namibia, 2012)**.**

3.3 OTAVI STRATEGIC PLAN

"My City, My Dream" is the motto of the Otavi Town Council. The Otavi Town Council's mission statement declares the following:

Mission: *"To effectively and efficiently service the community of Otavi and grow into a prosperous innovative, sustainable and economically vibrant city by 2030"*

The Town's Vision: *"To be a wealthy, well developed city with modern infrastructure, offering world-class services".*

Core Values:

- Accountability
- Innovation
- Customer Care
- Integrity
- Transparency
- Teamwork

Furthermore, the Council identified four (4) strategic priorities:

- Ensure Economic Development
- Infrastructure Development
- Service Excellence
- Empowerment

3.4 CONCLUSION

Situational the town of Otavi is within three of the focal areas of the NDP 4 – that of (i) logistics; (ii) tourism and (iii) agriculture. The fact that the economic development of town has been slow is unfortunate, as the town is within a position to reap benefits from these three sectors.

CHAPTER 4 – NATIONAL, REGIONAL AND LOCAL CONTEXT

This Chapter provides a snap shot overview of the role and function that Otavi plays within the context of Namibia's national and regional development. The development of any town needs to be evaluated within the context of the national and regional socio-economic development trends.

4.1 OTAVI IN NATIONAL CONTEXT

Namibia gained its independence from South Africa in 1990 and is a member state of the Southern African Development Community (SADC), the African Union (AU), the Commonwealth of Nations and the United Nations.

Namibia's Constitution makes provision for central, regional and local levels of government. The central government consists of the legislature (National Assembly) and the parliament (National Council), the judiciary (Supreme, high and lower courts) as well as the executive (the President, Cabinet and the Line Ministries).

At the regional level Namibia is divided into 14 political regions. Within these regions local authorities are provided for, these being either proclaimed as a Settlement in accordance with the Regional Council Act, 1992 or as villages, towns or municipalities in accordance with the Local Authorities Act, 1992. Otavi is one of the local authorities within Namibia that has been established as a Town Council.

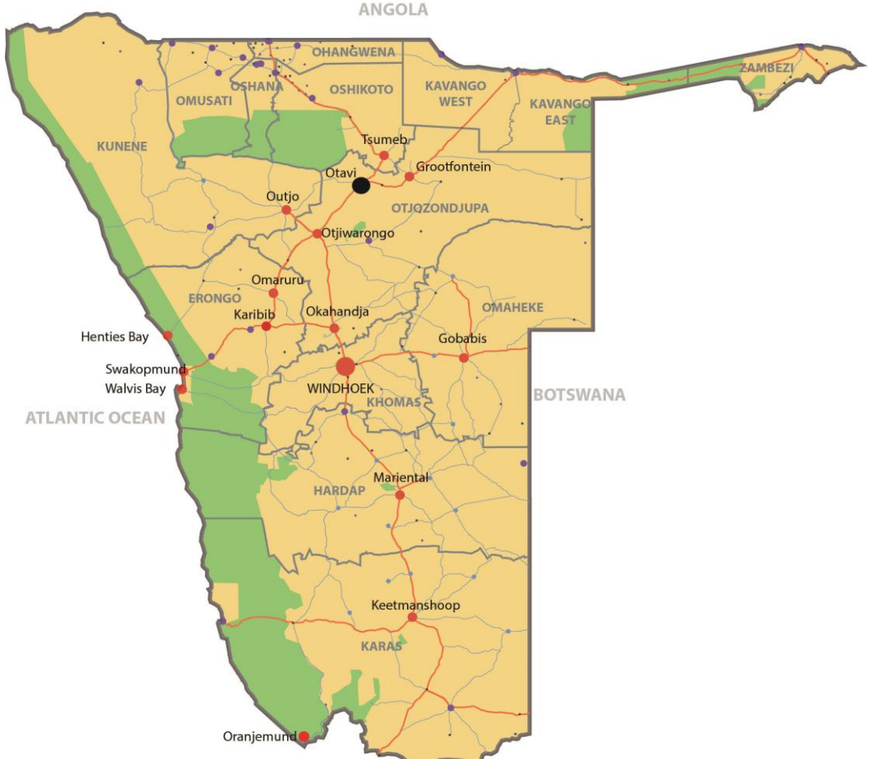


FIGURE 6 OTAVI IN NATIONAL CONTEXT

Otavi is one of the towns within the maize triangle, known for its exceptional water and crop production. Otavi is situated on the intersection of the road to the north-east and to the north. The road split to the north-east, becoming the Trans-Zambezi Corridor linking Namibia with the north-eastern SADC countries. The Trans-Cunene links Namibia with Lubango in Angola through Tsumeb and Oshikango. The locality of the town is excellent for trade related activities.

4.2 OTAVI IN REGIONAL CONTEXT

Otavi is situated within the Otjozondjupa Region, which is one of the 14 regions in Namibia and covers an area of 105,328 km^2. Otjozondjupa Region is one of the central regions in Namibia that is blessed with different landscapes and a strong agriculture economy.

The region is governed by the Otjozondjupa Regional Council, as per the Regional Councils Act 22 (Act 22 of 1992). The Otjozondjupa Region is divided into seven (7) constituencies namely:

Grootfontein Constituency covers the town of Grootfontein and surrounding commercial farms.

Okahandja Constituency covers the town of Okahandja and the surrounding rural areas.

Okakarara Constituency includes the village of Okakarara and surrounding communal farmland.

Omatako Constituency includes the settlements of Kalkfeld, Hochfeld and Ovitoto, the Waterberg Plateau and surrounding rural farming land.

Otavi Constituency includes the town of Otavi, the B2 Gold Mine, the Ohorongo Cement Factory and surrounding rural farming land.

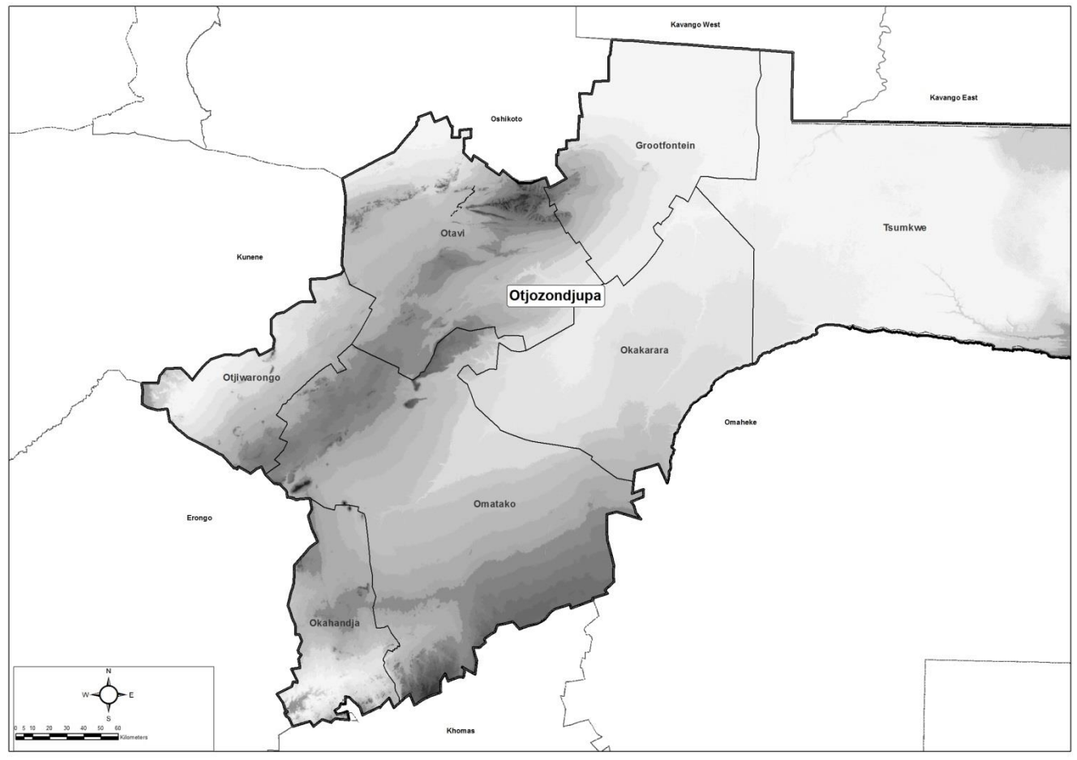


FIGURE 5 OTJOZONDJUPA CONSTITUENCIES

Otjiwarongo Constituency consists of the town of Otjiwarongo and surrounding rural farming land.

Tsumkwe Constituency consists of the settlement of Tsumkwe and the surrounding rural areas that consists of commercial farms and communal land.

The economy of the region is driven by a large non-tradable sector (government services) and a strong beef production and crop production sector. The farming sector is still predominantly livestock oriented with 18.2% of the regional households engaged in livestock farming and 9.3% in crop production. The main employment industry in the region remains the Agriculture, Forestry and Fishing sector.

Tourism and hunting is an important industry in the region with a number of well-known tourist attractions in the region and a number of game farms.

The household income of the majority of the households within the region comes from wages and salaries (60%) with the main employment industry being the agriculture, forestry and fishing industry (30.9%) and public administration (12.2%).

The private sector provided the most jobs (36.7%) with the government employing 21.3% and commercial farms employing 8.3% of the employed population (NSA, 2014).

Otavi forms part of the "maize triangle" within the region. the Maize triangle is known as such for its fertile land and high crop productivity. Recently the three towns, Tsumeb, Grootfontein and Otavi had a planning meeting in which they discussed the economic potential of the area and how the towns can benefit from a combined strategic effort by all three towns. The three towns formed a development agreement which is to look at increasing the economic cooperation between the towns.

4.3 OTAVI IN LOCAL CONTEXT

Otavi is a small town situated within the Otjozondjupa Region on the intersection where the B1 splits into the Trans-Zambezi Corridor and the Trans-Cunene Corridor. Historically the town of Otavi formed as a result of the copper and iron mining in the surrounding areas and later predominantly because of the railway that was built from Otavi to the coast to transport the copper and iron that was mined. Slowly Otavi started to develop as a railway station town. The development of the town of Otavi has been slow over the years with high levels of poverty and a small economic base some of the issues the town faces.

The town of Otavi had a population of 3,813 in 2001. The population increased to 5,242 in 2011 meaning a growth of 37.5% over the ten years, and an annual growth rate of 3.7%, which is higher than the annual national growth rate of 1.4% (NSA, 2014).

The reform of local government from the previous political regime was initiated in Namibia after it gained independence from South Africa in 1990. The Constitution of the Republic of Namibia established a three-tier system of governance in Namibia comprising of the central government, regional councils and local authorities.

The municipal councils are the most autonomous administrative units of the local authority categories. Under the Local Authorities Act of 1992, the Minister responsible for regional and local government may further classify the municipalities into two types: Part I municipalities and Part II municipalities. Currently there are three Part I municipalities (Windhoek, Walvis Bay and Swakopmund), 15 Part II municipalities, and in total 30 towns and villages in Namibia. Otavi is governed by a Town Council.

4.4 CONCLUSION

CHAPTER 5 – URBAN ENVIRONMENT

The historic development of the town of Otavi played a role in the urban structure of the town. The grid pattern of the town makes it easily accessible and cost effective for servicing.

The railway line through town split the town into two areas making integration difficult. The railway line, the industrial area, the sewage ponds and the surrounding private farms are some of the barriers of development westward. Residential developments may not be developed closer than 500metres from the sewage ponds, while any development westwards had to go around the industrial area of the town. The railway line also has certain development restrictions in terms of the number of level crossings over the railway line which limits the integration between the different extensions.

The question of ownership in properties of Otavi Extension 2 where it seems a property was sold to more than one person also had an impact on development; in fact, no development took place in this extension, due to the ownership issue of the erven. The absentee landlords in Otavi Proper also meant that many of the properties have not been developed leaving erven vacant and derelict. The town, over the years, got a reputation for being a 'one-street town', with many of the proclaimed erven lying vacant. Even though opportunities from Ohorongo Cement and B2 Gold came up a few years ago, the fact that no serviced erven were available at that time meant that these two investors choose Otjiwarongo and Tsumeb.

The town of Otavi is characterised by one storey low density residential development, with many erven in Otavi Proper vacant. Khoaeb Proper, Extension 1 and 2 is predominantly residential of nature but with smaller erven and higher density. Most of the streets in Otavi are unpaved resulting in dusty winter months and muddy summer months. Most of the trees and plants that was part of the landscaping on the main streets has died out or has been destroyed by the cattle and donkeys roaming the town.

The business component of the town is located within the centre of Otavi Proper and consists of two grocery stores, the Namib Mills, financial institutions, petrol station, some smaller shops and Agra. The town is started to develop into a southern, northern and western direction and some land has been allocated to developers to the east of the B1 main road for township establishment. This will mean the future Otavi town will consist of areas on both side of the B1 road and measures will have to be put in place to integrate these developments.

5.1 EXISTING EXTENSIONS

Otavi comprises of the following extensions:

Otavi Proper – 254 erven

Otavi Extension 1 – 171 erven

Otavi Extension 2 – no record

Otavi Extension 3 – 18 erven

Khoaeb Proper – 370 erven

Khoaeb Extension 1 – 238 erven

Khoaeb Extension 2- 207 erven

Khoaeb Extension 3 – 297 erven

In surveying and registration process

Khoaeb Extension 4 –292 erven

Khoaeb Extension 5 – 288 erven

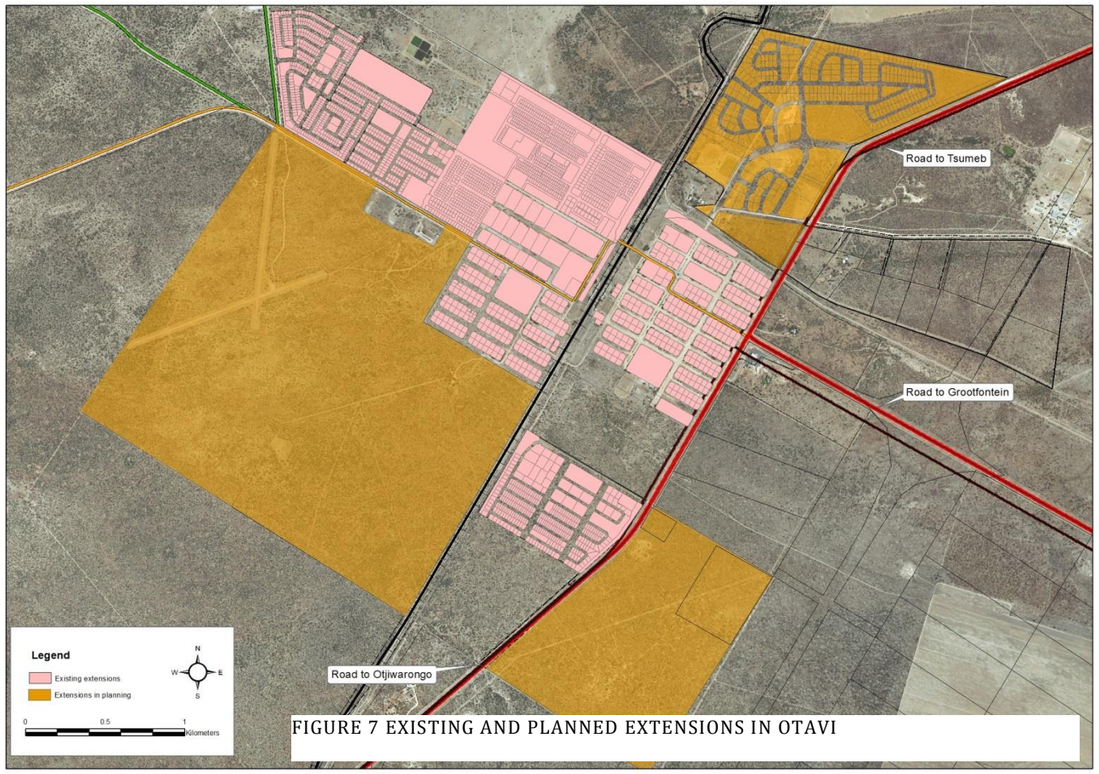


FIGURE 7 EXISTING AND PLANNED EXTENSIONS IN OTAVI

Otavi extension 4 – 317 erven

In Planning Process – will take another 1 ½ years until surveying and registration

Otavi Extension 11 – 317 erven

Extension 7 to 11 – approx.. 1,134 erven *(no data available on extension 5 and 6)*

Currently, the Otavi Town Council has 1,555 erven registered. By the mid 2016 it is expected that another 897 erven will be registered (Extension 4; Khoaeb 4 and 5). It is expected that by mid-2017 an additional 2,000 erven will be available from Extension 5 to 11. Figure 6 above shows the locality of the various extensions in Otavi

Although the townlands of Otavi is approximately 42,336 hectares in extent the Otavi Town Council only has about 560 hectares of land for development. Council already indicated that this is under planning, which means that by 2017 the Otavi Town Council would have utilised almost all of the land owned by Council. This means that either Council has to buy adjacent farms or that most of the development will have to be privately driven.

5.2 SERVICES AND INFRASTRUCTURE

The next section will briefly describe the services network in town.

5.2.1 WATER PROVISION

Bulk water to the town of Otavi is supplied by NamWater through the Otavi Water Supply Scheme. The water originates at the Otavifontein east of town, where NamWater has five operational boreholes. The total recommended yield from the boreholes and the fountain per day is 2,000m^3 per day. It is estimated by Aurecon that the estimated annual daily demand by the town of Otavi is 892m^3/ day (Aurecon, 2014).

Water is then transferred via a 200mm pipeline to two reservoirs and from these reservoirs further distributed to the town and other localities. The two reservoirs has a capacity of 750m^3 and 2,700m^3 each where water is stored and then distributed to town and other points. According to the Master plan done by Aurecon it is estimated that the water demand for Otavi is to increase by 2030 to 1,407m^3/day.

The current infrastructure within town is quite old with mostly low capacity asbestos pipes. These infrastructures are prone to water leakages and pressure problems. The Council is busy addressing the situation and the intention is to upgrade the water reticulation system in phases.

The Council is also addressing the future supply of water within the town by looking at the old dormant boreholes within the townlands of Otavi. These boreholes can be upgraded and utilised by the town in future to supplement the water supply.

5.2.2 ELECTRICITY PROVISION

Electricity to the town is supplied by CenoRed by means of a 2.5MVA line, which is to be upgraded to a 5MVA line. CenoRed is also in the process of constructing a 40km 33kV overhead line from the Sargberg substation to the town of Otavi. CenoRed also provides for the internal electricity supply in Otavi. Most of the town is connected to the grid system with the exception of Khoaeb Extension 3, which CenoRed will only supply with power once it is fully occupied.

5.2.3 SEWAGE PROVISION

The current sewage works are located just north of Khoaeb Extension 4 and 5. Due to the proximity and the expected growth of the town towards the north, the Council is of the intention to close down and rehabilitate the current sewage ponds. The intention is to rehabilitate and upgrade the old Meatco ponds, which is situated on the Farm Rentes, for the new ponds.

The Council is also in the process of upgrading the sewage pipe network system to ensure that all the extensions are connected to the grid sewer system. The contractors are currently busy connecting individual households to the main sewer lines.

5.2.4 EDUCATIONAL AND INSTITUTIONAL FACILITIES

There are no tertiary education facilities in the Otavi. The closes facilities are in Otjiwarongo.

Otavi has the following school facilities:

a) Otavi Primary School has 730 learners with 24 teachers, which means about 30 learners per class. The hostel accommodates only 36 children as it is shared with the Khorab Secondary School
b) Khorab Secondary School has 580 learners with 24 teachers giving a 1:24 ration. Only 31 pupils from the school are housed in the hostel that is shared with the Primary School.
c) Shalom Primary School has 1,039 children with 36 teachers giving a 1:28 ratio.
d) Private School – STILL TRYING TO GET INFORMATION

Otavi has following public institutions:

- police station;
- a fire station;
- a clinic
- magistrate office

There are a number of public open spaces within town, but most of these have not been developed as formal parks and some has been closed for urban infill.

5.2.5 ROAD INFRASTRUCTURE AND NETWORK

The town of Otavi is served with both the national railway line and the B1 Main Road (Trans-Zambezi Corridor and Trans-Cunene Corridor). The road leading through town (B1) is a bitumen road. Most of the street networks within town are unpaved streets. The street pattern of the town is based on a grid format.

FIGURE 8 STREETS IN TOWN AND B1 THROUGH TOWN (BOTTOM)

FIGURE 10 STREET OUTLINE

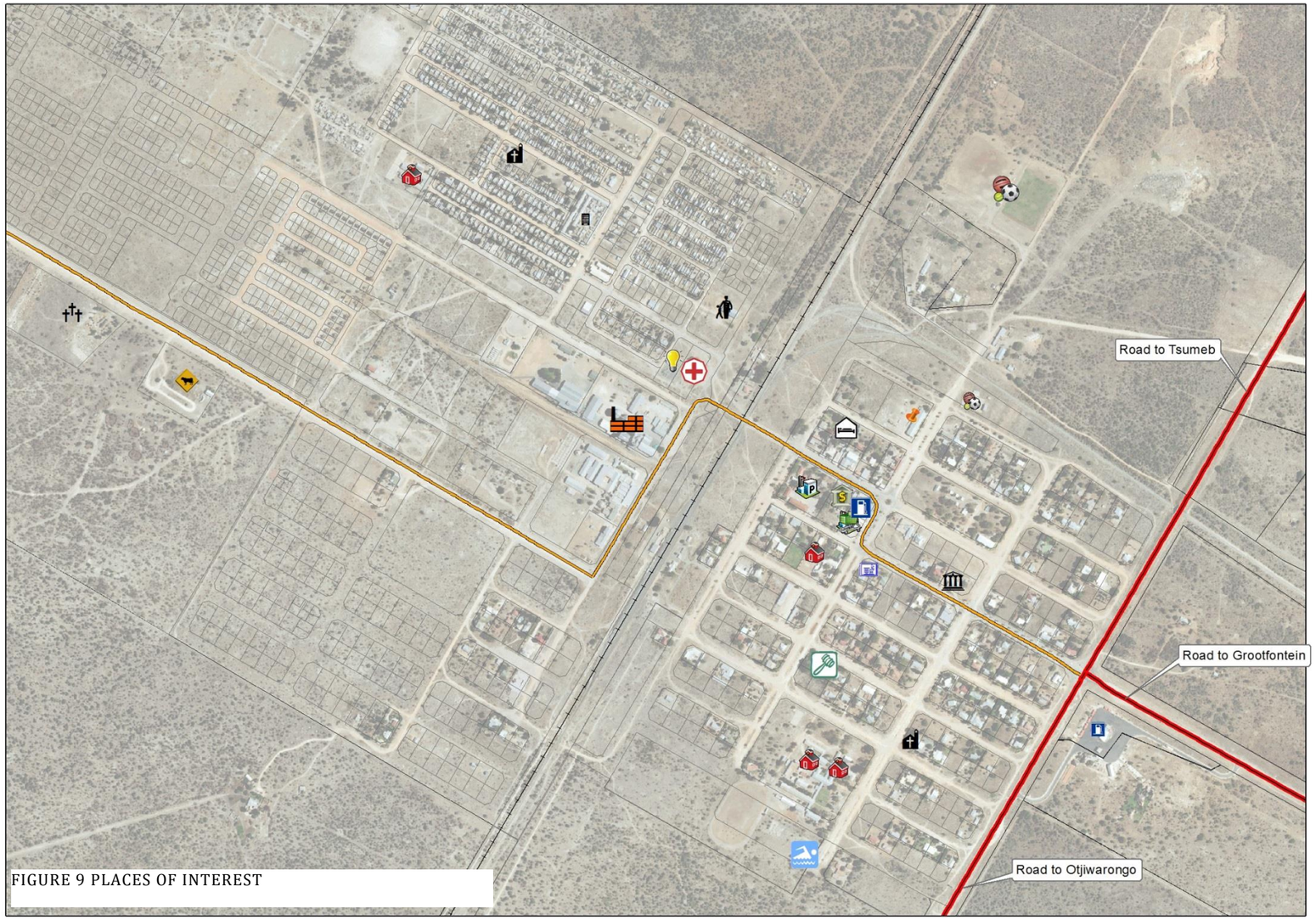


FIGURE 9 PLACES OF INTEREST

CHAPTER 6 – NATURAL ENVIRONMENT

Chapter 5 provides information about the natural environment of Otavi (where available) and Otjozondjupa Region by considering climate, ecology, the local environment, constraints and opportunities.

