



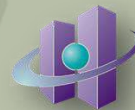
Siyathemba Local Municipality

SIYATHEMBA

SPATIAL DEVELOPMENT FRAMEWORK 2030

December 2019

Compiled on behalf of the
Siyathemba Local Municipality by:



Urban Dynamics Gauteng

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SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

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EXECUTIVE SUMMARY

1. CONTEXTUAL SETTING

The Siyathemba Municipal Area (also referred to as Siyathemba) is located within the Pixley ka Seme District Municipality in the Northern Cape Province of South Africa. The Municipality is located within the central eastern parts of the Northern Cape Province on the banks of the Orange River. The nearest large business centre is Kimberley, which is located approximately 220km from Siyathemba. The municipal area encompasses a geographic area of approximately 8,200km².

Siyathemba population was calculated using Census 2011 figures (see Figure 3). As depicted by Table A, Siyathemba housed a population of approximately 22,000 people by the year 2011. It was estimated that this population had increased to approximately 24,000 people by the year 2019. The number of households that resided in Siyathemba area by 2011 was estimated to be approximately 6,000. This figure was estimated to have increased to an estimated 6,600 households by 2019.

TABLE A: SIYATHEMBA POPULATION 2011 TO 2019

Settlement	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)	%	Population Growth Rate (%)
Urban population	18747	20047	20673	87	
Rural population	2838	1538	3130	13	
Total	21585	21585	23802	100	1.03%

Source: Estimated from Census 2011 and Stats SA Community Survey 2016

Siyathemba is a largely urban area in terms of population, with 87% of its population living within towns and settlements within the municipal area. This is despite the fact that most of Siyathemba is rural from a geographical perspective. This high level of urbanization within Siyathemba inevitably stresses the need to manage town and settlements development within this municipal area.

2. SPATIAL STRUCTURE

Siyathemba comprises a relatively flat topography, with most of the landform comprising plains. In fact, most of the southern (south of the N10 freeway) and eastern parts of the municipal area are plains. In addition, a valley floor or flood plain is located on the banks of the Orange River, flowing through the eastern parts of the municipal area. The flat topography of the municipal area is interrupted by the Doringberg mountain range that stretches through the centre of the municipal area. This mountain range basically follows the N10 freeway and provides a definite scenic element to the municipal area.

The land use pattern found within Siyathemba is broadly divided spatially by the N10 freeway. To the south of the N10 freeway the land use character is largely flat, sparse and rural. To the north of the N10 freeway the land use character is largely mountainous, residential and intensive farming. The following broad land uses occur within Siyathemba:

a. Settlement

Siyathemba has 4 towns that house the majority of the municipal area's population. These towns include Prieska, Marydale, Niekerkshoop and Copperton. Prieska is the main town and contains most of the municipal area's population and contains most of the municipal area's community facilities. The Prieska population resides in a number of suburbs, including Lemnertsville and Ethembeni. Prieska functions of the primary service centre to the local commercial agricultural industry and contains the only agri-industrial area within Siyathemba.

Marydale and Niekerkshoop also function as local rural service centres, but albeit smaller than that of Prieska. Niekerkshoop comprises the suburbs Rainbow, Rooidal and Rama Rou. Copperton is an old mining town that was sold to a private owner after the closing of the mine. Most of the houses were demolished.

b. Agriculture

Most of the land surface of Siyathemba is used for intensive and extensive agricultural purposes. Intensive and extensive farming areas in Siyathemba are roughly separated by the N10 freeway. Intensive, irrigation farming occurs north of the N10 freeway along the Orange River. The Orange River is used for the extraction of irrigation water. Irrigation farms along the Orange River are mostly used for the cultivation of grains and vegetables. Extensive, grazing farms are located south of the N10 freeway. Whereas the intensive farms are in the order of 1000-3000ha in size, the extensive farms are on average 5000ha and larger in size.

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030



DIAGRAM A: MOVEMENT PATTERN

c. Military and mining

The Copperton mine and the Alkantpan military test site are the only large non-agricultural land uses within Siyathemba. Mining at Copperton lasted for two decades until it was stopped in 1991. A portion of Copperton mine is also used for a large solar plant. The Alkantpan military test site located west of Copperton town. This test site is actively used by Armscor and international militaries for hardware testing. The Copperton mine airfield is used by the Alkantpan military test site to transport military personnel and equipment.

3. MOVEMENT PATTERN

Diagram A depicts the movement of people within Siyathemba and between Siyathemba and the neighbouring municipal areas. Movement within Siyathemba largely occurs along 2 axis that cross each other at Prieska. The first axis links Prieska to the northeast to Kimberley and southwest to Vanwyksvlei. The southwestern part of the axis also links Prieska to Copperton, located within the municipal area. The second axis links Prieska to the northwest to Upington and to the southeast to De Aar. The northwest section of the axis links Prieska to Marydale. A third, smaller axis, links Prieska to Niekerkshoop located in the northern parts of the municipal area.