6.1 GEOLOGY AND SOIL

The Otjozondjupa Region is characterised by mainly the Kalahari Group and Damara Supergroup and Gariep Complex. The eastern part of the region is dominated by the Kalahari Group while the interior around Waterberg is from the Karoo Supergroup complex and around Otavi from the Otavi Group of the Damara Sequence.

The region is known for it 's copper, silver and fluorite mineral deposits and more recently gold deposits.

The majority of the region is covered by Arenosols soils. Arenosols are low water holding soils with low nutrient levels. The rivers systems and omurambas contain the highly fertile Fluvisols, which is valuable agriculture land.

Pockets of Cambisols can be found in the region which is good for agriculture production. The town itself is dominated by Leptosols which is characteristic of mountainous areas. The Atlas of Namibia (Mendelsohn, 2003) shows that pockets of the Otjozondjupa Region has medium to high soil fertility, especially areas in proximity to Otavi, Grootfontein and Tsumeb.

6.2 LANDSCAPES, GROUNDWATER AND AQUIFERS

Otavi falls within the Karstveld landscape. This landscape is described as "a narrow, raised margin that encircles the lower-laying Owambo Basin in central northern Namibia. The rocks are dominated by limestone that dissolves easily in water, forming large underground caverns, lakes (such as Lake Otjikoto, Lake Guinas) and aquifers of underground water. There is little surface water run-off from the Karstveld landscape, and no major rivers drain it. Typically, areas with greater elevations around Grootfontein, Otavi and Tsumeb receive higher rainfall than the surrounding lowlands. White calcrete rocks litter the surface in most lower-laying areas." (Mendelsohn, Jarvis, Roberts, & Robertson, 2002)

The rest of the region is dominated by the Kalahari Sandveld, with smaller pockets of Central-western Plains and Khomas Hochland Plateau landscape towards Okahandja.

Perhaps the most outstanding feature of the Otavi area is the Otavi Mountain Land which is a dolomitic massif rising up to 2,090m, some 500 m above the surrounding plains ((Christelis & Struckmeier, 2001). The Otavi Mountain Land is a watershed draining westward into the Ugab River catchment, northwards into the Etosha Pan, south and eastwards into the Omatako Omuramba. This area receives a mean annual rainfall of 540mm and most of the area has been declared a Groundwater Control Area (Christelis & Struckmeier, 2001), which means that a permit is required to drill boreholes. There are numerous springs in the area that is important for water supply in the area.

6.3 BIOMES, VEGETATION

The African continent is divided into a number of different biomes. A biome is an area that shares broadly similar plant life and climatic features. The Otjozondjupa Region falls within the major Tree-and-Shrub Savanna biome, with the town of Otavi and surroundings forming part of the Karstveld.

The Tree-and-shrub Savanna is the largest biome and covers most of Namibia. This biome can be further divided into Broadleaved Tree-and-shrub Savanna and Acacia Tree-and-shrub Savanna sub-biomes, of which Otavi falls within the latter category. The Acacia Tree-and-shrub Savanna is characterised by 'large, open expanses of grasslands dotted with *Acacia* trees. The trees are tallest in areas of deeper sands in the east, with plant growth becoming progressively shrubby further west where the soils are shallower and the landscape is more hilly and rocky' The vegetation structure of the area is woodland that stretches north up to the border of Angola (Mendelsohn, et al, 2002).

6.4 CLIMATE

Climate variance and conditions play an important role in the design of shelter and the urban environment in general. Urban design elements can be used to mitigate impacts caused by local weather conditions or to utilise opportunities. As with many towns in Namibia, Otavi has the potential to capitalise on the sunny and warm weather conditions experienced throughout most of the year. However, climatic conditions also bring along a number of challenges that need to be addressed by planners and developers.

The town of Otavi is situated within the **higher rainfall** area of the country where annual rainfall is between 500-550mm. Rainfall is between October and April, with the wettest months January and February. The region is also prone to high levels of **humidity**, with the most humid month (March) recording between 80-90% humidity.

Average annual temperature can range from 20-22 ^{o}C with **maximum temperatures** of between 32 -34^{o}C during the hottest months (December and January) and **minimum temperatures** of 4-6 ^{o}C during the coldest month in July (Mendelsohn, et al, 2002). The region only has about 1 -5 days of frost per year, which is an advantage for growing of crops.

Namibia's **solar energy** potential is amongst the world's best. At an annual solar radiation average exceeding 6 kWh / m^2 per day, this resource has a most significant potential for the supply of energy. Except for photovoltaic electricity and water pumping installations on a limited scale, the use of solar energy for power generation in Namibia remains largely untapped. Solar energy, as a reliable source of renewable energy, can provide significant quantities of 'green' energy for the long-term sustainable development at local and the national levels. Otavi falls within the solar radiation category of 6.0 to 6.2kWh/m^2 with an average 9 – 10 hours of sunshine per day. This makes the town ideal for the expansion in the use of solar technology, both in the case of PV panels for the harvesting of electricity and solar collectors for the harvesting of heat.

Data on the dominant wind direction in a particular locality is important for town planning purposes. The wind direction informs town planners and developers on the location of polluting activities including noise and dust (e.g. stone crushers), odours (e.g. sewerage works), pollutants (e.g. garbage removal sites), etc.

There is only little scientific and official **wind data** available for Namibia. The only recorded data available for the areas is from the Otjikoto Gold Project that measured wind direction between 2007 and 2013. The Otjikoto Gold Project recorded the predominant winds being east and south-easterly (SLR, July 2013).

6.8 SENSITIVE AREAS

No Go' Areas

No-Go Areas are areas that, as a result of various factors, should not be developed. Any subsequent development in this area is therefore deemed to be sacrificial, meaning that something of value will be lost.

At the townlands scale, 'no-go' areas can be identified as the areas of natural beauty, environmental sensitivity or aesthetical quality. These areas should be left free of development to allow or alternatively low impact development.

There are three such areas in the Otavi townlands:

Otavi Mountains

The most prominent feature in the Otavi townlands area is the Otavi Mountains. The Otavi Mountains are a dolomitic massif rising up to 2,090m, some 500 m above the surrounding plains ((Christelis & Struckmeier, 2001). The Otavi Mountain Land is a watershed draining westward into the Ugab River catchment, northwards into the Etosha Pan, south and eastwards into the Omatako Omuramba.

Otavifontein and boreholes

The area surrounding the Otavi spring, is a no-go area. The Otavifontein (spring) is the source of water for the town of Otavi and any pollution of this underground source will have dire impact on the town. The NamWater boreholes in vicinity of the spring are also crucial to the water supply of the town and it is important that no development takes place in proximity of these boreholes that can compromise the underground sources.

Existing Sewage Treatment Plant

The area of the existing sewage ponds and a 500 metre radius (used as a 'rule of thumb' to discourage children from playing and swimming in the ponds) should also be kept free of development. The Council is investigating relocating the treatment plant to the western side of town and the new treatment plant and 500m radius will then become the no-go area.

Tread-lightly areas

Tread-lightly areas are areas in which known constraints exist and that although the areas can be developed, any development taking place should be mindful of the identified constraints.

Flood

As within any urban context, the potential of flood causing damage to property exists. Otavi does not have major flood problems, but the area where the street crosses the railway line towards Khoaeb is prone to flooding. This is more likely related to poor stormwater management and can be addressed by the Council through a stormwater management system.

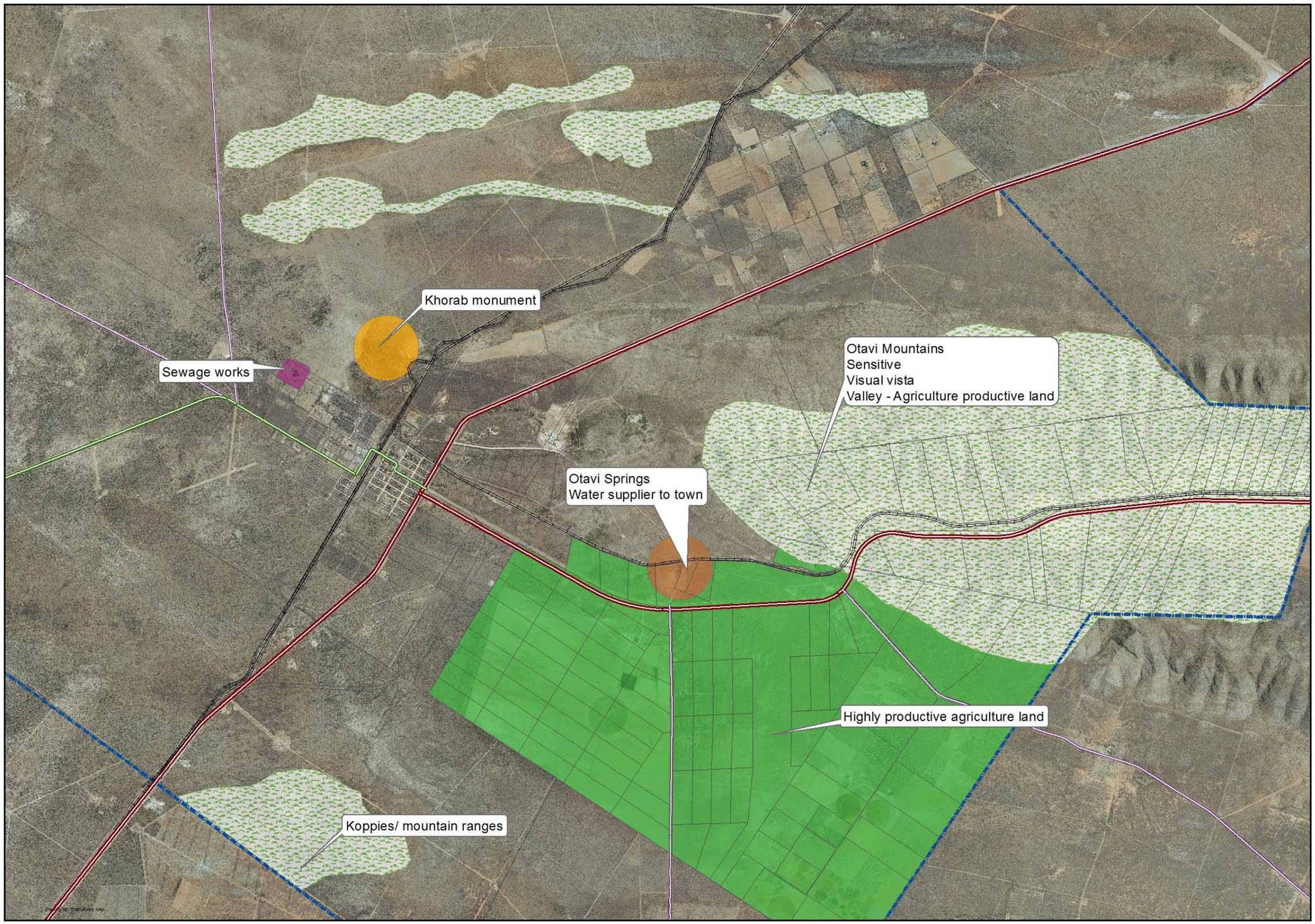
Landfill site

The landfill site needs to be properly enclosed to prevent rubbish from becoming scattered over the terrain. The fencing needs to be wildlife proof to prevent wildlife from entering the site. The enclosure should also be controlled for safety and health reasons. Illegal dumping in proximity to the site should be strictly prohibited.

Khorab Monument

Khorab Monument is a national monument and developments within town and vicinity should take the monument in consideration and attempt to link developments with the monument.

6.9 CONCLUSION


Khorab monument
Sewage works
Otavi Mountains
Sensitive
Visual vista
Valley - Agriculture productive land
Otavi Springs
Water supplier to town
Highly productive agriculture land
Koppies/ mountain ranges

CHAPTER 7 – DEMOGRAPHICS AND SOCIO-ECONOMY

The next chapter will provide some understanding of the demography of the Otjozondjupa Region and the town of Otavi. As the latest census mostly deals with providing a regional overview, these will be the more prominent statistics in the report.

7.1 POPULATION

The population of the Otjozondjupa Region has grown with 6.3% since the 2001 census to reach 143,903 in 2011. The population of the Otavi constituency reached 12,387 in 2011.

The population of the town of Otavi increased with 37.5% from 2001 to 2011 to reach 5,242 in 2011 (NSA, 2014).

7.2 DEMOGRAPHY

The Otavi Constituency has a population density of 1.4 people per km^2. The Otavi Constituency has a relatively intermediate aged population with a median age of 24 years (NSA, 2014).

A population is considered 'intermediate' when it has a median age of between 20 and 29 years. The male population is slightly higher than the female population in the Otavi Constituency with the 53.9% (male) and 46.1% (female). This can be attributed to the dominance of the mining and agriculture sector in the constituency (NSA, 2014). The average household size in the Otavi Constituency is 3.7 persons per household which is lower than the regional average of 4.2% and the national average of 4%.

7.3 TYPE OF HOUSING UNIT AND TENURE

Within the Otavi Constituency 43.2% of households live in detached houses; 18.2% in semi-detached houses and 19.9% in improvised housing unit (shacks).

Within the Otavi Constituency a staggering 52.8% of households occupied properties rent free, with only 25.8% of households being owners of their properties and 2.7% renting from the local authority.

7.4 SOURCE OF ENERGY FOR COOKING AND LIGHTING

The main source of energy for cooking within the Otavi Constituency was from wood/charcoal from wood (72.4%) and only 18% from grid electricity. (NSA, 2014).

Electricity is supplied to the town of Otavi by Cenored. Cenored buys electricity from NamPower and then supply these to the various contracted towns.

7.5 ACCESS TO WATER SUPPLY AND SANITATION

The main source of water for drinking and cooking within the Otavi Constituency comes from piped water outside the house (45.3%) and 20.2% from public water pipes. Overall 92.1% of the households in the constituency have access to safe water (NSA, 2014).

7.6 WASTE AND GARBAGE DISPOSAL

In the Otavi Constituency 43% of households garbage is disposed of by burning and 18% by roadside dumping and only 9.6% disposes of their garbage by taking it to rubbish dump (NSA, 2014).

7.7 SOURCE OF INCOME AND EMPLOYMENT RATE AND LIVELIHOOD

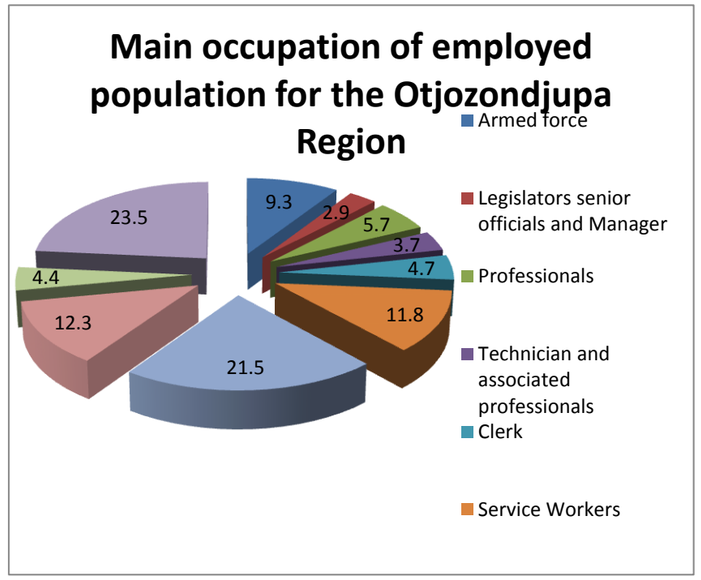
The main source of income of households within the Otavi Constituency is mostly from wages and salaries with 72.3% of households. The second main source of income is from farming with 7.4% of households obtaining their income from the farming industry.

The private sector remains the largest employer within the Otjozondjupa Region with 36.7% of the population employed by the private sector and 36.7% by the government sector.

The Otavi Constituency has an unemployment rate of 19.4%, which is much lower than the regional rate of 24.6%.

In the Town of Otavi, a variety of business activities can be found such as retail outlets, petrol stations, accommodation establishments, government offices, schools and a hospital. The local economy is small and perhaps the most vibrant economy is that of the informal business activities.

FIGURE 11: MAIN OCCUPATION OF THE EMPLOYED POPULATION WITHIN THE OTJOZONDJUPA REGION



Source: (NSA, 2014)

7.8 EDUCATION AND LITERACY RATE

The literacy rate for the Otavi Constituency is 73%, which is lower than the regional average of 83%. By 2011 across the Otjozondjupa Region, about 40.4% of the population had completed their primary education while only 19% completed their secondary school education and 4.1% completed some form of tertiary education. In the Otavi Constituency 47.5% of the population left school and 28.7% never attended school (NSA, 2014).

7.9 CONCLUSION

CHAPTER 8 – POPULATION PROJECTIONS AND SPATIAL GROWTH

There are two spatial growth scenario's foreseen for the town of Otavi:

- Status quo remains with moderate development taking place
- Council provides serviced land for investors and residents alike and attracts investors for the activities such as the industrial and logistics areas.

Population growth projections over the long term are difficult to make as they rely on a number of factors. To aid the Town Council in making decisions, two population growth scenarios have been developed, but caution should be applied when making decisions based on these projections.

The first projection shows the compound increases in population if growth continues to take place at the same rate.

It is thought that although the population growth will continue to increase, much of the growth is from rural - urban migration and therefore the town cannot grow at this rate indefinitely as eventually the rural population will stabilise at the point where no further rural urban migration will occur. When this will be is difficult to predict as it is dependent on a number of factors.

For comparison, a second projection indicates growth of Otavi if it continues at the national growth rate.

It is the consultants assumption that the growth of the town will fall somewhere between these figures over the long term, but in the short to medium term could be much higher.

It is therefore recommended that the Town Council plans for the higher figure over the short term, and assesses this on a needs basis as time goes on.

When using projections on the population figures, the following must be considered:

- The increase in population figures are estimates based on trends and not scientifically calculated growth rates.
- The calculation of future population figures for towns in Namibia makes projections from the actual rate with which the population grew between 2001 and 2011 (1991 figures are not available)
- We know that the household population of Otavi as measured in the census of August 2011 was 5,242 (NSA, 2014)
- The average household size of the population in the Otavi constituency is 3.7 persons per household (NSA, 2014)
- The Structure Plan makes recommendations for increases in density along activity corridors, and within central residential areas, however, as the majority of this land is privately owned and redevelopment of these properties requires investment, it is not possible to predict how quickly these areas will densify.
- One of the aims of the Structure Plan is to put Otavi in a position where it can be **proactively** delivering land, **before** it is required.

Given that the process from the start of the planning process to the completion of buildings is currently around three years, and the town does not want to be in a position after three years of running out serviced land, it is advised that Council start planning for serviced erven in 2016 to be ready for delivery in 2019 and this strategy is to be followed on a continuous basis.

Because accurate projections about long term population growth are difficult to make, in 2020 the Council must then assess:

i) If they are currently oversupplying land, in which case no further extensions need to be planned for delivery in 2020.

ii) If population growth has matched the population projections, in which case the Council can continue planning at the same rate.

iii) If population growth is growing much faster than the projections, in which case the Council should increase the rate of land delivery for 2020 and 2025 after which time the results of the 2021 census can be referenced to project future population growth rates once more.

8.1 ESTIMATING THE HOUSEHOLD POPULATION

To estimate the future household population, we have used three projections:

a) The first takes the existing household population of Otavi in 2011 (5,242) and multiplies it by the population growth rate of Otavi constituency as recorded between 2001 and 2011, which is 6.29% for the 10 years and 0.63% annually. This estimate projects that the population will grow at an annualized rate of approximately 0.63% per annum.

b) The second takes the existing household population of Otavi in 2011 and multiplies it by the population growth rate of Namibia (1.4%) as a whole as recorded in 2011. This estimate projects that the population will grow at an annualized rate of approximately 1.4% per annum.

c) The third takes the existing household population in 2011 and multiplies it by the population growth rate of Otjozondjupa Region as a whole as recorded in 2011. This estimate projects that the population will grow at an annualized rate of approximately 3.4% per annum.

The table below provides an overview of the various growth projection scenarios.

TABLE 1 : POPULATION PROJECTIONS FOR OTAVI

Population At 0.1% Constituency growth rate			Population At National growth rate of 1.4%			Population At Regional Growth rate of 0.63%		
Date	**Population**	**Household**	**Date**	**Population**	**Household**	**Date**	**Population**	**Household**
2015	5,263	1,422	2015	5,542	1,259	2015	5,375	1,344
2020	5,289	1,430	2020	5,941	1,350	2020	5,547	1,387
2025	5,316	1,437	2025	6,368	1,447	2025	5,724	1,431
2030	5,342	1,444	2030	6,827	1,552	2030	5,906	1,477
2050	5,450	1,473	2050	9,015	2,049	2050	6,697	1,674

TABLE 2 ESTIMATED POPULATION PROJECTION FOR OTAVI

Survey and registered erven	**Extensions**	**Year of registration (estimate)**
1,555	Otavi Proper; Ext 1; Ext 3; Khoaeb Proper; Ext 1; Extension 2; Extension 3	Existing
897	Khoaeb Ext 4 and 5; Otavi Ext 4	Mid-2016
2,951	Ext 5 to 11; 12 to ……	2020
5,403	**TOTAL**	2020

TABLE 3 PROJECTED AVAILABILITY OF ERVEN BY 2020

If we base the need for erven on the number of households and taking a conservative approach of regional growth the Council needs to provide for 1,555 erven in 2015; and 1,387 erven by 2020. The Council already has 1,555 erven surveyed and registered, with an additional 897 erven expected to be registered by mid-2016 (Khoaeb Extension 4 and 5 and Otavi Extension 4). Extension 5 to 11 which is in planning process is expected to provide for an additional 2,000 erven by 2020. Council also recently identified the planning of at least another 5 extensions which should be ready by 2025. This then leaves the Council by 2025 with approximately 5,600 erven. This is by far exceeding the projected **household** population of Otavi by 2025. Obviously utilising only the projected household numbers for the amount of erven needed are the not only variables to be used when calculating the amount of erven needed. One has to also take into account investment from households outside of the region wishing to invest; business investors wishing to invest and then cater for any unforeseen events such as mining activities or large developments taking place in the region or town.

8.2 KNOWN PLANNING APPLICATIONS

Council is in the process of planning Otavi Extensions 5 to 11, which will most likely provide approximately 2,000 erven by mid-2017. Council also appointed a consultant to undertake the planning for an industrial township and medium density erven to the west of Extension 4. It is expected that approximately 1,500 additional erven can be provided for by 2020 in these extensions.

8.3 SPATIAL REQUIREMENT FOR 2020 AND 2025

If the demand for erven is calculated on the estimated households by 2020 as per Table 1, it will mean that the Council will have excess erven available. If however, the demand for erven is calculated on the provision of erven from 2013 this calculates to almost 1 ½ extensions per year being planned (Khoaeb Ext 4, 5 and Otavi Extension 4). Based on this assumption and if this trend continues it will mean by 2020 Council needs to provide an additional 6 extensions. This is being met by Council by the planning being undertaken for Extensions 5 to 11 and the western extensions.

The demand for erven in Otavi is estimated at 80% for low income housing and the remaining 20% for upper- and middle income. (This percentile split is an assumption of the consultant. Town specific statistics are not yet available for Otavi regarding the difference in demand between low income and middle to high income housing, therefore the 80/20 split is the common trend that has been observed in other Namibian Towns.)

Therefore based on the assumption that by 2025 Council needs to provide another 3 extensions (approx. 900 erven), of which at least

- Low income at 80% = 720 erven
- Middle – upper income at 20% = 180 erven

Given the need for an additional 900 erven by 2025 it is estimated that the following spatial requirements will be needed by 2025:

Higher density, Low income spatial requirements:

720 x 330m^2 (average high density erven size) = 237,600 m^2

Plus an additional 35 % for non-residential uses (roads / infrastructure / Public Open Space etc) =**83,160 m^2**

Middle to upper income spatial requirements:

180 x 750m^2 (average middle - upper density erven size) = 135,000 m^2

Plus an additional 35 % for non-residential uses (roads / infrastructure / Public Open Space etc)

= **47,250 m^2**

So the spatial requirement for 900 erven by 2025 will be approximately 50 hectares*

8.4 SPATIAL REQUIREMENT FOR 2030

The total life span of the Structure Plan is up to 2030, therefore we should consider the spatial requirements of Otavi by that time if the current growth rate is sustained.

Considering that by 2030 Otavi can expect to have 2,049 households (at a National growth rate of 1.4% annually) and if we subtract the projected residential stock (at 2025) then it shows that there will be an oversupply of erven. As the household size and projected population are not the only measures to account for erven needed, the assumption of the previous section will apply, where the provision of 3 extensions in for every two years seems to the more realistic figure. As the Otavi Town Council would have exterminated its backlog by then the assumption would be to create 300 erven every two years. Which means between 2025 and 2030 an estimated additional 600 erven will be needed. This means for 600 erven:

Therefore, 600 erven:

- Low income at 80% = 480 erven
- Middle – upper income at 20% = 120 erven

Given the need for 600 erven, it is estimated that the following figures should be used:

Spatial requirements of 600 Erven:

Low income spatial requirements:

480 x 330m^2 (average high density erven size) = **158,400 m^2**

Middle to upper income spatial requirements:

120 x 750m^2 (average middle - upper density erven size) = **90,000m^2**

With an additional 35 % for non-residential uses (roads / infrastructure / Public Open Space etc) = **86,940m^2**

So the spatial requirement for 600 erven will be about 33.5 hectares by 2030*

*Please note that the sum does not take into account the spatial requirements for other uses, such as business, industrial and institutional uses which will be needed in support of any residential activities.

It is important when considering demographic data to be aware of the terms used. '*A household consists of a person or a group of persons who live together in the same homestead/compound but not necessarily in the same dwelling unit. They have a common catering arrangement (cook and eat together), and are answerable to the same household head. It is important to remember that members of a household need not necessarily be related, either by blood or marriage*'. (Source: Namibia 2011 Population and Housing Census Main Report, 2013)

SECTION II – URBAN STRUCTURE PLAN

CHAPTER 9 – THE STRUCTURE PLAN

The Otavi Structure Plan has the following overarching objectives:

a) To integrate the various developments
b) Support the business sector
c) Provide for a variety of land use options for the investor
d) Utilise the potential of the trade corridors for investment
e) Intensifying business area and corridors

Development in Otavi has been slow for many years. Since 2013, the development of the town has grown with investors willing to invest in town, the Council becoming pro-active in its planning approach and the realisation that Otavi is strategically located within two of the most important transportation corridors in Namibian and SADC.

9.1 BROAD SPATIAL VISION FOR THE TOWN

The town of Otavi wants to change its image from being a fleeting memory for people passing by or stopping for fuel at the Four Ways Truck Port to becoming a vibrant town with access to restaurants, shops and industries. The town wants to create employment through creation of industrial activities.

Town entrances

The town wants to attract the people traveling with the transportation corridors, bring them through town, rather than having them pass by the town. The concept is to create two entrances, on the B1, that is to notify the travellers that they have now entered the town of Otavi. Speed is to be reduced and development will start taking place on both sides of the B1. The entrances will be in the form of traffic circles which will give travellers the option of continuing straight to their destination or to leave the main road and enter the town of Otavi.

Activity spine and higher intensity uses

Travellers will then travel along an activity spine through the town. The activity spine will consist of a road with bus stops, bicycle lanes and landscaped pavements and will consist of a mixture of higher intensity land uses such as businesses, offices and higher residential activities. The activity spine will continue through the heart of Otavi – the old business area, where again a higher intensity of uses can be found. The uses will slowly taper off in terms of intensity until it reaches the second gateway/exit out of town.

Nodal development

Apart from creating corridors of intense use the Council also identified the creation of pockets of intensified use for higher densities, office and business use.

Industrial development

Land is available for industrial development. The Council has identified an area for industrial development in town. The position of the Council is to not only provide for residential needs but also to provide for employment creation within the town and thereby mitigating the poverty levels in town.

Intensified agriculture development

With the increase of the townlands area of the town of Otavi to include a number of farms the Council hoped to jumpstart development on these farms. By including these farms into the local authority boundary of the Council it opened up the various opportunities for development on these farms, be it intensive agriculture development or urban development.

Integrating and consolidating pockets of development

The railway line and the main road created a man-made barrier between the various developments over the years. The Council is of the intention to break down these barriers and integrate the developments on the western and eastern part of the town, with the town centre.

Intensifying, densifying and expansion

One of the challenges the Otavi Town Council faces is that the land owned by Council is almost fully developed. This means that Council has to adopt a strategy of intensifying and densifying the existing town as well as acquiring additional land for future development. It is expected that the main thrust for residential development will be westwards and north, while the industrial activities will mainly be to the south-west of town.

Curbing Urban sprawl

Large properties have been the norm in Namibia for many years. Unfortunately, large properties also means

- higher rates and taxes for the owners, making it unaffordable for large sections of the population
- higher maintenance costs
- higher water costs (if property has large gardens, it means large areas needs to be watered and with Namibia being a dry country, this is simple no longer an option)
- Less security – bigger properties tend to mean higher security costs
- cost of engineering services – larger properties lead to urban sprawl and this leads to higher cost to service such neighbourhoods
- Unsustainable – all over the world the norm of having large properties are changing. Urban sprawl also leads to higher personal vehicle usage, which means that the low income person that does not have personal transport must make use of public transport, which are non-existent in Namibian towns. They then have to rely on taxi services which are expensive, not always safe and unreliable
- Longer travel distances between development nodes (places of employment) because of urban sprawl, with fragmented and dispersed urban activity patterns. Such a dispersed pattern makes it difficult for a viable public transport system
- Leads to lower social cohesion.

Urban sprawl is a term that describes the continuous low density development without a clearly defined centre, usually encouraging care dependency and the segregation of land-uses. Urban sprawl is seen not seen as environmentally sustainable as it increases distances between land-use activities, increase the dependency on cars, it increase the expense of providing a future public transport system and it increase the cost of service delivery to developments further away.

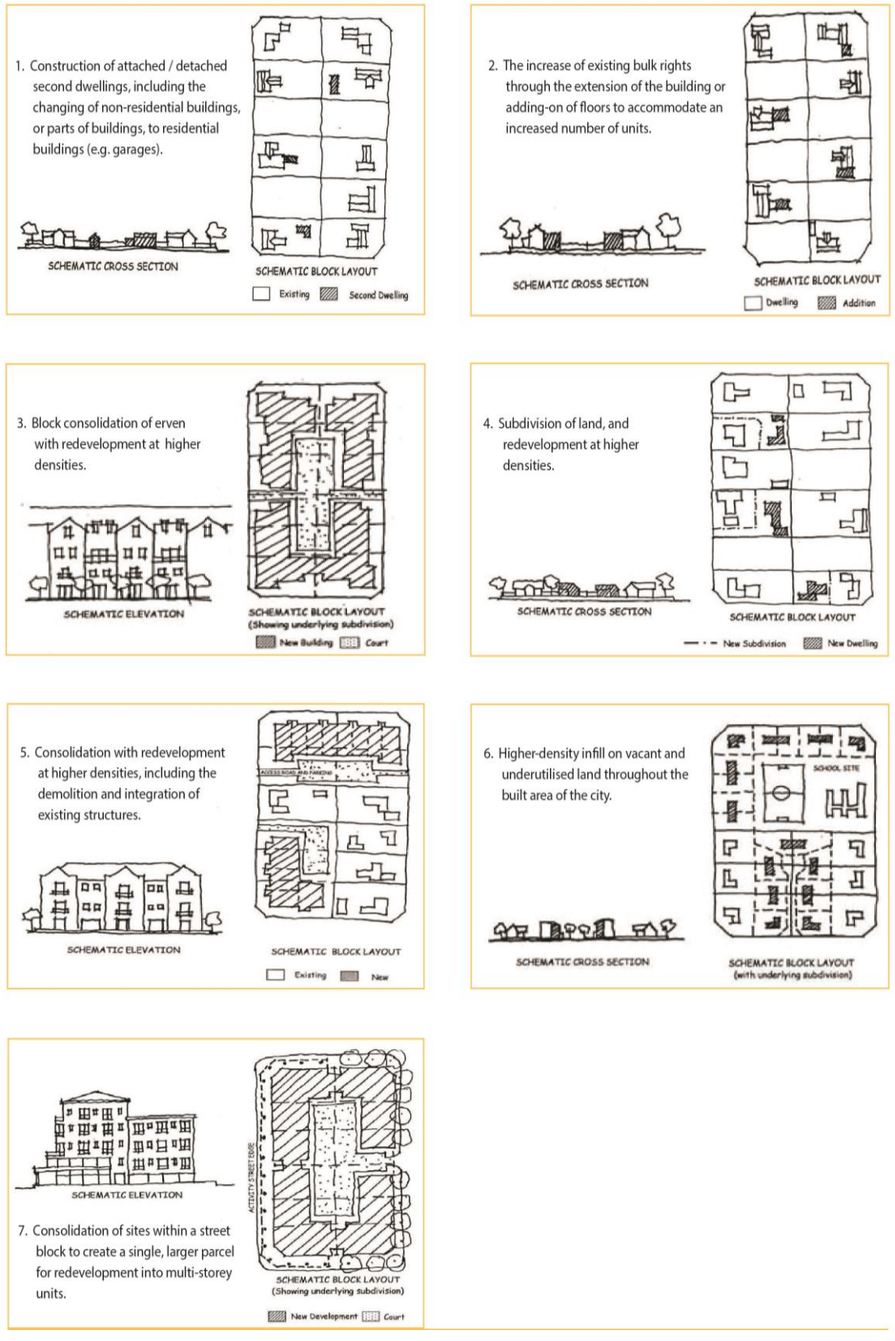
Low density developments are popular with many consumers and these can still be catered for within an urban development Densification in the Namibian context can refer to many different housing typologies and methods. It can mean:

- Intensification of larger residential properties by permitting a second dwelling on the property

- Intensification of larger residential properties by subdividing into an additional erf (creating attached row/ duplex housing
- Consolidation of properties for higher density developments
- Changing the density of residential properties for townhouse/ flat development

A function of increased density, buildings will need to be allowed to get taller, and to cover a greater bulk and allowed to offer a mixture of uses such as retail, office, institutional and residential uses. “In addition to increasing density, taller buildings have other passive advantages, such as the creation of shade and enclosure that can moderate the environmental conditions at street level, by cooling through shading and by providing a wind barrier” (SPC, 2015 Khorixas Structure Plan).

Figure 12 shows the different forms of densification that can be taken up in an urban area



Source: (City of Cape Town, 2012)

FIGURE 12 DIFFERENT FORMS OF DENSIFICATION

Caution: Densification in the Namibian setup does not refer New York, Dubai or Hong Kong. Each country has to assess their own realities and situations and come up with a strategy that works for the particular situation. Densification in the Namibian context will take on different forms and typologies and will most likely refer to 2 to 4 storey developments and not necessarily to a 10 to 50 storey development. Figure 2 below shows how the same density can be applied, but with different housing typologies. This shows that a building does not necessarily have to be 10 storeys high to allow for higher density. Buildings can also be 2 to 3 storeys in height but spaced differently.

Densification is **feared by many** because of the perceived negative impact of density. Many see the unattractive, monotonous buildings being constructed under the auspice of densification. **Densification does not have to be unattractive** and should not be feared. One of the principles of densification is to ensure proper building form, ensuring that such developments makes provision for open spaces; ensure that the architecture and typology of the building is attractive. This is also where a Town Council have the responsibility when approving the building plans.

Densification can be done either through **a) infill** or **b) compaction**. Infill is when open, vacant areas are developed. Compaction refers to the redevelopment of the existing properties to higher densities (densification) and may include subdivision and development of large properties within urban areas.

Densification does not mean blanket densification of the entire town. Densification is to allow for choice, is to allow for the investor the choice of choosing high or low density properties. It is important to allow for variety and choice within an urban context and to take into account aspects of recreation, agriculture, ecological, sensitive areas, conservation and low density and identify areas accordingly.

Densification should typically take place in target areas such as

- Town centres; development nodes; activity spines, proximity to major transport roads, areas where higher residential density development should be promoted. Typically higher densities will be placed in proximity to shops, offices and public transport routes
- In areas where density should be managed such as in residential suburbs

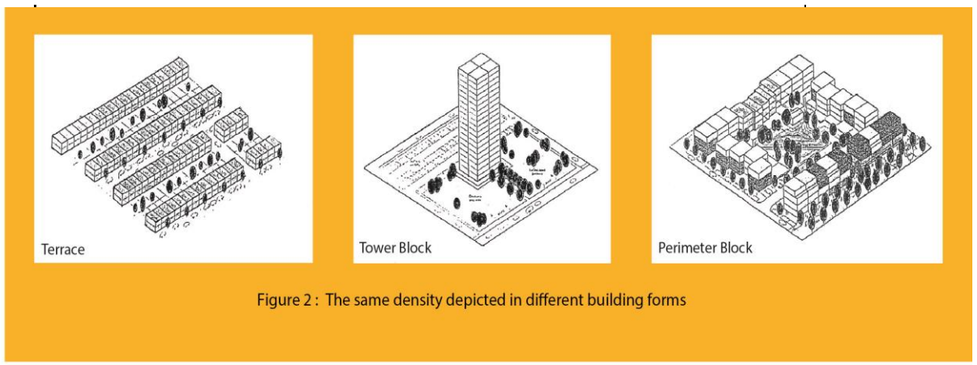


Figure 2 : The same density depicted in different building forms

Source: (City of Cape Town, 2012)

Densification and intensification should be discouraged in high priority agriculture areas, identified rural areas, conservation and sensitive areas and areas earmarked for low density development.

Density in Namibia is controlled by town planning schemes through the allocation of densities to residential land. Densities can vary from high density 1:100m^2 to lower densities of 1:900m^2 or 1 per Erf. Business and office activities are regulated by prescribing a bulk factor/ floor area ration for each of the properties. This bulk can vary from as low as 0.4 to as high as 3.0. For single residential zoned properties the densities are not allowed to go lower than 1:300m^2 due to the restrictive government measures put in place that prohibits single residential erven being smaller than 300m^2. Currently the only way to allow for residential properties to be smaller than 300m^2 is through rezoning to General Residential and creation of sectional title ownership.

Objectives of densification

Broadly densification guidelines are to ensure

- Higher levels of densification and intensification of different land uses in highly accessible localities, central business areas; commercial nodes
- Higher levels of densification and intensification along activity streets and corridors
- Densification in civic and institutional nodes
- Mobility access roads is to remain for mobility purposes
- Incremental small densification in areas away from these nodes

The need to beautify the town

The lack of paved roads and landscaping leaves a poor impression on visitors and investors. Council needs to adopt a policy of beautification within the town, providing landscaped streets and clean streets.

9.2 ANALYSIS OF MAIN ISSUES

Accessing the informants and constraints a number of things become clear:

- The high density developments within Otavi are most likely to expand towards the north and west of town, especially if the industrial area to the south-west of town takes place. This places Khoaeb extensions then in proximity to work opportunities. As Council has limited land available, the Council will have to start negotiating purchasing adjacent land.
- As Council land is limited, the focus should be on densification and intensification of the existing town in order to provide for much needed residential components.
- The various pockets of development, east and west MUST be connected and integrated. This will mean that Roads Authority and TransNamib will have to be approached by Council to make available more access points over these infrastructure components and to reduce restrictions. Eastern and western developments can be integrated and connected through the creation of activity streets and corridors.
- The proclaimed bypass can have a negative economic impact on the town if constructed. The Council is trying very hard to attract visitors into town and if the bypass is constructed, it will again cancel out all these efforts.

Based on these the Structure Plan will focus on three key concepts:

- Connectivity and integration

- Economic growth (industrial; better options for investors; logistics area etc)
- Recreation and open spaces

9.3 KEY CONCEPTS

The Otavi Structure Plan is based on the following key development concepts:

The beautiful Otavi Mountains to the east of the town is a gateway into the town. These mountains are to remain undisturbed and for low – key tourism development. Hiking trails, mountain biking trails and camping are some of the activities that can attract visitors to the town. Not only are the mountains ecologically important, it is also an important visual vista.

Otavi has a number of heritage buildings. By renovating these buildings and preserving the character it will contribute to place making in town.

Creating an entrance into town – by creating an entrance, travellers will realise that they have entered into a town area. Placement of traffic roundabouts at the southern, northern and eastern entrances of town will demarcate the town and inform travellers that they need to slow down. Tree planting and landscaping along the corridors and street lights and street furniture are to be encouraged along these corridors.

It is further recommended that the Council approach TransNamib to lease or purchase the areas along the railway that is vacant. These areas can be turned into landscaped open spaces rather than vacant waste lands.

Creation of activity streets and corridors – the identification and creation of activity streets and corridors is to encourage intensification and densification along these identified corridors. Higher intensity uses are to be located along the corridors with a tapering off of intensity the further one moves away from these corridors.

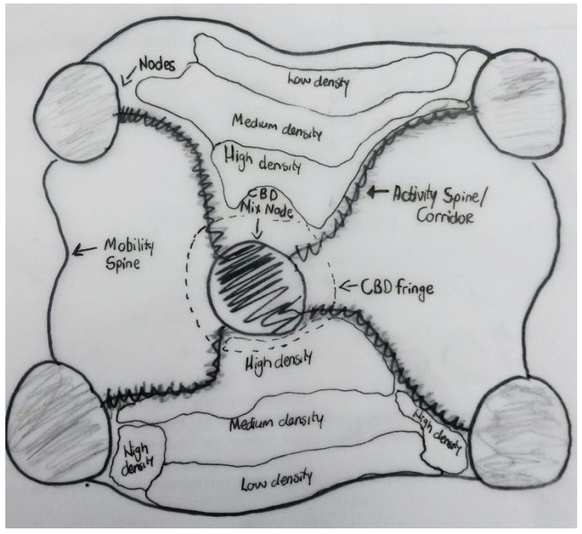
Curbing Urban sprawl: Urban sprawl is a term that describes the continuous low density development without a clearly defined centre, usually encouraging care dependency and the segregation of land-uses. Urban sprawl is seen not seen as environmentally sustainable as it increases distances between land-use activities, increase the dependency on cars, it increase the expense of providing a future public transport system and it increase the cost of service delivery to developments further away.

For clarity purposes the following concepts are defined

CBD – Central business area where the highest intensity of retail activities to be permitted.

Mobility spine (Arterial road) is a road linkage between activity spines and the main function is to ensure mobility. On such a spine office and business activities are to be restricted as this will impact mobility.

Mixed Use Nodes are areas with a unique mixture of land uses having higher intensity of activities and high density. These nodes are usually situated on major crossings which is well served by pedestrian and vehicle traffic. Nodes will be linked with each other by means of activity streets. Intensity and density should be higher than those of the activity street/corridor.



Speciality nodes are areas with specific functions such as industrial node; institutional node etc

Activity street/ corridor is a mixed use area along a major street. Typically this street should be pedestrian oriented with slow moving traffic. The activities are to incorporate a mixture of retail, offices, and residential uses with higher density than the surrounding area, but lower density and intensity than that of the mixed use nodes. Corridors are to link development nodes/ activity nodes and other areas of activity. Typically an urban area will have higher intensity corridors and lower intensity corridors.

Shop-house: term that refers to a building where the front or lower level is used for a shop and the back area or first floor used for residential purposes. A shop-house ensures that there is a link with the pedestrian world outside and brings vibrancy to a traditional business area that closes down after 5'o'clock.

The purpose of ***Corridors*** is not only for densification and intensification , is also to form part of the heart of a town and expanding this heart to become more accessible. These corridors must be beautified through creating streetscapes that are attractive, safe, accessible (pedestrians, vehicles and cycling), providing shelter and shade in harsh climates. It is the responsibility of the Town Council to ensure that developments also make provision for amenities such as open spaces, and beautification of streets when applying for approval of building plans on these corridors.

Table 4 Recommendations Categories of intensification and densification guidelines

Area and number on map	*Description of the area*	*Aim*	*Density and Intensity Guidelines*
CBD/ downtown **B12**	Retail, commercial heart of the town	Intensify and strengthen existing business district – be careful of creating secondary business districts within small towns	Higher bulk of 3.0; Mixture of retail, commercial, office and housing (density of housing 1:100) Developments to include open space provision and landscaping. Historical buildings and older building character to be retained.
Historic CBD **(still needs to be defined)**	Historical buildings within the CBD needing conservation	Preserving the character of the historical commercial area	Lower bulk (1.0) and residential densities of 1:250. Historical buildings are to be retained. New buildings to conform to regulations pertaining to historical usage
CBD fringe **B11**	Surrounding the CBD area a transition area with mixed uses – lower densities and bulk than in CBD	Act as a transition area between residential and business district and allow for expansion of business district	Bulk 1.0 and density 1:250. Mixture of uses from business, office, residential entertainment etc.
Activity nodes **(B4, B6, B7, B8, B9, B10)**	Mixed use nodes where a mixture of activities can be permitted	On activity streets or nodes	Business and offices with bulks of 1 to 2.0 (allow for residential component above ground level)
Sub-urban nodes **B1, B2, B3, B5, B13, B14, B15)**	Mixed use nodes where a mixture of activities is to take place	Allow for smaller neighbourhood nodes to develop – care to be taken when allowing large commercial	Residential Density 1:250 and Office Bulk 1.0 . Only local businesses in this node with Shop-houses along major streets. The larger commercial and retail to be established in CBD
		activities so as to ensure that the town CBD remains vibrant and alive	
Mobility spines (B1-Trunk road)	Major road through town	To create mobility route through town	Preferable no office or business activities alongside this spine (except in selected nodes).
Major Activity Street	Along major streets (north south corridors and east west corridor)	Creating vibrant streets	Office and residential mixture (only local business – no large retail and commercial) Density 1:250 and Bulk 0.75
Secondary Activity Street	Along secondary streets	Creating vibrant office, shops and residential areas	Offices and residential mixture with bulk of 0.5 for office and 1:250 for residential. Shop-house typology supported.
Shop-House	Corridors, CBD, Activity Streets	To create a vibrant area whether day or night	Along corridors and within business areas
Residential neighbourhoods R1	Khoaeb Extension 3, 4 and 5. Higher density areas		Densities of 1:300 with supplementary dwelling unit for rental (if want to alienate supplementary dwelling –must rezone)
R2	Khoaeb Proper and Extension 1	Higher density area	Densities of 1:300 with supplementary dwelling unit for rental (if want to alienate supplementary dwelling –must rezone)
R3	Khoaeb Informal area	Highest density area	Needs to be formalised – densities of 1:250
R4	Otavi Extension 3 – currently low density with large	Incrementally densify the area	Densities of 1:600

Area and number on map	*Description of the area*	*Aim*	*Density and Intensity Guidelines*
	properties. Owners starting to subdivide		
R5	Otavi Extension 4 and southern part	Incrementally densify the area	Densities of 1:450
R6	Higher density node next to business node	Higher densities for flats, townhouse, duplex flat development	Densities of 1:100
R7	Low density development	Further away from business and work opportunities	Densities between 600 to 900
R8	Medium density	Incrementally densify the area	Densities between 300 to 450
R9	Medium density along activity street	Incrementally densify the area	Densities of 450
R10	Higher density along railway and activity street	To increase density along the activity street	Densities of 1:100
R11	Higher density node	Increased densities in the suburban node of Extension 11	Densities of 1:250
R12	Low density node	Retain low density for a low density neighbourhood	Densities 1:900

CBD Precinct

Intensified business activities with activity streets tarred and landscaped pavements. This is the entrance into town and the first impression visitors will have to the town. This area needs to be clean and welcoming to visitors.

Strengthen the existing business area and provide for growth by identifying an extended business area where the maximum bulk of a business use in this area can be 3.0. Lower bulks can be permitted. The bulk of 3.0 are to answer the request from Council to allow for higher buildings in the town centre itself. The land uses in this section will be mixed use of nature, with predominantly business activities. Residential use in the section is to be encouraged to higher densities of 1:100. Lower densities will also be permitted. It is advised that the two activity street in the main business area is to be beautified by tree planting and defined pedestrian and cycle lanes. Higher residential development has to provide open space amenities within the developments as well as undertaking the paving of the pavement on the street front, with tree planting. The area must be clean, well light at night and no donkeys, cattle or goats are to roam this area.

CBD Fringe Precinct

South of the business district will be the business fringe where slightly lower intensity activities can be permitted. The objective of this area is to act as an expansion of the business district by allowing for business and office activities with a bulk of 2.0 to take place. Predominantly the area is to be more office and higher residential oriented, with business uses oriented on the activity street. Consideration will be given for properly motivated business applications.

Otavi Activity Street Precinct

- Properties along the Activity Street are to be densified with densities of 1:100 being permissible.
- The Shop-house concept is to be encouraged

Extension 4 Precinct

- The Activity Street passes through Extension 4. Erven adjacent to the activity street (B8, B9, B10) is to have higher intensity uses, with higher office and business bulks. Bulks of 2 for business activities within the small business node and bulk of 0.75 for offices to the north of the activity street. Light Industries with a bulk of 1.
- Residential component in Extension 4 can be incrementally densified by allowing subdivisions and densities of 1:450. Please note that the rezoning process still needs to be followed if the current density does not allow for subdivision.

Extension 3 Precinct

- Extension 3 currently has densities of 1:900. The objective is to incrementally densify the area by allowing densities of 1:600 in this area. Already a number of properties have been subdivided as the erven are quite big.
- Three activity streets (west, south and east of Extension 3) have been identified. Along these corridors higher intensity uses with bulks of 0.5; 0.75 can be permitted and higher densities of 1:450.

Khoaeb Extensions

Khoaeb is predominantly higher density with densities of 1:300. As Khoaeb is already relatively dense compared to the rest of the town it is not advisable to further densify the Khoaeb extensions with the exception of the General Residential properties in the area. One larger business node has been identified within Khoaeb Proper where higher intensity business and office activities can be permitted. The Old Single Quarters will be changed into a SME market, which is close to the business node. Erf 139 Khoaeb Extension 1 will be subdivided for a church node. Khoaeb Extension 3 and Extension 5 will have small business nodes that are to serve the neighbourhoods. Bulks of 0.75 can be permitted within this node. Densities of 1:150 for the General Residential erven in Khoaeb can be permitted.

Institutional

Four Institutional nodes have been identified. I1 (Erf 139) is currently being subdivided for the purpose of creating erven for churches. I2 consists of the community hall and the doctors consulting rooms. I3 and I4 are proposed institutional nodes on the area bought by Council. This will compliment to the proposed hospitality and conference centre in the same area)

Logistics Area (L1 and L2)

The two areas on the eastern gateway have been identified for a logistics area. This can include anything from a techno park, hospitality, service industries, warehousing and so forth. This is to compliment trade to Angola and other SADC neighbours.

Activity Spine

The main activity street has the objective to intensify uses. These activity streets are the entrances into town and should be paved and beautified with natural gardens and landscaped streets. Activities along these major activity streets will have higher intensity uses such as offices with a bulk of 1; higher densities with a density of 1:100.

Activity street

The activity street will have lower intensity uses than the activity spine. Along these streets activities such as shop-houses, offices and higher residential activities are to take place.

Mobility spine (Trunk Road – B1)

The objective is for the Council to enter into an agreement with Roads Authority, where the trunk road between the three gateways is reduced in status. The road will remain the jurisdiction of Roads Authority but with fewer restrictions on the road, with four way stops and traffic circles to regulate and slow down traffic. With developments taking place on both the eastern and western side of the trunk road there is a need to integrate these developments and the only way to do that is to incorporate the trunk road into the street network of town. Thirdly – there should NOT be a bypass for the town. The aim is to keep the traffic from being diverted – to create opportunities for the traffic to stop and invest in the town. Access onto the trunk road will still be restricted with only certain points allowed and no direct access.

9.3.1 ROADS AND CORRIDORS

Objective

- Promote connectivity
- Promote increased densities and intensities of land uses
- encourage through-traffic that will support and re-inforce the range of land use activities along the corridor
- Do-away with the term Bypass and re-model the current Trunk Road to be mobility and access oriented
- Creation of a cycling route.

The main objective is to integrate the various town developments. This can be achieved by creating connectivity through planning of different road hierarchies for different activities. It is important to have different street/ road types for different activities. Ideally heavy traffic should be diverted from the neighbourhood streets and be linked with their own street network that can provide mobility and access. The structure plan aims to identify different categories of street and road corridors from the mobility roads to activity streets.

Activity spine/corridor will be a street network linking activity nodes. Such an activity street will be bordered by higher intensity land-use activities, where pedestrians and vehicles have equal importance.

Activity street focus is to be more towards being pedestrian friendly.

In the case of Otavi, the B1 Trunk Road will be the mobility spine. An activity spine can simple be defined as "transport route that links major activity centres, whether these are national, regional or local". An activity corridor refers to the areas adjacent to a spine where intensified land use activities and higher densities will take place in support of the activity spine. The corridor will therefore be a mix-use area adjacent to a spine linking nodes of development with each other. These nodes of development can be local, regional or national. In the case of Otavi, the nodes will be local nodes within the town

Policy Guidelines and Proposals

- The Mobility Spine (B2 and B8) is to be remodelled. This means that gateways have to be created to announce to visitors that they have entered the town area. Certain speed restrictions and means of reducing speed will be introduced between these gateways so as to slow traffic down. To ensure connectivity and permeability, certain access points will be allowed on the mobility spine, but the main objective is to keep traffic flowing on this spine.
- The proclaimed bypass is to be de-proclaimed. The alignment of the bypass will remain as such, with the exception of the area passing over the existing NDF base, where a re-alignment has to be done. The bypass is not ideal for a town such as Otavi in terms of economic development. Having a bypass in a town such as Otavi that rely on passing traffic is not economically sustainable. Therefore the objective is to turn the proclaimed bypass into a "future mobility" spine. This it say that by 2030, if development has reached this spine and it becomes clear that the current mobility spine is no-longer viable because of increased traffic, the 2nd phase spine will be developed
- Re-routing passing visitors into the town of Otavi through the creation of two circles (north and south) that is to be linked by a high intensity activity spine, that is to encourage visitors to de-tour through the town, rather than the mobility spine.
- Along this activity spine, an activity corridor with higher intensity land-uses is to be encouraged. The activity spine is to be paved, landscaped and kept clean. Bus and cycling lanes are to be introduced on this spine. Speed along this spine is to be slower than along the mobility spine. On-street parking, four-way stops, traffic lights are all methods to reduce the speed along the corridor.
- The activity streets are streets with a certain purpose in mind, either it links various development nodes or the idea is to increase activity along these streets. Here activities such as offices, business and shop-house developments are to be encouraged. The main objective is to make these streets vibrant, interactive and permeable. This activity street will address connectivity by proposing an additional 3 level crossings over the railway line. As these are within the boundaries of the town, measures can be put in place for train traffic to slow down within these boundaries. Electronic warning systems can also be put in place between these sections.
- The proposed industrial road is to ensure that the industrial township to the west have access to a higher order road and that heavy traffic from the industrial area does not proceed through the town and residential neighbourhoods. The access to the industrial road is to via a bridge to be constructed over the railway.
- The 50year road link is merely a conceptualisation of where, ideally, the town is to be in 50 years' time. By then, the town should have expanded up to this road link and this road link will then become an activity spine.

FIGURE 13 TURNING A PAVEMENT INTO A MARKET AREA ON WEEKENDS

A pavement can easily be turned into a market area on weekends or holidays or special events. This is a cost effective way to bring weekend festivals to the town without spending large amounts on venues. Pavements can be interlocked, with different colours, thereby also creating different spaces.

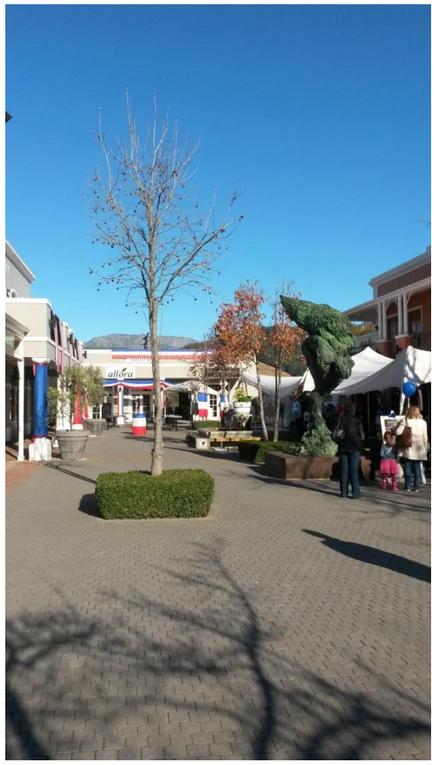


FIGURE 14 CREATING PUBLIC SQUARES

The creation of public squares is an important element of Placemaking in a town. Interlocking of such squares, planting of a few trees and outdoor furniture can add value to such an outdoor place.

Figure 15 Historical buildings turned into financial institutions

Preserving the character of historical buildings is an element of placemaking. Small, tasteful signage of the institution that does not overpower the historical element is important. Maintaining the outside façade of historical buildings contribute to the character.

Landscaping does not have be all green.

Interlocking an area, with trees at selected areas can contribute to the character of an area

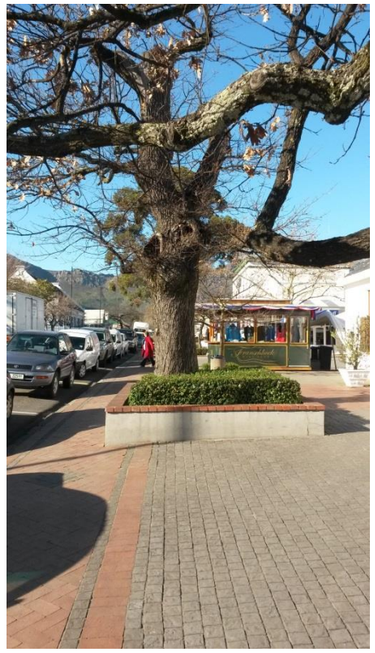


FIGURE 16 LANDSCAPING

Greening an area or landscaping an area can be minimalistic. Trees planted within an enclosement with a few hardy green shrubs can lend an element of “green” without being water intensive.

FIGURE 17 RESIDENTIAL STREET

Source: Christopher di Armani

The figure above shows a residential street with a vehicle lane, on-street parking, a curb with some greenery that split the vehicle and cycling lanes, thereby creating a protected cycling lane and pedestrian lane.

Source: www.migcom.com

Interlocking pavements with different coloured pavers ensures for a lively visual sensation. Planting of trees and , curbing of landscape areas adds to the visual aspect and also provides for distinction between cycling and pedestrian routes.

Source: www.camiros.com

Creating an median on an activity street can be done by including street lights, landscaping and pedestrian interlocked walkway.

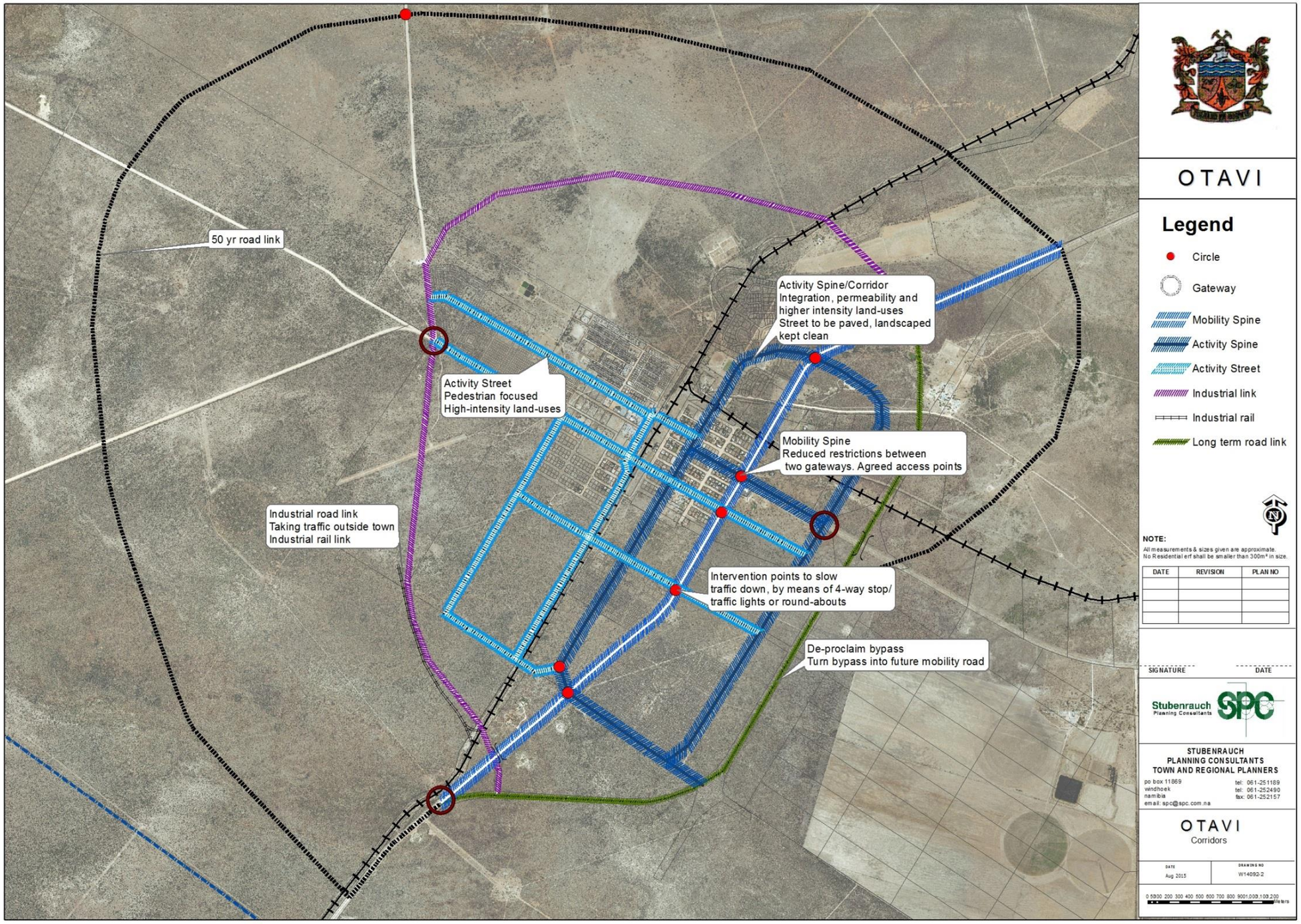


FIGURE 18: PROPOSED STREET AND ROAD CORRIDOR

Cycling route

The Otavi Town Council also identified the need for cycling lanes within town. Through a public-private initiative between the town of Otavi and B2Gold, Otavi will receive an array of bicycles for social and tourism use. To take full advantage of this opportunity possible cycle routes for the town was identified, which will essentially in the end form part of the transportation network.

The criteria used for the identification of the routes hinged on the following aspects:

1. The network has only been set out for the extent of the current and existing infrastructure and built up area of Otavi.
2. The cycle routes have been identified to be used by the local population, but may also serve as tourism function simultaneously.
3. The routes as identified in this document have been identified at a high level of analysis and therefore individual routes will be subject to detailed analysis and design before implementation.
4. The use of the bicycles will be regulated by the Council through a bicycle rental system.

Planning of cycle ways has to consider the existing road system and traffic intensity as well the main centres of attraction (e.g. major shopping facilities, cultural/historical attractions, social /community institutions, sport and education facilities). With this in mind three possible routes namely the Town Route, the Khorab Route and the Khoaeb Route were identified.

All Routes originate from the same point in the centre of town, identified as the Otavi Community Centre. This location will also be best suited for a rental station for bicycles and to serve as a tourism and information point. The routes disperse in different directions covering main needs of users - activity (Town Route), leisure time (Khorab Route) and residential service (Khoaeb Route).

For safety and security reasons, the rental bicycles should be numbered (serial number used to identify individual bikes) and could be coloured (bicycle colour corresponding with the route colour). Furthermore, bicycle flags can be used to easily distinguish the rental bikes and make them more visible to other road traffic and police alike, adding another level of safety.

Below is a brief description of each route and the mail function it will serve:

Town Route (blue):	This is the "busy-route", which is aligned through the main activity spots in Town. It links shopping areas, social, educational and sport facilities as well as cultural and architectural attractions. This diversity of activities and attractions makes this an appealing route not only for citizens, but furthermore for tourists and guests of the town.
Khorab Route (green):	This is the "Scenic Route", which offers a great opportunity to discover natural surroundings of the Town. Khorab Route values the existing town infrastructure, as it provides space and a healthy environment for NMT, which is often in conflict with motorised transport - cycling, walking or hiking and other related sport activities. It has also big potential to attract tourists, who may have guided tours on history and/or nature of the town. The route runs from the start-point to the North, passing the Khorab Monument, turning back into the new proposed Extension 5 and finally ends up back at the starting point.
Khoaeb Route (yellow):	This Route serves the north-western residential area of the town. It connects the main points of interest such as school, kindergarten and church. This is a "citizen" Route, which supports their daily activity and should engage more people to use bicycles.

Although these routes are clearly defined, each with its distinct purpose and function, the idea is to develop a well-established non-motorised transport network for Otavi with the end uses determining his own route depending on individual needs.

The following section is aimed at providing a broad brush overview of international best practice in use of bicycles as a mode of public transport.

Design of cycleway

"Policies for [...] cycling should incorporate five basic principles regarding trips: they should be direct, coherent, comfortable, safe and enjoyable." (UNEP, 2013: p. 8)

A cycleway can be designed in different ways:

- Cycle path;
- Cycle lane;
- Shared road;
- Green corridor

Appropriate cycleway should be selected in consideration of existing road situation and required dimensions of bicycle traffic.

A *cycle path* or cycle track is a separated path for the exclusive use of cyclists, physically set apart from motorised vehicles through grade separation or a median island. [...] The two main reasons for separating cyclists and vehicles through dedicated cycle paths are: the high speed of vehicles, and insufficient room and/or poor conditions for safe cycling on existing streets.

A *cycle lane* is a portion of a carriageway that has been marked for the exclusive use of non-motorised users. The separation from motorised traffic can be visual (painted markings with a standard 100mm edge line or a buffer zone) or physical (through bollards or raised kerbs). Visual separation measures are usually not enough unless there is strong traffic enforcement and education. For this reason, physical separation of lanes is desirable, although it is not always possible.

A *shared road* is a low-speed, sometimes kerbless roadway designed as a single surface for use by pedestrians, bicyclists

and low-speed motor vehicles. On a shared road, drivers and cyclists share the same space in a way that is safe for all users. Shared roads are also known as "Zones 30" since vehicles using them should maintain a speed limit of 30km/h.

A *green corridor* or green route is a dedicated off-street cycleway free from other motorised traffic. Green corridors can be built along footpaths in peri-urban areas, and can be used to overcome urban or topographic barriers (crossing rivers, streams or other topographic obstacles), increasing the attractiveness and convenience of bicycle travel. They can also be designed for recreational purposes, along attractive scenery like parks, streams, lakes, seashores, etc.
(UNEP, 2013: p. 26-29)

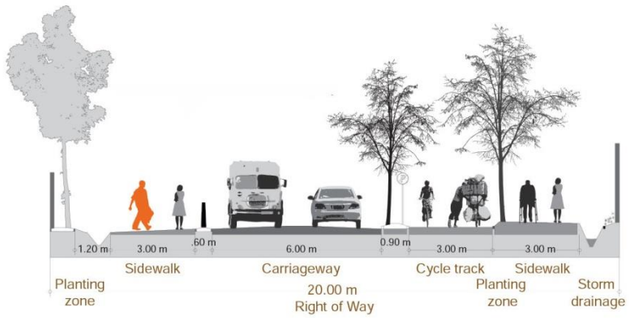


Figure 2: Bidirectional Cycle-Track

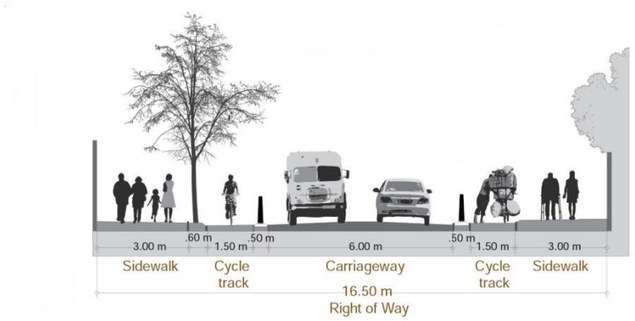


Figure 3: Unidirectional Cycle-Track

Signage

Independent of cycleway type the signage is essential for safety on the road for all road users. There are two categories of signage vertical (placed on vertical sign panels) and horizontal (printed on the road surface).

Basic cycleway information must include: lane delimitation (100mm wide), standard crossing signs, and the announcement of its use as a cycleway. The information or direction on each signage element should be clear and suited to its particular function. The scale should be appropriate for whom it is intended; at a scale that is easily visible to pedestrians and cyclists. For vertical signage, the distance and viewpoint of the reader should be taken into consideration; motorist eye level is between 1070-1200mm high, while pedestrian eye level is around 1740mm from the ground. The typeface and characters must be appropriate for the reading distance and the viewer's speed.
(UNEP, 2013: p. 34)

Figure 4: Horizontal Signage (City of Cape Town, 26.05.2015)

Figure 5: Vertical Signage (UNEP, 2013: p. 35)

Bicycle Parking Location

- *Bicycle racks should be permanently affixed to a paved surface, and must be installed in an orderly and neat appearance.*
- *Bicycle parking facilities should also be encouraged at schools, buildings, public transport facilities and universities within any urban area. [...]*
- *Bicycle parking facilities should not obstruct the pedestrian walkways but be located within the vicinity of each public transport station and should be placed outside the accessible path of travel.*
- *Bicycle parking facilities should be easy to find and as close to destinations as practicable. Numerous small clusters of stands throughout the city are generally preferable to one large parking area.*
- *Cycling facilities should be fit for purpose and easy to use. Stands that support the bicycle by gripping the front wheel alone should be avoided, because of the damage they can cause.*
- *Stands should have sufficient space around them to ensure they are convenient to gain access to [...].*
- *Public transport interchanges, places popular with tourists and other such attractors should be provided with bicycle parking facilities appropriate to demand.*
- *Long-term parking for regular users should ideally be within a secure access area and protected from the weather. The level of weather protection for other parking should be appropriate for the length of stay.*
- *(SMEC/UCT, 2015: p. 126)*

Figure 6: U-Shape bicycle parking
(UNEP, 2013: p. 33)

Figure 7: Rent Station
(UNEP 2010: p. 46)

ROAD SAFETY

- *[...] Motorists should ensure that they have 1.5m distance between your bicycle and their vehicle on the road at all times.*
- *No helmet = no ride. Make sure your helmet is properly fitted and worn correctly [...]*
- *Be visible. Wear reflective gear. If you plan on riding after sunset or before sunrise, place flashing lights both at the front and rear of your bicycle.*
- *Carry your emergency details with you. Have your contact details with you at all times in case of an accident.*
- *Keep left, single file. Cyclists should always stick to the left of the road to make way for motorists and keep the 1.5m distance. Also remember to ride in single file.*
- *Obey all traffic rules. As road users, motorists, cyclists and pedestrians are required to obey all traffic laws – this includes making a full stop at an intersection.*
- *Tell a friend or family member. Always let someone know when and where you are going.*
- *Remember your manners. Indicate your intentions (for example if you are going to turn) and check that*

drivers have seen you. Make eye contact with them so that they know you are there, and thank them if they let you through.

- *Be prepared. If you are going to be cycling for a long time, make sure you have sufficient water and something to eat.*
- *Carry spares. A spare tube, tyre lever and pump are the bare minimum.*
- *Be vigilant. Ride in groups or with other people. If you are feeling unsafe, turn back.*
- *Check your bicycle before you start your trip. Check for anything that may cause a flat tyre; also check your brakes and check for any loose nuts and bolts.*

(City of Cape Town, 26.05.2015)

BICYCLE ROUTES

OTAVI

LEGEND

- Erf Boundary
- Future Erf Boundary
- Railway Line
- Main Road
- Farm Ptn Boundary

PROPOSED BICYCLE ROUTES:

- Town Route
- Khorab Route
- Khoaeb Route
- Rental Station
- Level Crossing
- Center of Attraction
- CBD
- School
- Kindergarten
- Library
- Hotel / Guesthouse
- Police Station
- Retail
- Sport
- Church
- Medical Centre
- Hall
- Khorab Monument

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PROJECT TITLE

OTAVI
Proposed Bicycle Routes

DATE	DRAWN	DRAWING No.
May 2015	IR	Cycle Routes

SCALE

0 50 100 200 300 400 500 Meters

9.3.2 BUSINESS AND INDUSTRY

Objective

The Otavi Town Council realised the need for employment creation and economic development in town. To support the objective of creating opportunities from informal to formal businesses, the Council has identified a number of business nodes, a logistics area and will be planning an Industrial township.

One of the key factors in attracting investors is to provide them with a choice, whether it is for an informal investor or a formal investor. Secondly, an opportunity needs to be attractive for an investor. Without municipal services, an investor will not invest and it is therefore key that Council provide quality services within the town.

The Council therefore wants to provide:

- Business and industrial erven for the town
- Remodelling of the current town model by identifying areas for higher intensity uses, densification and providing different choices of land-use activities.

Policy Guidelines and Principles

- The current industrial area in Extension 3 is almost fully developed. Council has earmarked the development of an industrial township towards the south-west of town for Light Industrial and Industrial activities.
- A larger area on private land has also been earmarked for future industrial development. Once the Industrial development on the Portion 3 of the Farm Rentes (shown as Ixxx on Figure xx) has been fully developed, the Council can then consider purchasing a portion of the the farm to the south for Industrial development. However, Phase 1 of the Industrial node must first be fully developed before Council start with Phase 2.
- Sales agreements on business and industrial erven must state that the new owners have to develop within 2 years. Failing to develop within 2 years will result in increased levies of 10% annually. This is to encourage investors to develop the properties and to prevent a situation as experienced currently in town where erven has been laying vacant for more than 20 years.
- Sales agreements on industrial and business land bought from Council are to stipulate that if the owner wants to sell the property within 3 years, the Council is to get first option on buying of the property. This is to prevent land banking and speculation that leads to long periods of no building.
- Erven situated along the activity streets and within the activity nodes are encouraged to rezone to General Business with a bulk of 0.75. The betterment fee paid for the rezoning can be used by Council for paving of pavements and landscaping of the area.
- 20 to
- Informal business and trade is an important supporter of livelihoods for the low income sector. The structure plan realises this and encourages the informal trade in a healthy and sustainable manner. Illegal trading and vending on sidewalks that causes a nuisance or health risk is however not supported by the structure plan. The structure plan rather encourages the informal trade within a formal setting such as a SME market. The SME market in Khoaeb and Otavi shown as LBN8 will be the areas for informal trade.
- Selected small informal trading within the CBD area can be allowed with permits from Council. Such permits are to regulate the vending activities in terms of products, hours of operation and cleaning of the area daily.
- In order to encourage higher investment opportunities, the Council has to become transparent and accountable in selling of business erven. The residents of Otavi should be able to invest in the town if they are aware of these opportunities. Marketing and information sharing is key to the development of town.
- One of the biggest factors an investor looks at is the level of services within a town. If the services are not sufficient or non-existence, an investor will not invest. The Otavi Town Council is to ensure the servicing of the business and industrial areas with good quality
- Landscaping, tarring of streets and beautification of the town is essential to attract investors. Council needs to undertake a clean-up of the town annually and to budget annually for landscaping and tarring of the streets.
- Council and the business community need to find common ground to work towards the development of the town. Establishing a local chamber of commerce in town can help to breach the current “gap” between the Council and the business community.
- Identifying different business models for the town in order to provide choice for investors, local and national. This is done through creation of neighbourhood mix-use nodes with bulk of 0.5 or 0.75 and allowing for shop-house mix-use developments along major activity streets/ corridors.

CBD:

- Expansion of the current CBD area by allowing for rezoning of properties to Business or Office with a bulk of 3.0 within the extended CBD area. The central business area (shown as CBD1 on Figure xxx) is to remain the hub of business activities. Here financial institutions; service providers, shopping centres and offices are to be encouraged. This area needs to be vibrant, alive and the centre of the town.
- The beautification of this area is important. Streets are to be kept clean, tarred and livestock to be kept out of this area. This mixed use area is to encourage business, office and higher density developments
- Allow for higher densities to 1:100 within the extended CBD area.
- Allowing for shop-house type developments along the activity street in Otavi Proper.
- CBD2 as shown on Figure xxx shows the 2nd phase of the CBD expansion. Once the CBD1 area has been developed to its potential, this area is to be encouraged to intensify and densify. In the short term higher densities of 1:250 and office rights can be encouraged.
- The area is to be kept clean, streets are to be paved and livestock to be kept out of the area. Landscaping along the activity spine and activity street ought to be encouraged. Developers are furthermore encouraged to maintain and beautify the street frontage of their buildings. Betterment fee paid during the rezoning process can be used by the Council for landscaping and beautification of the area.

Local Business Node (LBN)

The neighbourhood nodes are areas that have been planned as small business nodes that is to serve the community of the specific neighbourhood. These nodes will have a lower bulk than the central business area and higher density. Generally the idea is to allow for local business type activities and offices within such a node, where typically the shop-house concept will be supported in areas adjoining this node. The area should not contain large shopping malls or centres, as these are to be

established within the central business area. Typically a bulk of 1.00 for business and offices can be considered and residential densities of 1:250.

The Khoaeb LBNs will be small neighbourhood complexes within the Khoaeb that is to support local business and office activities with a bulk of 0.75. Here activities such as shebeens, corner shops, offices can be encouraged. Higher residential densities of 1:250 can be encouraged on erven surrounding this node. As these erven might not comply with the minimum erf size for General Residential erven in the Town Planning Scheme it is recommended that if higher densities are sought, erven are to be consolidated in order to comply with the 750m^2 minimum erf size. This minimum erf size was introduced to prevent the overpopulation of already smaller properties.

LBN 1 is the neighbourhood node within Extension 11. Here bulk of 2.0 for business activities can be encouraged. This node is on the entrance into town and care needs to be taken when designing buildings on this activity corridor. Buildings are to front the street, with landscaping a priority along the streets. This node will be business and office with a higher density node towards the north-west of the business node. The node is to be supported by a large open space that is to be developed as a central park for the neighbourhood.

LBN 2 is a smaller node within Extension 11 with a bulk of 1.00. LBN3 is on private land and identified as a higher intensity node where business and office activities with a bulk of 0.75 can be encouraged LBN4 is a larger business node within Extension 4 where business and office activities with bulk of 2.0 can be encouraged.

LBN 10 is a corridor where higher intensity activities such as offices and higher residential densities can be encouraged. Offices with bulk of 0.75 and residential densities of 1:250 can be encouraged along this spine. Shop-house developments are also encouraged along these routes.

Industrial node

The Remainder of Portion 3 of the Farm Rentes No. 783 has been identified for Industrial activities for the first phase of Industrial development. The industrial node will be a mixture of heavy and Light Industrial activities. An industrial road will link the industrial area with the main road and provide for traffic to go around town, rather than through town. An area for an industrial railway link has also been identified, which will link the industrial area with the national railway line. Roads within the industrial node must be between 25 to 30metres in width so as to provide for walkways as well as heavy traffic. The medium term phase development is to the south-west of town and on private land. The Council should aim to purchase this area by 2030 – if Phase 1 has been fully developed. This can be reconsidered by 2025 by accessing whether phase 1 has been sold out and developed by then. The long-term area is earmarked for 2050. The need to acquire this area will have to be assessed once phase 1 and phase 2 has been developed.

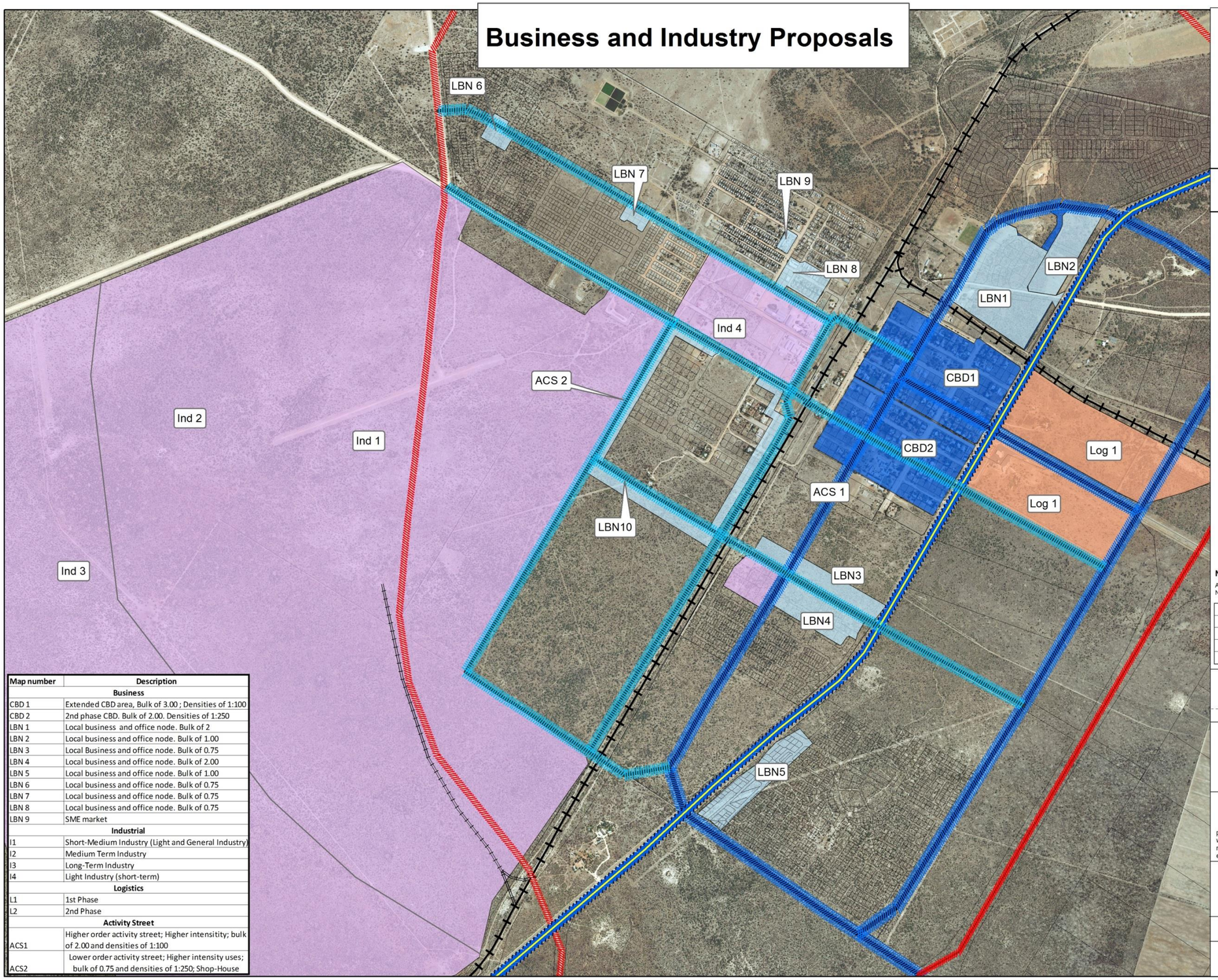
Logistics node

With Otavi located on two of the main transportation corridors (Trans-Zambezi and Trans-Cunene Corridors), it lends itself strategically to the establishment of a logistic node. Such a logistic node can include warehouse and storage facilities, distribution centres/ offices, trucking services and related activities. The area identified for the logistic node is next to the Trans-Cunene and Trans-Zambezi Corridor and next to the railway line, increasing the connectivity potential of the area.

General Recommendations

Betterment fee paid by developers for rezoning within these nodes ought to be used by Council for the beautification and development of the streets and pavements within the ara.

Business and Industry Proposals



Map number	Description
	Business
CBD 1	Extended CBD area, Bulk of 3.00 ; Densities of 1:100
CBD 2	2nd phase CBD. Bulk of 2.00. Densities of 1:250
LBN 1	Local business and office node. Bulk of 2
LBN 2	Local business and office node. Bulk of 1.00
LBN 3	Local Business and office node. Bulk of 0.75
LBN 4	Local business and office node. Bulk of 2.00
LBN 5	Local business and office node. Bulk of 1.00
LBN 6	Local business and office node. Bulk of 0.75
LBN 7	Local business and office node. Bulk of 0.75
LBN 8	Local business and office node. Bulk of 0.75
LBN 9	SME market
	Industrial
I1	Short-Medium Industry (Light and General Industry)
I2	Medium Term Industry
I3	Long-Term Industry
I4	Light Industry (short-term)
	Logistics
L1	1st Phase
L2	2nd Phase
	Activity Street
ACS1	Higher order activity street; Higher intensitity; bulk of 2.00 and densities of 1:100
ACS2	Lower order activity street; Higher intensity uses; bulk of 0.75 and densities of 1:250; Shop-House

OTAVI

Zones

- CBD
- Local Busines Node
- Industrial
- Logistics

Road corridors

- Activity Corridor
- Main Activity Street
- Secondary Activity Street
- Industrial link
- Long term road link
- Industrial rail
- Railway

NOTE:

All measurements & sizes given are approximate.
No Residential erf shall be smaller than 300m² in size.

DATE	REVISION	PLAN NO

SIGNATURE DATE

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OTAVI
Business and Industry Proposal

DATE	DRAWING NO
Aug 2015	W14092-1

0 50 100 200 300 400 500 600 700 Meters

9.3.3 CIVIC AND INSTITUTIONAL

Objective

The institutional and civic sector is to for the community of Otavi. The Strength of any town is within its civic and institutional sector. Otavi is striving to add additional institutional opportunities within the town to the benefit of the Otavi Community and has identified a number of institutional nodes.

Policy Guidelines and Proposals

Three institutional nodes were identified as part of the structure plan.

The first and smallest node is located within Khoaeb Extension 1 (Erf 139). This will become a small institutional node. Care needs to be taken when allocating land-uses within proximity of this node. Shebeens or bars should not be allowed within a 150m radius of the node. Developers should be encouraged to landscape and beautify the area. On-street parking, the planting of trees/ landscaping can change the area significantly.

The second and larger node will be within the newly acquired Portion 1 of Portion 7 of the Farm 783 and Erf 406 Ext 1, where provision is to be made for larger institutional properties for institutions such as VTC, Polytechnic or any other institutions. Figure 55 shows the proposed activities within this precinct with activity streets with higher intensity uses, a public open space system and medium density residential activities.

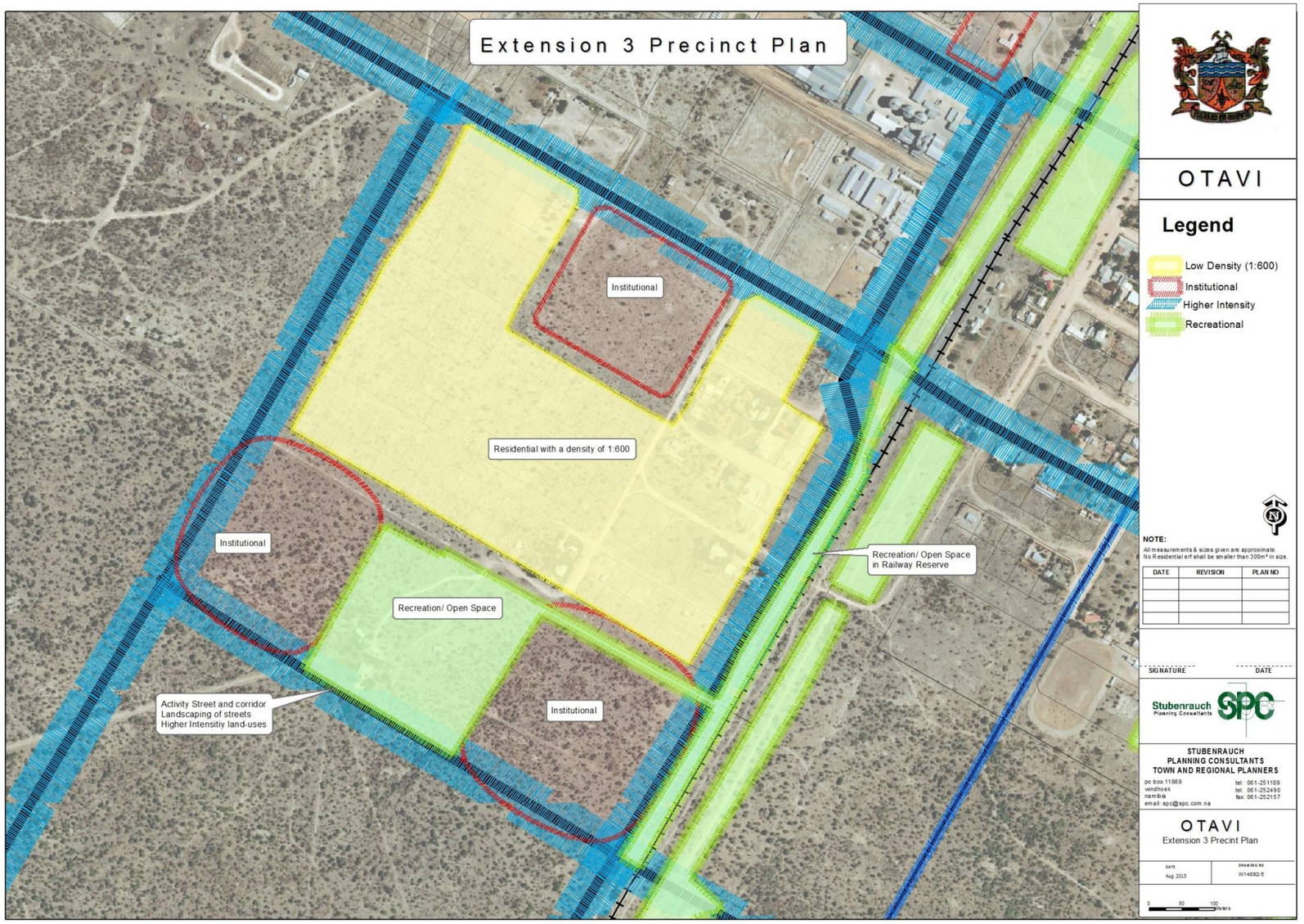


FIGURE 19 EXTENSION 3 PRECINCT PLAN

FIGURE 20

INSTITUTIONAL NODE

9.3.4 OPEN SPACES AND RECREATIONAL AREAS

Objective

To increase recreational and public open space and space in town for the benefit of the community.

The town has limited open spaces available as over the years Council has closed down these open spaces to increase the residential component. To ensure that the residents of Otavi has sufficient open space and recreational space it is paramount that provision is made for these space, even if these are only developed at a later stage.

Policy Guidelines and Proposals

Figure 21 shows the open spaces within the town of Otavi. These open spaces were created for recreational and beautification purposes and the Structure Plan propose that these open spaces not be closed down for urban infill. Rather the Council is to plan pro-actively for different land-uses and retain the open spaces. Retaining and developing open spaces and recreational areas are just as important to the welfare of the communities living in town.

With that said, it is equally important that Council develop these open spaces either in the form of play areas; desert gardens; informal soccer fields and not leave this areas open for dumping of rubbish or to become an eyesore and dangerous area.

It is the Council's responsibility, just as it is to provide services, to also provide social amenities and develop these amenities. This can be done by means of Council budgeting annually for the upgrading and development of one of these parks. Council should also encourage business enterprises and developers to become invested in development of these parks.

The railway reserve is empty land that can be leased from TransNamib for the purposes of open spaces. A linear park system can be created alongside the railway line, with benches, walkways or even desert gardens. This linear park system can connect the institutional node in Extension 1, with the recreational facilities in Extension 11 (sport stadium).

Future developments / extensions must provide between 5 to 10% of functional open space systems within new developments. Open Spaces created within township establishments are created for a purpose and the closure of such open spaces are not recommended. Higher density developments such as townhouse development should provide some aspect of communal open space for residents, or alternatively enter into agreements with the Council for development of an open space or even the development of the pedestrian area in front of the development. The ultimate goal is for Council and investors alike to start developing parks and recreational features within town

Rezonings within town is subject to betterment fee levies. Such betterment fees can be utilised by the Council for the development and maintenance of parks and open spaces.

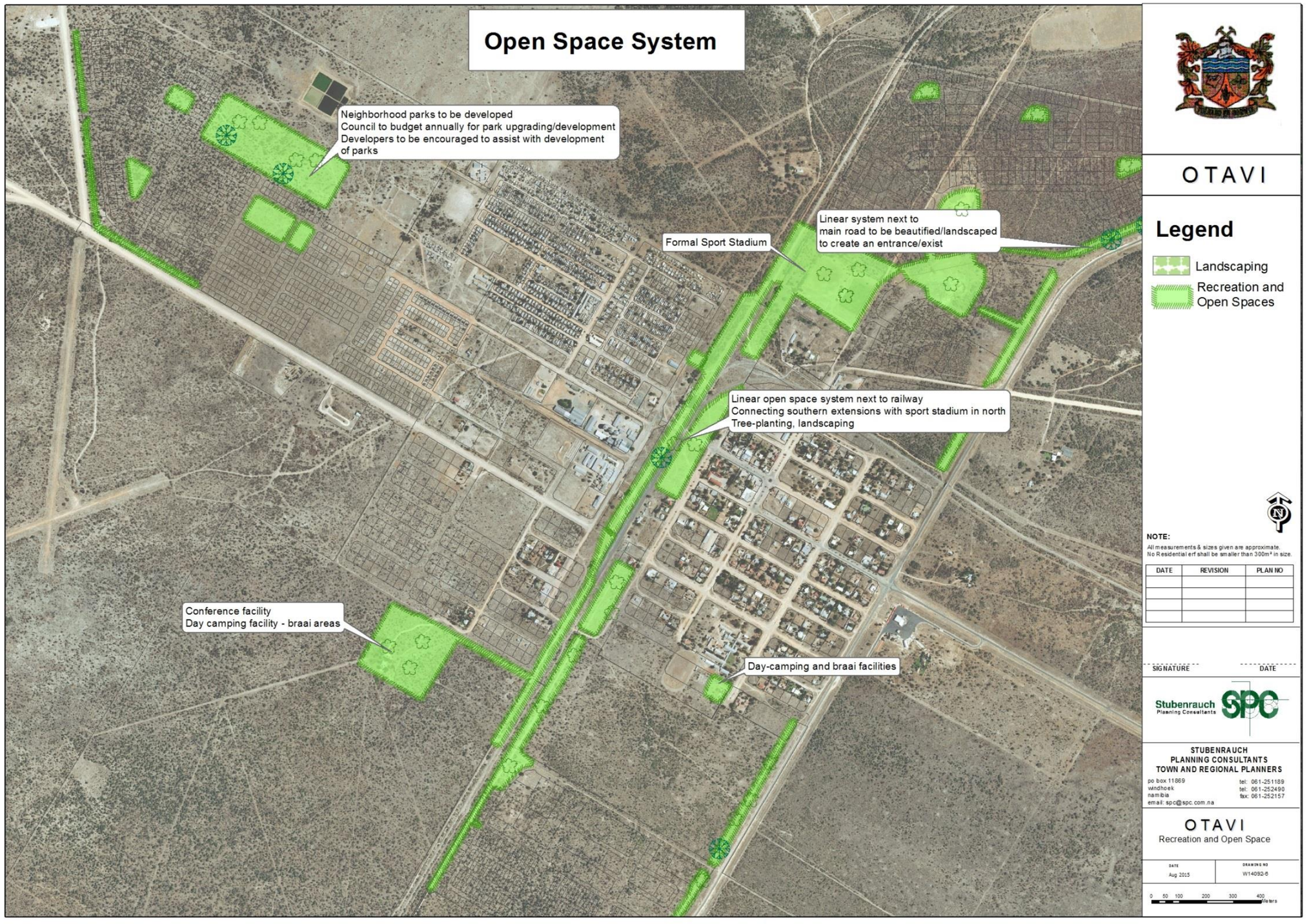


FIGURE 21 OPEN SPACE SYSTEMS

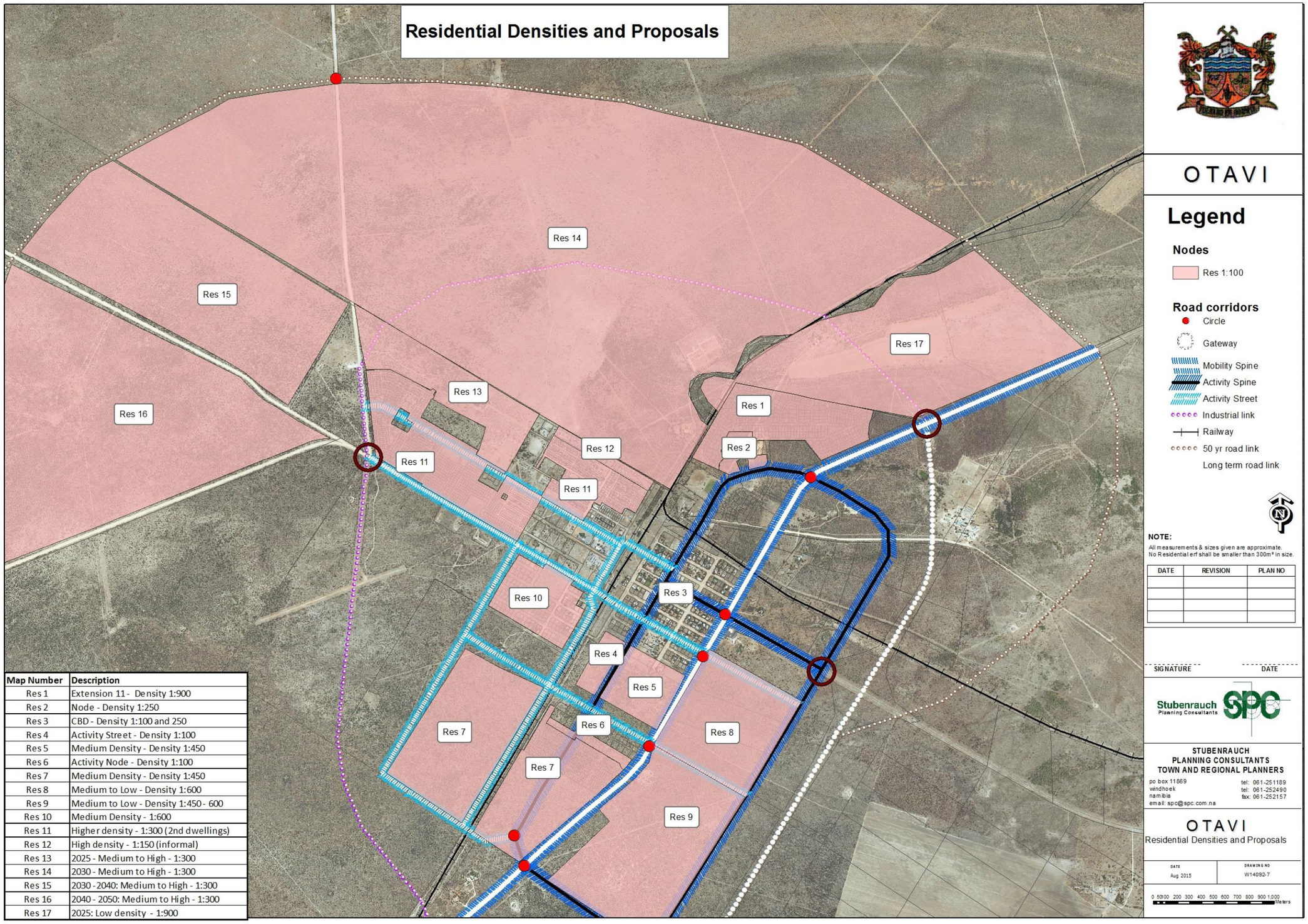
9.3.5 RESIDENTIAL COMPONENTS

Objectives

The main objective is for the Council to reduce urban sprawl and increase densities within town. One of the main constraints in the town is the lack of Council owned land, which means that Council has to plan pro-actively to purchase adjacent land and has to look at ways to reduce the town's footprint.

Policy Guidelines and Proposals

- Otavi Town has to provide for different densities and type of land-use activities in order to attract investors and cater for a variety of different investors – being from low income to high income investor.
- The structure plan recommends the overall densification of the residential neighbourhoods in Otavi. Densification does not necessarily refer to high densities of 1:100. In the case of Otavi it refers to densification of neighbourhoods to one higher category – for example: if an area had a density of 1:900, the recommendation will be to density the area to a density of 1:600. NOTE: the Structure Plan does not intend to take away rights or prescribe new rights; therefore owners of properties still have to undertake the rezoning process.
- Khoaeb Proper to Extension 2 is already relatively small erven with a dense population. It is therefore recommended that densification in these extensions only take place along the business nodes and the activity streets as identified. Densification in this instance will refer to encouraging erf owner to construct a second dwelling on their property which can be leased out or rezoned to a density of 1:150 for row housing/ duplex housing.
- Khoaeb Extension 3 to 5 is medium density and it is recommended that erven situated in proximity to the business node and Activity Street be rezoned to a density of 1:250.
- Otavi Proper is to densify and will form part of the new CBD area and 2nd phase business area of the town. Densities of up to 1:100 can be encouraged in this CBD and 2nd phase CBD.
- Owners in Extension 1 Otavi can be encouraged to apply for rezoning to densities of 1:600.
- Otavi Extension 4 will have medium densities of 1:450 with erven along activity streets and nodes recommended for higher densities of 1:100.
- The new extensions of Otavi will have lower densities with Extension 6 to 10 having densities of 1:600 and Extension 11, being the upmarket area, densities of 1:900.
- Pockets of higher densities on nodes will have higher densities of 1:100 or 1:250. Densities of future township establishments will follow a similar trend with higher densities situated alongside activity corridors/ nodes tapering off to lower densities further away from the nodes. Figure22 indicates the densities of the various extensions.
- Encourage the establishment of accommodation establishments such as guest houses and bed and breakfast establishment on single residential erven (in line with the Town Planning Scheme and the Tourism Board Act).
- Encourage the establishment of second dwellings, as per the Town Planning Scheme, on single residential erven
- Encourage higher density development on erven situated along activity streets and corridors
- Request developers of such higher density developments to provide recreational space within the development and to landscape/ beautify the street in front of the development
- When purchasing residential properties from Council, the sales agreement are to stipulate that the owner must develop within 2 years. This is to avoid the current situation in town where prime property has been vacant for the better part of 20 years. Such an agreement is to stipulate that if the owner does not build on the property within 2 years, the rates and taxes to be levied will be increased to be based on the value of a build property.
- Betterment fee payable for rezoning activities should be used by Council for construction of pavements and landscaping within the particular extension and development of open spaces within the neighbourhood.



Map Number	Description
Res 1	Extension 11 - Density 1:900
Res 2	Node - Density 1:250
Res 3	CBD - Density 1:100 and 250
Res 4	Activity Street - Density 1:100
Res 5	Medium Density - Density 1:450
Res 6	Activity Node - Density 1:100
Res 7	Medium Density - Density 1:450
Res 8	Medium to Low - Density 1:600
Res 9	Medium to Low - Density 1:450 - 600
Res 10	Medium Density - 1:600
Res 11	Higher density - 1:300 (2nd dwellings)
Res 12	High density - 1:150 (informal)
Res 13	2025 - Medium to High - 1:300
Res 14	2030 - Medium to High - 1:300
Res 15	2030 -2040: Medium to High - 1:300
Res 16	2040 - 2050: Medium to High - 1:300
Res 17	2025: Low density - 1:900

FIGURE 22 RESIDENTIAL PROPOSALS

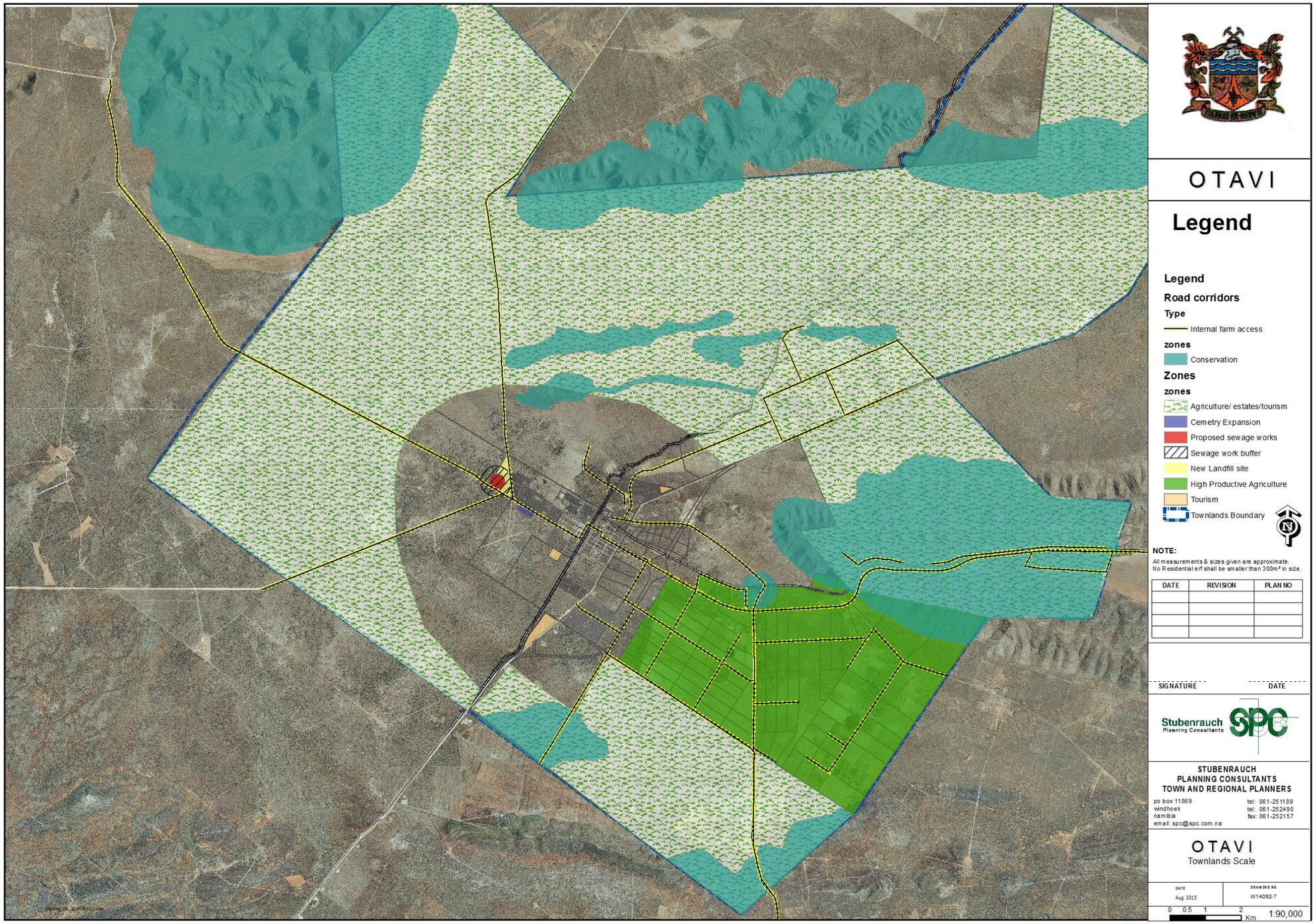
9.3.6 TOWNLANDS SCALE

Objectives

- Retain the productive agriculture areas for crop production
- Encourage nature estate and residential estate development on farms within the Local Authority boundary
- Encourage recreational activities
- Protect the sensitive natural resources

Policy Guidelines and Proposals

- Protect the Otavi Mountains and the Otavi Fonteine as conservation areas due to their ecological sensitivity.
- Encourage tourism establishments or low-key nature estate developments in the Otavi Mountains.
- Encourage hiking trails and eco-friendly tourism establishment in the Otavi Mountains.
- Key productive crop areas to be retained
- Encourage residential estates on farms within the Local Authority Boundary
- Encourage agriculture industries such as poultry farms; dairy farms and so forth on agriculture land
- Formalise the existing right of way servitudes on the farms and retain these servitudes for future roads.
- Relocate the sewage ponds to west of the town and rehabilitate the existing ponds. A trickling filter sewage system with modern technology will reduce the footprint of the sewage works and will also reduce the buffer area needed between the system and residential properties.
- Establish landfill site that incorporates recycling. Getting private investors involved in the landfill site and rubbish collection can also alleviate the demand on Council and add a sense of accountability if under private service delivery.


OTAVI
Legend
Legend
Road corridors
Type
Internal farm access
zones
Conservation
Zones
zones
Agriculture/ estates/tourism
Cemetry Expansion
Proposed sewage works
Sewage work buffer
New Landfill site
High Productive Agriculture
Tourism
Townlands Boundary
NOTE:
All measurements & sizes given are approximate.
No Residential erf shall be smaller than 300m² in size.
DATE
REVISION
PLAN NO
SIGNATURE
DATE
Stubenrauch Planning Consultants
STUBENRAUCH
PLANNING CONSULTANTS
TOWN AND REGIONAL PLANNERS
po box 11869
windhoek
namibia
email: spc@spc.com.na
tel: 061-251189
tel: 061-252490
fax: 061-252157
OTAVI
Townlands Scale
DATE
Aug 2015
DRAWING NO
W14092-7
0 0.5 1 2 Km
1:90,000

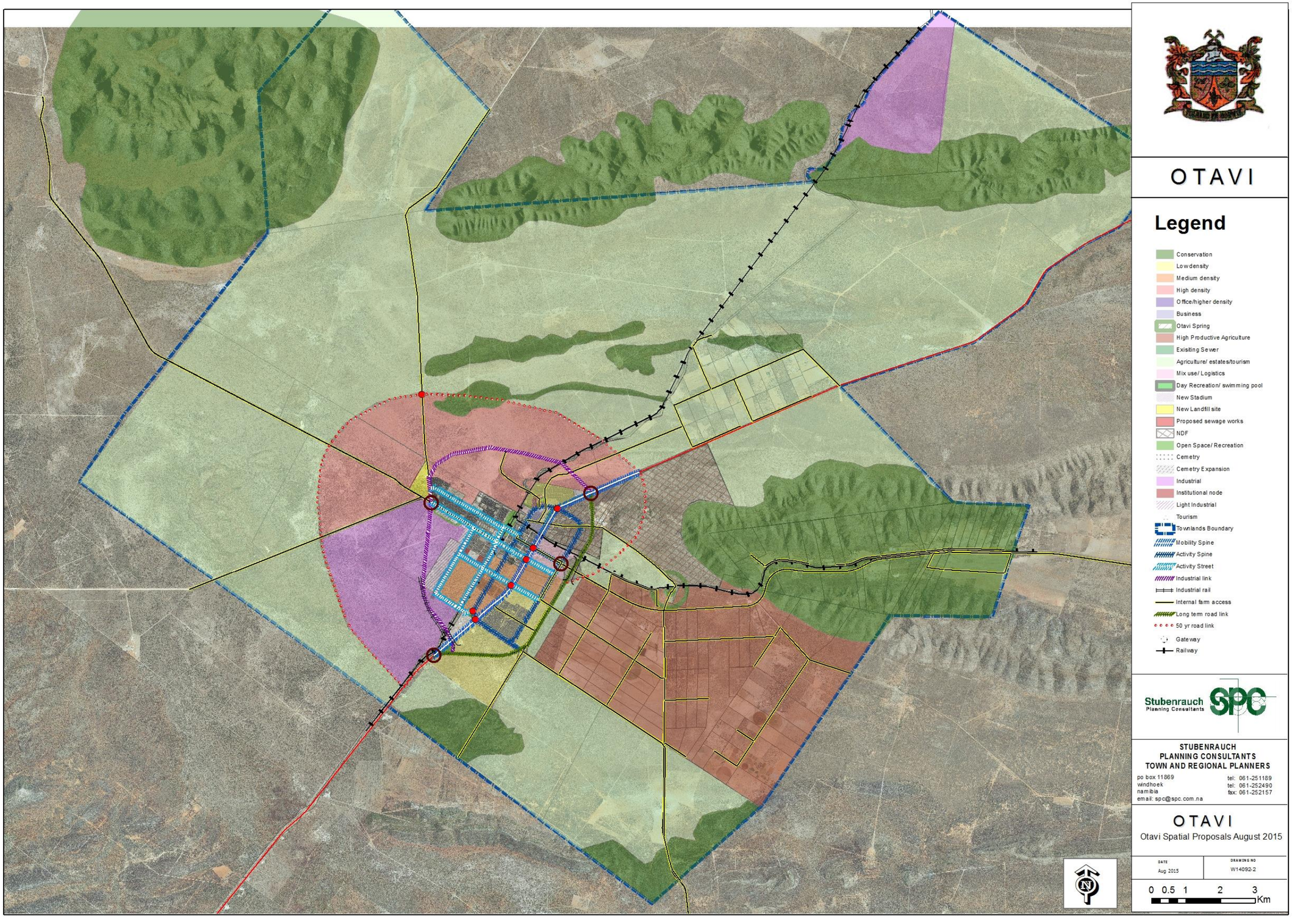


FIGURE 23 PROPOSALS ON TOWNLAND SCAL

		2016				2017				2018				2019				2020			
Structure Plan recommendation	Priority	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

CHAPTER 11 CONCLUSION

Appendix A

The use of sustainable building technology is only one aspect of sustainability and should not be considered in isolation to other sustainable approaches to Planning and Urban Design as a whole.

In Khorixas there are a series of activity corridors where density should be encouraged, it is recommended that the Council seeks to promote the development of 3 storey high general residential type buildings with mixed uses on the ground floor. These mixed uses can include business and office uses, but the use of the ground floor should be demand driven.

Sustainable building technology

The purpose of this section is to inform the Council of some of the technologies that are available that can increase energy saving within the context of building construction.

When new residential buildings and neighbourhoods are designed within Khorixas, observation of best practice in environmental sustainability should be encouraged. The abundance of sunlight within Namibia creates both constraints and opportunities when considering individual building designs. A range of measures can be employed by the building designer to mitigate or exploit environmental conditions, and the cost of these measures can range from being relatively cheap to expensive, and in many cases provision needs to be made by the builder or developer of increased capital costs versus lower operational costs to ensure that the design solution remains economically feasible and deliverable.

The Council should try to balance the promotion of sustainable principals in design with possible additional construction costs which may discourage development. Energy efficiency in terms of building design should also be considered in order to lessen the burden on power producers, distributors and suppliers in terms of domestic demand. Which can result in more electricity capacity being available for industrial demand, or even an overall net energy saving. Design criteria should also be cognizant of the impact of climate change.

Sunlight

Solar gains need to be mitigated through intelligent building design so that an acceptable internal ambient temperature can be achieved without the need for excessive use of electricity, water and fossil fuels, as is the case with traditional mechanical / electrical air conditioning systems.

Passive mitigation measures can include coatings on roof surfaces to reflect heat, roof insulation to reduce heat gained through conduction, increased levels of thermal mass in floors and wall finishes to absorb heat during the day (and releasing it in the evening), external louvres / climber plants to shade areas of glazing, openings on each side of the buildings with an appropriate floor-to-wall ratio to promote cross ventilation, and high level openings / pitched roofs / cowls to promote a stack effect, for passive cooling.

Cooling

External water features may also be used to cool passing air through evaporation, but analysis will need to be done on the effectiveness of this in areas of such high levels of evaporation, and where disease carrying insects may be prevalent. Active mitigation measures can include Cooling Towers (passing warm air drawn through evaporating water and distributed through stack effect) and Earth Tubes (cooling of air by drawing it though pipes in the ground during the day). But these active mitigation measures require a level of knowledge from the building designer that may not always be available.

As well as mitigating the effects of sunlight, sunlight energy can be harvested as a source for hot water through the use of solar collectors, for the generation of electricity through the use of Photovoltaic's, and as a source of ventilation through 'Solar Cooling'.

Solar Cooling is the use of a variety of techniques to convert sunlight energy into cooling, i.e. using photovoltaic-gained electricity to pump air around a building that has been passed over a desiccant to extract moisture. Solar Cooling is one of the most technologically complex environmentally-friendly solutions, but it has been done, and designers of larger more complex buildings with larger budgets should be encouraged to explore this technology if desirable conditions cannot be reached with passive measures alone.

Heating

When internal heating is required, this can be provided either through the slow release of heat stored in the building's thermal mass as it cools down in the evening, or through the use of ground heat pumps, providing, for instance, under-floor heating.

It may be that on analysis, the design criteria may not be met economically with any of the above techniques. In this case, a mixed approach should be promoted in which at certain times of the year / or times of the day more conventional approaches to heating and cooling strategies are employed. The buildings will then be operated in what is referred to by building designers as 'mixed mode'.

Embodied Carbon and Water

In addition to building performance, criteria such as the environmental cost of the buildings materials and construction should be considered, particularly embodied carbon, (through materials and transport of materials), embodied water through materials (wet and dry) and the re-usability of the buildings materials when the building comes to the end of its life-cycle.

Assessment Tools

For a comprehensive assessment of the sustainability credentials of a building, the Local Authority may wish to request developers to self-assess their building by using an environmental assessment tool. Unfortunately, an environmental assessment tool has not been developed for Namibia, which means that developers wishing to self-assess their building will need to use one of the globally recognised standards to assess the sustainability of buildings. In the English language, the most commonly used international standards and performance evaluation mechanisms are:

- LEED NC (buildings scale) - This is a tool developed by the US Green Building Council

- BREEAM (buildings scale) - This is similar to a tool that has been developed in the UK.

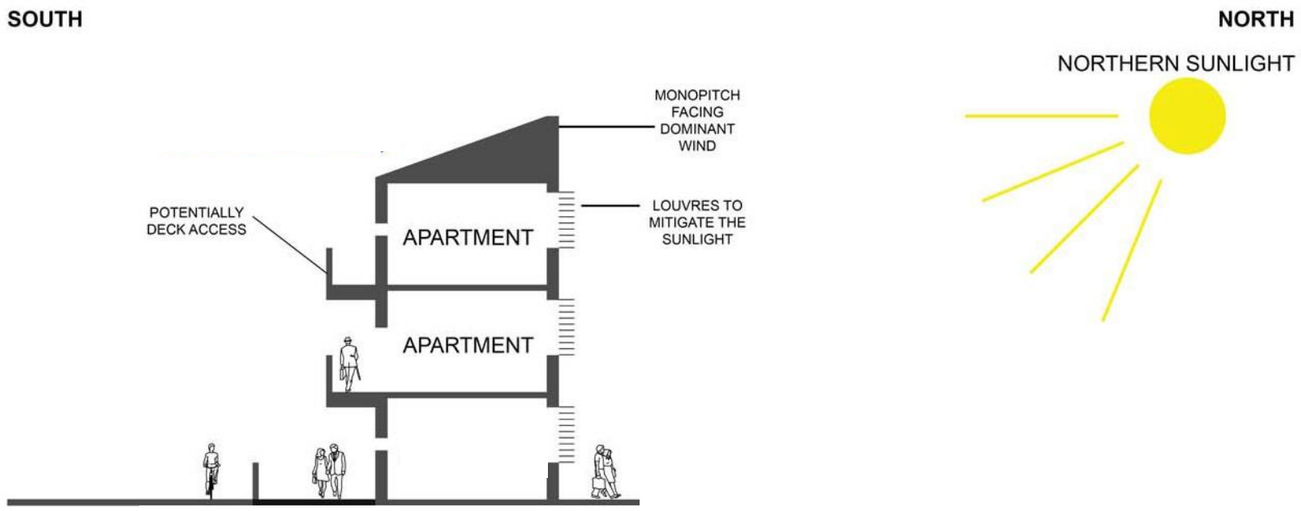
- GREEN STAR – This is a similar tool developed in Australia and also being used in South Africa.

It should be noted that the use of these self-assessment tools does require a qualified assessor, and that acquiring such a person will have a cost implication, therefore the Council should consider the costs of this when approaching developers.

Reference Guides

A short publication 'Guidelines for Building in an Energy Efficient Manner', published by REEEI and the Habitat Research & Development Centre in Windhoek, provides guidelines on how to incorporate energy efficiency and renewable energy technologies and principles into housing designs.

Fig. 126 WHEN BUILDING ALONG AN EAST-WEST AXIS



This diagram tries to show, in a very basic way potential building typologies that could be developed for higher density three storey buildings in Khorixas.

The design of the building should be determined by the direction it is facing.

When Buildings are Constructed Along an East-West Axis

The south face of buildings should have louvres to mitigate sunlight. If deck access is being integrated into the design, then these should be on the colder north side of the building. Household waste should be collected for use as compost and where practicable communal fruit and vegetable gardens should be promoted.

When Buildings are Constructed Along a North-South Axis

Atrium buildings should be considered which use the predominant wind to ventilate the atrium. Individual apartments can then be west and east facing, household waste should be collected for use as compost and where practicable communal fruit and vegetable gardens should be promoted.

Fig. 127

WHEN BUILDING ALONG AN NORTH-SOUTH AXIS

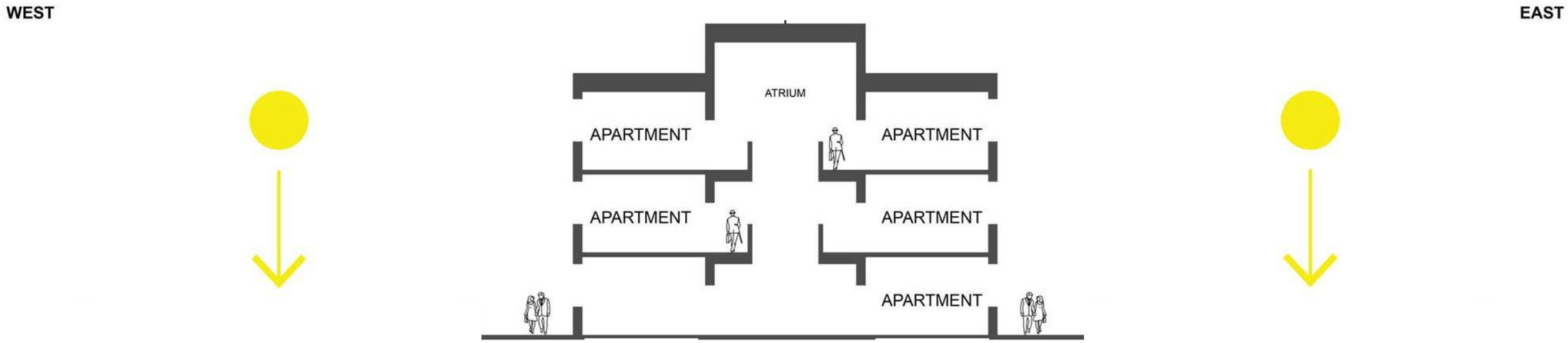


Fig. 128 One Building Developed in Isolation

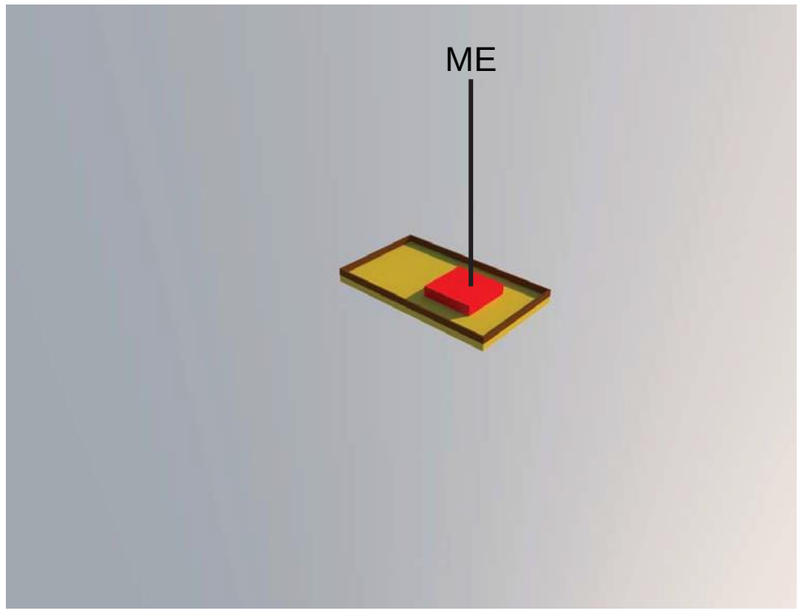


Fig. 129 Individual buildings should not be considered in isolation

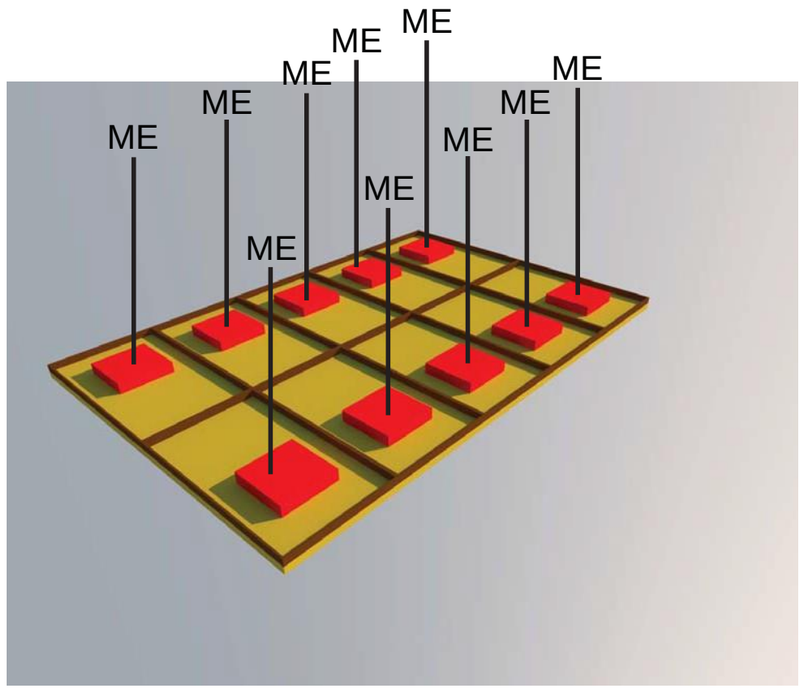
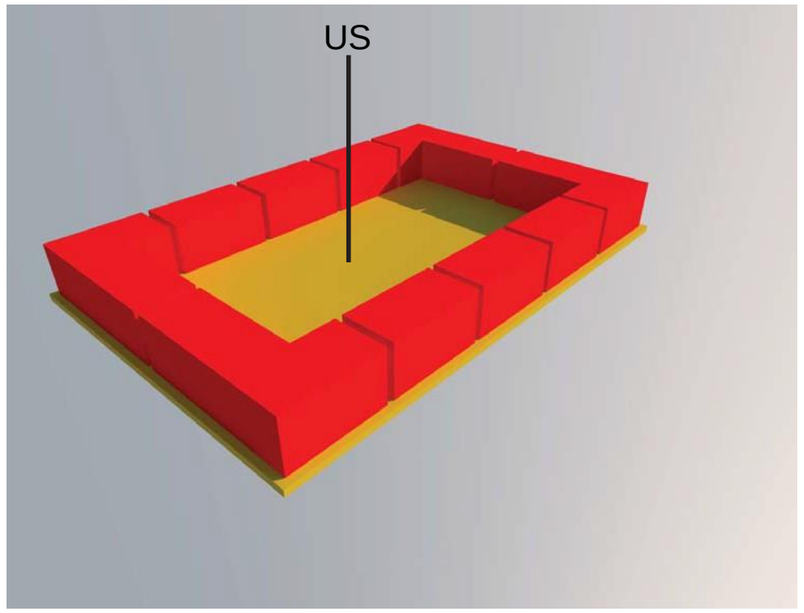


Fig. 130 They are part of a neighbourhood precinct



Understanding the Superblock

The diagrams above should not be taken figuratively, but the essential concept is that individual buildings should be considered as part of a coherent whole. Additionally, by clustering individual buildings together the micro-climate can be moderated.

The previous diagrams looked at medium rise high density housing which creates the opportunity for densification and mixtures of uses.

It is acknowledged by the authors of this report that there will always be a requirement within Khorixas for single residential properties.

One of the phenomenon observed nationally within Namibia is the tendency to construct buildings within the centre of their erven. There are advantages to this approach particularly in terms of cost and ease of construction. There are also a number of building regulations that specify distances between buildings and the edge of the erven. It is important to be cognizant of safety, and building designers in the future will need to demonstrate that their designs represent best practice in terms of safety, particularly in reference to fire safety, and that provision is made for the access and ingress of emergency vehicles.

The disadvantages of building small buildings in the centre of the erven is that an overall impression is created of low density and lack of what designers refer to as ‘urban grain’.

It is important that in the future each building once constructed forms part of a coherent whole with the other buildings within the study area. It may be that as a future project the Local Authority looks at design coding which can be provided for how individual buildings should be massed, how blocks should be massed and how at precinct scale each of these individual buildings will form part of a coherent whole.

ANNEXURE B - RECOMMENDATIONS FOR LONG-TERM ENVIRONMENTAL PLANNING

The purpose of this Chapter is to provide a guideline for the Town Council on what they should be aware of in terms of long-term planning and the management of environmental concerns in the Townlands of Otavi.

Subjecting the structure plan to a Strategic Environmental Assessment (SEA) process is not part of the scope of work for this project. However, as an SEA is now increasingly being required by the MET it is a recommendation that a SEA is carried out by the RTC in the future.

It should also be noted that whether or not an SEA is carried out, individual EIA's will still be required for any development that constitutes a listed activity.

It is intended that the Otavi Town Council uses subsequent sections of this Chapter to provide the foundation on which the Town Council can build its environmental policy and environmental management strategy.

Legal Requirements

It should be noted that the requirements stated in this section only highlight some of the duties of the Council to be met. It is recommended that a legal register be drafted for the Town Council so that they are fully aware of their duties and requirements. This register can then also be used as a tool to audit both the Town Council and the industries situated within the boundaries of Otavi and to ensure that all operations within the Townlands fall within the scope of environmental legislation.

Waste Management and Pollution

The following is based on the Draft Pollution Control and Waste Management Bill (2003) (10.1):

Air quality

- Duties to monitor air quality may be delegated to the Local Authority Council, in this case Otavi Town Council, if the necessary resources and expertise are available.
- Air quality action areas may be established where pollution clean-up is required.

Water quality

- Duties to monitor water quality may be delegated to the Local Authority Council, in this case Otavi Town Council, if the necessary resources and expertise are available.
- Water quality action areas may be established where pollution clean-up is required.

Waste management

The waste management process shall be dealt with in such a manner that waste does not become a significant risk to human health or the environment.

Each local authority shall be responsible for the development of a local waste management plan that should:

- Describe quantities and types of waste generated.
- Detail existing methods to manage waste including the identification of existing waste disposal sites.
- Analyse anticipated current and future needs for additional capacity and infrastructure.
- Objectives of waste management.
- Description of measures to achieve these objectives.

Local Authorities are required under the scope of this policy to:

- Take all practical measures to promote and support the minimisation of waste and recovery of waste. Particularly at the point of production.
- Provide litter receptacles in public places.
- Collect and dispose of household waste.
- Prepare and submit a local waste management plan.
- Report annually on the waste management plan.

Nuisance

The Local Authority must have systems in place to ensure the abatement of activities resulting in nuisance in terms of noise, dust and odour. Even though the Draft Pollution Control and Waste Management Bill (2003) has not yet become an official policy document of Namibia, it would be an advantage for the Town Council to move towards compliance with the requirements before any deadlines are established. This will ensure that the necessary requirements can be met, or compliance procedures be established, before any punishment for non-compliance comes into force.

Environmental Impact Assessments

The following are listed activities that require Environmental Impact Assessments, and the Town Council should not allow any of these activities unless the project proponent has received clearance from the Ministry of Environment and Tourism:

- Energy generation, transmission and storage activities.
- Waste management, treatment, handling and disposal activities.
- Mining and quarrying activities.
- Forestry activities (does not include town beautification initiatives unless full-scale afforestation is planned).
- Land-use development activities
- Tourism development activities
- Agriculture and Aquaculture activities
- Water resource developments.
- Hazardous substances treatment, handling and storage.
- Infrastructure developments.

More details with regards to these listed activities can be found in Government Gazette No 4878 dated 6 February 2012. (10.2)

It should be noted that the full EIA process may not be required for all activities, but that at least a scoping report will be required based on the process flow stated in the legislation.

It should be noted that any activity stated above, already in existence within the boundaries of Otavi, must apply for a clearance certificate and submit an EMP. Small scale, informal activities should be considered in general, and the assessment of the cumulative impact must be managed by the Town Council.

Strategic Environmental Assessments

According to the draft regulations for Strategic Environmental Assessments (SEA) (April, 2008) (10.3), all policies, plans and programmes should be assessed by means of an SEA process. This process should be undertaken during the development of the policy, plan or programme and before its adoption or submission to the legislative procedure. This process is,

however, not required if only a small piece of land is affected at the local level.

It will be the responsibility of the Town Council to cover the costs related to this process. The process as detailed in the draft regulations should be adhered to.

Strategic Planning Requirements

Some issues to be addressed by the Otavi Town Council are not only of local concern but may affect the entire region. Dealing with these issues on a local level may in the short term alleviate the problem within the boundaries of the town, but may result in more issues over the long run for the entire region.

It is recommended that the following issues be considered as issues that should be discussed, planned for and managed on a regional level:

- The management and control of flood waters – initiatives implemented in isolation may result in unanticipated upstream or downstream impacts if such initiatives are only implemented on a local level and not considered on a regional level.
- Development and maintenance of infrastructure – if infrastructure is only developed and maintained within the boundaries of one town, the failure of other towns to follow suite may result in the wastage of the towns resources since the overall impression that investors will have of the region will be one of underdevelopment, even if the situation is different at a local level.
- Provision of services – if services are not equally distributed throughout the region, it may result in a situation whereby one town is burdened by people in need of services without the town benefiting from the presence of these individuals on a permanent basis.
- Climate change adaptation – the impacts of climate change will not only be experienced on a local level; it is therefore necessary to plan for these impacts on a regional level. Some issues of concern with regards to this are highlighted later in this chapter.
- Land management – Sustainable approaches to farming should be encouraged to reduce any possible erosion in the quality of the soil over the long term, particularly in the context of an extended townlands area in which agricultural activities will still be practiced.

Any plan or policy developed on a regional level for any of the concerns stated overleaf should be subjected to a Strategic Environmental Assessment (SEA).

Community Learning and Participation

Even though a thorough public consultation process and scoping exercises were followed during the development of the Structure Plan, further participation from the community will be required if the Town Council wishes to ensure that the recommendations in the plan can be successfully implemented.

In some instances, the initiatives proposed will result in an alteration in the lifestyle of the community and these initiatives will therefore only be successful if the community buys into the proposed changes.

In other instances the active participation of the community will be required in order to make the initiative a success and they therefore need to be involved in, and educated about, the process from the beginning.

Community involvement is also essential to the success of this project as it will heighten the sense of ownership of any project that takes place, making environmental initiatives more likely to succeed in the long term. If work that does not require a high level of skill and training (such as some landscaping, brick making, etc.) is undertaken by the local community it will also mean that money spent on these projects will remain in the local economy, aiding economic growth.

Therefore, it is recommended that the Town Council creates a community education and discussion forum to ensure that people are aware of what is happening, why it is happening and what their rights and responsibilities are.

Such initiatives tend to be costly, and it is therefore recommended that the programme be designed with the aid of a qualified and experienced expert who should ensure that the programme is appropriate for the local community and their cultural and community preferences.

Climate Change Adaptation

Namibia in general is vulnerable to the impacts of climate change. The extent of the anticipated impacts cannot be precisely defined due to a variety of factors, but all modelling scenarios indicate that Namibia will be negatively affected and that impacts may be severe. Therefore, it is important that all long-term policy or strategy documents be aware of the risk that changing climate poses to the people and development of the country, and should incorporate basic strategies to adapt to, and mitigate these risks.

The following risks should be kept in mind and strategies sought to avoid them or to adapt to them (from 'Information Packages and Targeted Awareness-raising and Training to Decision-makers and Practitioners on Climate Change Adaptation published by the MET as part of their Climate Change Adaptation Training) http://www.met.gov.na/AAP/TechnicalStudies/TrainingDecisionMakers/Pages/default.aspx

Temperature – Projections show that the country is likely to get hotter with a greater number of days exceeding 35° each year.

Rainfall – Projections show the intensity of Rainfall will increase although the total amount of rain is likely to decrease. Rainy seasons may get shorter and the number of consecutive days of rain may decrease.

Changes in temperature and rain fall patterns may significantly impact agricultural output and thereby reducing grain production and reduced yields.

Vegetation is expected to suffer some reduction in net primary productivity, having a negative impact on browsing livestock such as cattle.

This may in turn lead to ***longer-term food shortages***, poor nutrition and malnutrition with indirect negative impacts such as changes in soil quality, introduction of pests, and possible increases in water- borne diseases.

The MET has not produced a climate risk management plan for all of the individual regions of Namibia, but they have undertaken a pilot study for the Oshana region, and many of the risks identified in this report can be applied to other regions such as the Erongo Region.

The following risks represent an edited list of the risks identified in the Climate Risk Management Plan for the Oshana Region, DRFN, 2011) (10.4), this risks should be kept in mind

by the Council and strategies sought to avoid them or to adapt to them;

- Flooding of settlements
- Damage to infrastructure
- Inadequate storm water drainage
- Improper planning for settlements
- Inadequate building standards
- Financial implications (costs to repair, insurance, etc.)
- Limited coordination and information exchange
- Sanitation and health
- Displacement of people
- Open pools of water
- Increase in temperature and resultant deaths due to heat exposure

The issues stated above relate only to those where climate change and the built environment will directly affect one another. There are many more issues at play such as impacts on agriculture and possible increases in disease related deaths due to a rise in opportunistic infections caused by changing climate. However, the issues stated in bullet point above can be dealt with on a local level and should be taken into consideration when planning for development in the Otavi.

Red Flagged Initiatives

The Town Council must carefully consider activities that may impact on air or water quality. The legislation is being developed to force the Council to actively monitor, manage and control air and water pollution. Therefore, the precautionary principle would mean that activities likely to have such impacts should be closely scrutinised and managed once implemented.

No industry should be allowed to drain or pump water into the sewer system unless a permit has been issued to allow this activity. In these instances activities should be closely monitored and audited at least once a year against the stipulations of the permits and the requirements of the mandatory Environmental Management Plan.

Generally, the Town Council is discouraged from allowing any entity or business to import general or hazardous waste and dispose of such waste within the town boundaries.

Monitoring and Management

It is recommended that the Town Council identifies key capacity gaps and moves towards the development of individuals to fill those gaps in order to ensure that the right personnel are available to do the necessary monitoring when required in order to determine whether or not pollution levels are within acceptable levels.

It is also recommended that the Town Council identifies the most significant environmental issues currently being experienced in the Town and to develop an Action Plan to deal with these issues. This will ensure that Otavi can move towards being a sustainable town, it will allow for improved planning and ensure that the necessary resources are available to deal with possible threats and opportunities.

The main issues to be evaluated and prioritised by the Town Council include:

- Natural resource management
- Infrastructure development – identification and maintenance of corridors
- Animal management
- Community education and awareness
- Land management
- Waste management
- Quarrying
- Climate change

Having an environmental policy and plan in place for the town will be a great benefit in the long run. Most importantly, it will provide investors with a framework for development.

Chapter findings

A high-level SEA should be carried out against the Structure Plan in the future as the assessment does not form part of the scope of this report.

A legal register should be drafted making the Council aware of their duties under the environmental legislation.

The Council has duties regarding air quality, water quality, waste management and nuisance control.

Otavi Town Council is responsible for the development of a waste management plan.

Listed activities taking place in Otavi require clearance from the Ministry of Environment and Tourism.

Existing listed activities must submit an Environmental Management Plan (EMP)

Issues such as control of floodwaters, maintenance of infrastructure, provision of services, climate change adaptation and land management should be considered at the regional level as well as at the local level.

In the event of an increase in the townlands area, some areas falling under the townlands jurisdiction will be used for agricultural activities. In these areas the Council should encourage sustainable farming practices and soil management.

The Council should create a community education and discussion forum.

Otavi Town Council should develop an integrated Waste Management Plan.

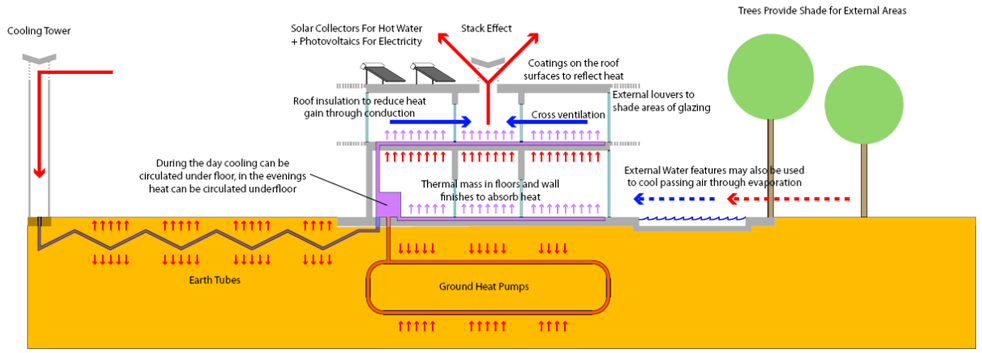
Otavi Town Council should develop basic strategies to adapt to and mitigate climate change over the long term.

No industry should be allowed to drain or pump water into the sewer without a permit.

The Otavi Town Council should identify capacity gaps and train individuals within their staff to fill these capacity gaps.

ANNEXURE C: SUSTAINABLE BUILDINGS TECHNOLOGY

FIGURE 24: SUSTAINABLE BUILDING TECHNOLOGIES



Using sustainable building technology is only one aspect of sustainability and should not be considered in isolation to other sustainable approaches to Planning and Urban Design on the whole. However, the purpose of this chapter is to inform the Council of some of the technologies that are available that can increase energy saving within the context of building construction.

In Namibia the current national standards are being developed, and a lot of thought is going into the development of localized sustainability codes for buildings. At the present time though these codes are still being developed and as with all building codes in Namibia, when a local authority has not developed their own, the South African Building standards are applied.

With regard to sustainability the applicable building control code is: SANS 10400-XA:2011 – 'South African National Standard (SANS) The application of the National Building Regulations Part X: Environmental sustainability & Part XA: Energy usage in buildings'.

Notwithstanding the guidance set out in the code the following advice has been assembled as a guide to the Council when considering sustainable buildings technology.

When new residential buildings and neighbourhoods are designed within Otavi, observation of best practice in environmental sustainability should be encouraged. The abundance of sunlight within Namibia creates both constraints and opportunities when considering individual building designs. A range of measures can be employed by the building designer to mitigate or exploit environmental conditions, and the cost of these measures can range from being relatively cheap to expensive, and in many cases provision needs to be made by the builder or developer of increased capital costs versus lower operational costs to ensure that the design solution remains economically feasible and deliverable.

The Council should try to balance the promotion of sustainable principals in design with possible additional construction costs which may discourage development. Energy efficiency in terms of building design should also be considered in order to lessen the burden on power producers, distributors and suppliers in terms of domestic demand, which can result in more electricity capacity being available for industrial demand, or even an overall net energy saving. Design criteria should also be cognizant of the impact of climate change, and possible effects of flooding in the future.

Sunlight

Solar gains need to be mitigated through intelligent building design so that an acceptable internal ambient temperature can be achieved without the need for excessive use of electricity, water and fossil fuels, as is the case with traditional mechanical / electrical air conditioning systems.

Passive mitigation measures can include coatings on roof surfaces to reflect heat, roof insulation to reduce heat gained through conduction, increased levels of thermal mass in floors and wall finishes to absorb heat during the day (and releasing it in the evening), external louvers / climber plants to shade areas of glazing, openings on each side of the buildings with an appropriate floor-to-wall ratio to promote cross ventilation, and high level openings / pitched roofs / cowls to promote a stack effect, for passive cooling.

Cooling

External water features may also be used to cool passing air through evaporation, but analysis will need to be done on the effectiveness of this in an areas of such high levels of evaporation, and where disease carrying insects may be prevalent. Active mitigation measures can include Cooling Towers (passing warm air drawn through evaporating water and distributed through stack effect) and Earth Tubes (cooling of air by drawing it though pipes in the ground during the day). But these active mitigation measures require a level of knowledge from the building designer that may not always be available.

As well as mitigating the effects of sunlight, sunlight energy can be harvested as a source for hot water through the use of solar collectors, for the generation of electricity through the use of Photovoltaics, and as a source of ventilation through 'Solar Cooling'.

Solar Cooling is the use of a variety of techniques to convert sunlight energy into cooling, i.e. using photovoltaic-gained electricity to pump air around a building that has been passed over a desiccant to extract moisture. Solar Cooling is one of the most technologically complex environmentally-friendly solutions, but it has been done, and designers of larger more complex buildings with larger budgets should be encouraged to explore this technology if desirable conditions cannot be reached with passive measures alone.

Heating

When internal heating is required, this can be provided either through the slow release of heat stored in the building's thermal mass as it cools down in the evening, or through the use of ground heat pumps, providing, for instance, under-floor heating.

It may be that on analysis, the design criteria may not be met economically with any of the above techniques. In this case, a mixed approach should be promoted in which at certain times of the year / or times of the day more conventional approaches to heating and cooling strategies are employed. The buildings will be operated in what is referred to by building designers as 'mixed mode'.

Embodied Carbon and Water

In addition to building performance, criteria such as the environmental cost of the buildings materials and construction should be considered, particularly embodied carbon, (through materials and transport of materials), embodied water through materials (wet and dry) and the reusability of the buildings materials when the building comes to the end of its lifecycle.

Assessment Tools

For a comprehensive assessment of the sustainability credentials of a building, the Local Authority may wish to request developers to self-assess their building by using an environmental assessment tool. Unfortunately, an environmental assessment tool has not been developed for Namibia, which means that developers wishing to self-assess their building will need to use one of the globally recognised standards to assess the sustainability of buildings. In the English language, the most commonly used international standards and performance evaluation mechanisms are:

- LEED NC (buildings scale) - This is a tool developed by the US Green Building Council

- BREEAM (buildings scale) - This is similar to a tool that has been developed in the UK.

- GREEN STAR – This is a similar tool developed in Australia and also being used in South Africa.

It should be noted that the use of these self-assessment tools do require a qualified assessor, and that acquiring such a person will have a cost implication, therefore the Town Council should consider the costs of this when approaching developers.

Non-Residential Buildings

As user population density is anticipated to be higher in non-residential buildings than in residential buildings, it is considered that natural ventilation may be the most significant consideration for the building designer. Ventilation can be achieved naturally through openings on each side of the buildings and a considered floor-to-wall ratio to promote cross ventilation.

Reference Guides

A short publication 'Guidelines for Building in an Energy Efficient Manner' (13.1), published by REEEI and the Habitat Research & Development Centre in Windhoek, provides guidelines on how to incorporate energy efficiency and renewable energy technologies and principles into housing designs.

Chapter Findings

Future building developers should be encouraged to incorporate sustainable principals, and a brief overview of sustainable building technologies have been described in this chapter.

Building designs should minimise the use of mechanical / electrical cooling if possible.

Heating, where needed, could be provided through ground source heat pumps, thermal mass or through solar gain.

If, for a variety of technical, financial and human capacity reasons a best practice solution cannot be introduced, the developer should use a mixture of techniques to achieve the desired outcome, operating buildings in what is known as mixed-mode.

The embodied carbon and water within building materials should be considered, as should the embodied carbon and water within the construction process.

Developers can be requested to self-assess their buildings, however a specific assessment tool is currently not available specifically for Namibian, and therefore reference should be made to internationally recognised sustainability tools, and these are listed.

ANNEXURE D: INTERNATIONAL TRENDS IN URBAN PLANNING

The UN Habitat recently released a report on "International guidelines and territorial planning – Towards a compendium of Inspiring Practises" that looks at 26 international experiences in urban and territorial planning with a cross section of inventive, ambitious and unique cases that address common issues of urban and territorial development and highlights successful examples of how urban planning can reshape areas. There are five key lessons that were reflected from the wider case studies in the report:

a) Integrated policy formulation and implementation
b) Transformative renewal strategies
c) Environmental planning and management
d) Planning compact and connected cities and regions
e) Inclusive and participatory planning

The international trend within urban planning has been for the past years to focus on the following main trends:

Placemaking and greening cities

Placemaking refers to creating public places that uplift and help people connect with each other; it is the re-invention of public spaces for people to enjoy. It not only refers to public open spaces, but also to streets and neighbourhoods. Turning former derelict areas into areas where people want to be.

Greening cities does not necessarily mean planting large amounts of trees, flowers and grass that are high on water consumption. Namibia, being an arid country, needs to also look at alternative "green" parks that uses less water as well as utilising filtered grey water for parks. Hard landscaping with a few trees or desert plants can also make a difference to an area such as the small park in the town of Karibib that mostly uses desert plants for greening (Figure 25).

The Figure 8 shows the transformation of dreary double lane road into a street café by simple utilising the island in the middle of the road for a social space.

Figure 9 shows the well-known highline in New York, USA, where the former railway line was transformed from a derelict area to a vibrant open space system (Figure 9)

FIGURE 25 PARK IN IN THE TOWN OF KARIBIB

FIGURE 26: TRANSFORMING A MAIN ROAD INTO A SOCIAL ARENA IN CHICAGO, USA

Source: David Broz (Gensler, 2015)

FIGURE 27: MINIMALISTIC GREEN

FIGURE 28: STREETSCAPE IN ARID AREAS

FIGURE 29 DESERT PARKS

FIGURE 30: MINIMUM TREES - PLAYING WITH DESIGN

FIGURE 31: HIGHLINE NEW YORK - BEFORE

FIGURE 32: HIGHLINE NEW YORK - AFTER

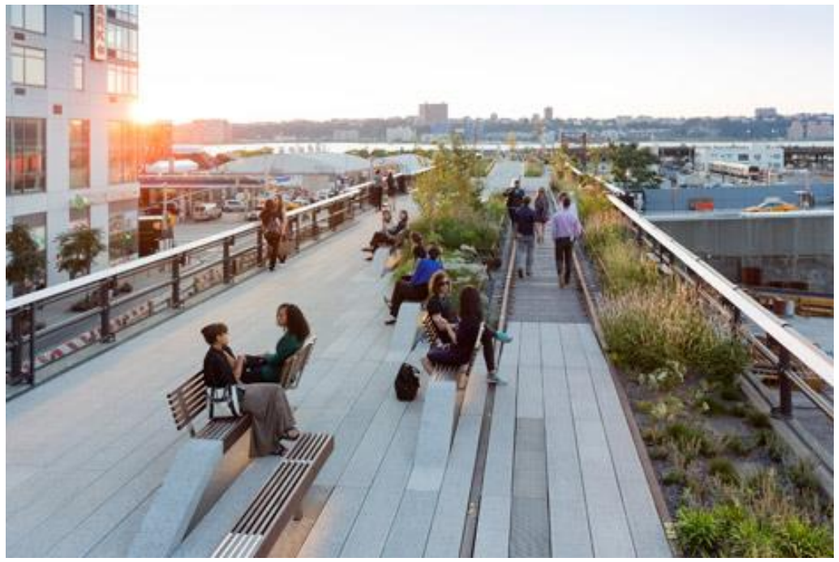


Figure 10 and 11 illustrates further the importance of simple ideas and how these ideas can transform monotonous residential areas into proper neighbourhoods.

FIGURE 33: MONOTONOUS RESIDENTIAL AREA

FIGURE 34 TRANSFORMED RESIDENTIAL AREA

Windhoek

FIGURE 35 PAVING, TREES AND SHADE STRUCTURES

The southern end of Independence Avenue features shop fronts and offices facing directly onto the street. The walkway is fully paved with shade provided by awnings and overhangs from buildings and trees planted to separate the vehicular and pedestrian traffic.

- Note that pedestrians are naturally walking along the cooler shadier areas of the street.
- Note that the paving exists as one continuous surface, without breaks for drainage infrastructure

FIGURE 36: TREE PLANTING AND LANDSCAPING FOR BEAUTIFICATION

The quality of Public Open Space in the Windhoek town centre is enhanced with tree planting and landscaping.

Typically it is recommended that tree or shrubs species chosen in Otavi are those that are native to the area.

FIGURE 37 TREE PLANTING AND LANDSCAPING FOR AMENITIES

Street lighting is provided for pedestrians as well as vehicles. Bollards are provided around road crossings to prevent vehicles entering the street. Bins are provided for refuse.

It is recommended that the advice of a horticulturist is sought before planning any tree planting program, but in broad terms trees in the Acacia group appear throughout the region and this may be a good starting point when researching the appropriate trees for a large scale planting programme.

Windhoek

FIGURE 38 STREET FURNITURE PROVIDING VEHICLE AND PEDESTRIAN BUFFER

Care needs to be taken when developing street furniture along the road edge that could be used by hawkers and illegal traders to trade and interact with passing traffic along the roadside. Creating a nuisance and endangering safety.

Here street furniture is used to create a buffer between the vehicular and pedestrian traffic. Seating is orientated towards the pavement side of the street, away from traffic.

FIGURE 39 STREET FURNITURE PROVIDING VEHICLE AND PEDESTRIAN BUFFER

Landscaping can be used to provide shade for these areas through the planting of trees and shrubs.

- Note care needs to be taken in terms of orientation so that shade is provided for seating during the times of the day that most activity is likely to take place within a given area.

Swakopmund

FIGURE 40 HUMAN SCALE – SHORT DISTANCES BETWEEN BUILDINGS

- Notice the intimacy and human scale of this small square in Swakopmund. The closeness of the buildings provides protection from the elements, and the ability to circulate easily as a pedestrian.
- **Note** that spaces between buildings are often determined by fire safety requirements, and that design will need to consider fire safety carefully when building more densely.

FIGURE 41 DIFFERENT TREATMENT OF THE NORTH AND SOUTH SIDE OF THE STREET

This photograph demonstrates how the north and south sides of the street are treated differently as a result of sunlight orientation.

The northern side of the street creates shade naturally as the sun is behind it for much of the day.

The southern side of the street provides roof overhangs to provide shade.

- Note this street is semi pedestrianised and retains its human scale.

Swakopmund

FIGURE 42 TREES DIVIDING ROAD LANES FOR BEAUTIFICATION

Trees Dividing Road Lanes for Beautification

Tree planting is used to beautify the roadway.

Note that it is recommended that Otavi uses native trees/ shrubs

FIGURE 43 TREES LINING PEDESTRIAN ROUTES TO PROVIDE SHADE

Tree planting on both sides of this pedestrian route provide a cool, shaded route towards the waterfront, making the journey pleasant even on a particularly hot day.

FIGURE 44 STREET FURNITURE PROVIDING PLACE TO REST

Benches and trees provide a public amenity along this promenade.

Note the landscape buffer between the area of seating and other forms of activity.

FIGURE 45 PEDESTRIAN ONLY PARKWAYS PROVIDE AMENITY

This pedestrian link between the beach and the town centre is surrounded by trees providing shade and provides picnic benches and tables for public use.

Note: care needs to be taken to ensure clear site lines for pedestrians as to much shade and the absence of clear site lines can make criminal activities easier and more likely.

Swakopmund

FIGURE 46 PEDESTRIAN ONLY ARCADES LEADING TO ENCLOSED SQUARES

Off street business activities can be linked back into the main activity spines via pedestrian only arcades.

This allows intensification of business activities in the form of more shop frontage space without the need to extend the activity spine outwards or upwards.

- Note care needs to be taken not to introduce too great an increase in pedestrian footfall without having adequate street side pavement width, thus avoiding unmanageable congestion points.
- Despite the promotion of walking and pedestrian activities in Swakopmund, the popularity of the town has resulted in large numbers of cars entering the town and has resulted in a greater need for car parking. When Khorixas considers pedestrianisation of retail areas, provision of additional car parking will need to be provided.

FIGURE 47 SQUARES PROVIDE SHADE, FURNITURE AND RETAIL OUTLETS

Off street enclosed squares provide shade furniture and retail outlets.

By keeping these squares relatively small in relation to the height of surrounding buildings, the surrounding buildings themselves can create shade, which can be further enhanced with shade structures and street furniture.

FIGURE 48 PAVING DESIGN REFLECTS COASTAL CITY IDENTITY

Paving design reflecting coastal towns identity. As a coastal city Swakopmund further promotes its identity by referencing water in its pavement design.

FIGURE 49 SCULPTURAL ELEMENTS ENHANCE MARITIME IDENTITY

Landscape sculpture can be used to further reiterate the identity of the town.

Otjiwarongo

FIGURE 50: OLDER BUILDINGS WITH SHADE STRUCTURES

These older buildings in Otjiwarongo provide very simple shade devices, which could be provided retrospectively for older buildings.

FIGURE 51: NEWER BUILDINGS WITH SHADE STRUCTURES

The local authority should encourage developers to incorporate shade structures into their designs, particularly along major pedestrian corridors, and particularly with regard to buildings used by the public.

This newer building has a simple shade structure built onto it. As this shop is north facing the shade structure provides shade for customers outside of the shop and mitigates the solar gains entering through the large windows.

FIGURE 52 TREES PROVIDE SHADING AND BEATIFICATION

Even in places where buildings are set back from the roadsides, for instance in the case of residential areas, trees or shade structure can be used to provide shade and for beautification.

FIGURE 53 ONCE PLANTED TREES NEED TO BE MAINTAINED

As well as selecting the most appropriate trees for each locating, there is also a requirement to maintain them.

Urban intensification and densification

Urban intensification is a process where new buildings are built at higher densities, vacant land in urban areas is developed and high density re-development takes place. It is also associated with the increase in amount of activities – therefore both an increase in population density and the extent of economic and social activity.

Densification does not mean poor urban quality and overcrowding and this is not the purpose of densification. The purpose of densification is to ensure higher numbers of people in an area which can then support urban services such as public transport, shops and schools. Research has shown that 100 people per hectare can support a bus service. Taking a typical block of residential erven in Otavi measuring 1 hectare will have typically 12 erven. Taking the average household of 3.5 people per household this means that typically in Otavi such a 1 hectare area only holds a population of about 45 people. If however, the density was changed to allow for duplex units on these 12 properties, it will already increase the density to 84 people, by simple allowing duplex flats.

By simple intensifying the activities and use within the town, the town can become more compact. Densification in the Namibian context does not necessarily mean a Dubai or Shanghai high-rise type development. Densification in smaller towns such as Otavi, can mean

- Intensifying the business centre (allowing for higher buildings – 3 or 4 storey buildings) with shops at the bottom; offices on the first floor and residential units on the second floor.
- Densifying policy areas within town with buildings such as duplex flats, townhouses and apartments (2 storey buildings)
- Densifying areas within town by simple subdividing larger erven into an additional property (2 storey buildings).

Integrating natural and historical environments into planning

Recent international trends in urban planning have been to start recognising the importance of the environment within a town. Integrated the environment into urban planning can makes cities and towns liveable. One of the key elements of making a city liveable is to provide also for the environmental element within the city or town. Taking the environment into account also means undertaking sustainable development and not venturing into sensitive habitats or productive agricultural land. One such an example is the Avis Dam Reserve in Windhoek which is a large area being leased by a group of concerned citizens. The reserve is open for public enjoyment, hiking, fishing and cycling.

FIGURE 54 AVIS DAM - INCORPORATING NATURE INTO THE CITY

Incorporating the history of an area and historical buildings and sites into planning is also a trend in sustainable development. By incorporating historical sites and buildings it also lends a certain character to the town upon which spin-off benefits such as tourism can be attached.

The strong tourism in towns such as Swakopmund and Lüderitz thrive on the historical background of the town. The historical background and preservation of the buildings in these towns attracts tourist.

FIGURE 55: HISTORICAL BUILDINGS IN SWAKOPMUND

Source: http://knownamibia.com/locations/swakopmund

Incorporating historical landmark features into the fabric of the city contributes to the character of a town/city such as the Christus Kirche in Windhoek that has become a famous stop-over for visitors to the city.

FIGURE 56: CHRISTUS KIRCHE, WINDHOEK

Source: www.alchetron.com

Some additional international concepts:

- To attract people to an area the area must be safe, comfortable, varied and attractive to encourage people to use the area.
- Avoid planning secondary business nodes in smaller towns and rather support the existing business arena with integrating new business developments
- Create transition areas between the commercial core and the residential areas. Within these transition areas mixed use activities such as shops, offices, warehouses, artists and cultural quarters, restaurants and schools.

Creation of Pedestrian and cycle friendly streets

Thinking about pedestrian and cycle-friendly streets, here are a few questions for local authorities to ask when designing such areas:

- Does the route connect the places where the people want to go?
- Are routes direct, and are crossings easy to use? Do pedestrians have to wait more than 10 seconds to cross roads?
- Are routes attractive and safe?
- What is the quality and width of the footway and what obstructions are there?
- How easy is it to find and follow a route?
  (Llewelyn; Davies; Yeang)

Creation of mixed use high streets

As part of the design of the town it is also important to look at the urban structure. A liveable and sustainable urban structure needs to look at the creation of:

- Movement networks
- Walkable neighbourhood
- Street network
- High street/ activity corridors
- Densities

FIGURE 57 TYPICAL HIGH STREET

Regent Street in London is a typical high street where a mixture of intensified activities have been developed. At the ground floor will be the shops; first floor offices and second and third floor accommodation. These activities ensure that the street always have people whether it is day or night.

CONCLUSION

Generally cities and towns worldwide are becoming more focused on creating sustainable cities. A sustainable cities does not only refer to environmental sustainability, but also at the urban environment,

- creating a walkable city,
- creating recreational spaces,
- creating economic growth through provision of investment opportunities,
- cycling lane
- bus routes
- densification
- curbing urban sprawl

These terminologies are important planning concepts that local authority needs to implement.

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