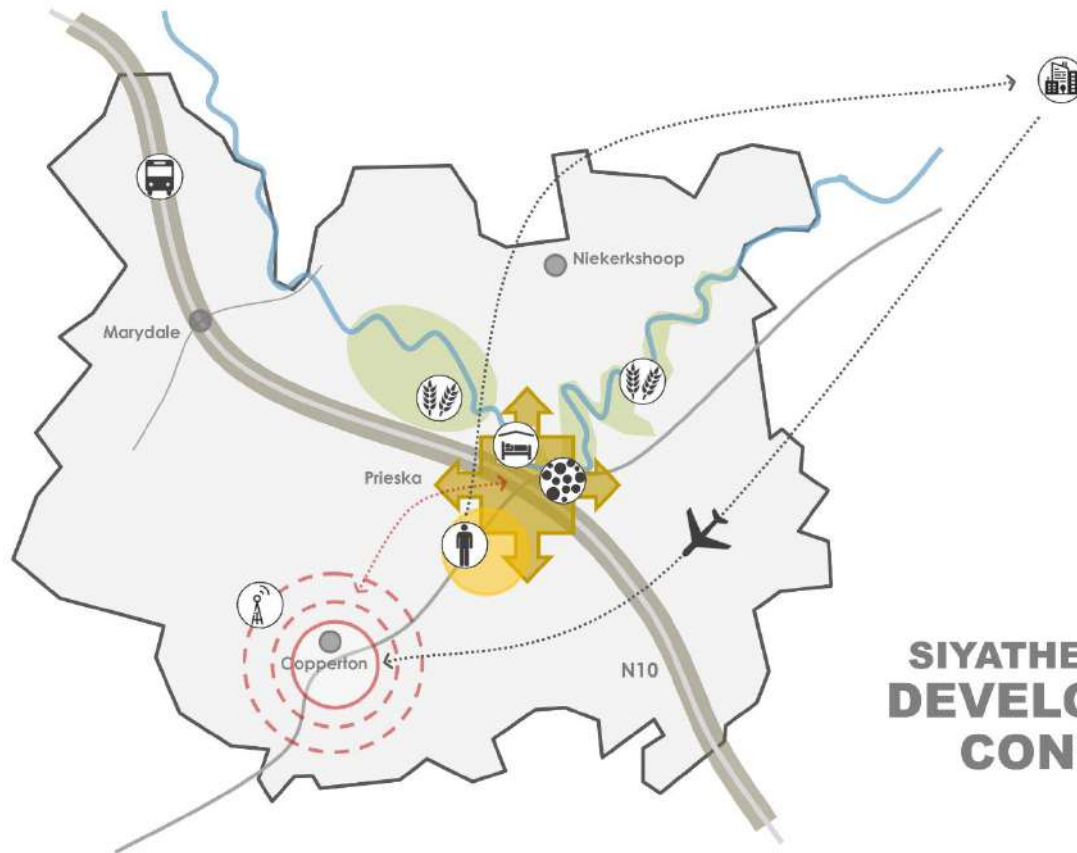
Taking into account the movement pattern set out above, it can be assumed that the strongest movement of people and goods occurs along the N10 freeway because of the road's hierarchy and the fact that this axis connects Namibia and Upington in the northwest to De Aar and Port Elisabeth in the southeast. Movement along the axis is supported and strengthened by an existing freight railway line. A strong movement of people and goods also occurs between Prieska and Kimberley, largely because of the size of Kimberley. This implies strong movement along the R357. Movement along this axis is supported by military and chartered flights to Copperton airfield.

4. DEVELOPMENT CONCEPT

The development concept provides a platform for envisioning a spatial development concept for Siyathemba. This development concept needs to achieve specific objectives. The following development objectives have been identified for the spatial development of Siyathemba:

Objective 1: Protect, enhance and develop the agricultural industry

The existing agriculture industry is the historical economic base of Siyathemba, and remains so to this day. Consequently, it is important to protect and enhance the existing commercial agricultural industry. Partially this can be done by maintain and strengthen linkages between the agriculture industry and Prieska; the agri-service centre to the local commercial agricultural industry. At the same time, it is necessary to give a greater number of people within Siyathemba access to this industry. This can be done by developing irrigation subsistence farming along the Orange River near Prieska.



**SIYATHEMBA SDF
DEVELOPMENT
CONCEPT**

DIAGRAM B: DEVELOPMENT CONCEPT

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

Objective 2: Maintain and utilise external linkages

Siyathemba is linked to the regions and cities surrounding it. This linkage is becoming increasingly stronger as large high-tech companies are developing projects within Siyathemba, such as renewable energy projects. Ways to capitalize on these linkages is by utilising the accommodation industry as the connection between Siyathemba and these external economic entities. It is also necessary to ensure good and direct linkages between Prieska and the N10 freeway. The latter relates to physical linkages, but there are also non-physical linkages to take into account. For example, it is necessary to improve the forward and backward linkages between the local population and the city. Forward linkages can be established through skills training to improve the mobility of the youth to access employment opportunities within the city.

Objective 3: Accommodate and capitalize of the high-tech industry

The increasing presence of the high-tech industry in Siyathemba includes the SKA, renewable energy enterprises, international military equipment testing and possibly in future advanced copper mining. This is necessary to accept, accommodate and ultimately capitalize on the economic development potential the external, high-tech industries brings to Siyathemba. In particular, the accommodation/ hospitality industry can be used as a means to capitalize on the presence of the high-tech industries.

Based on the development objectives set out above, a development concept is proposed for Siyathemba. The Development Concept is illustrated by Diagram B. The development concept aims to maintain and support the existing agriculture industry, development subsistence irrigation farming, linking to the N10 corridor and neighbouring cities as best as possible, and accommodate and capitalize on the expanding high-tech sector involvement in the area.

5. MUNICIPAL FRAMEWORK

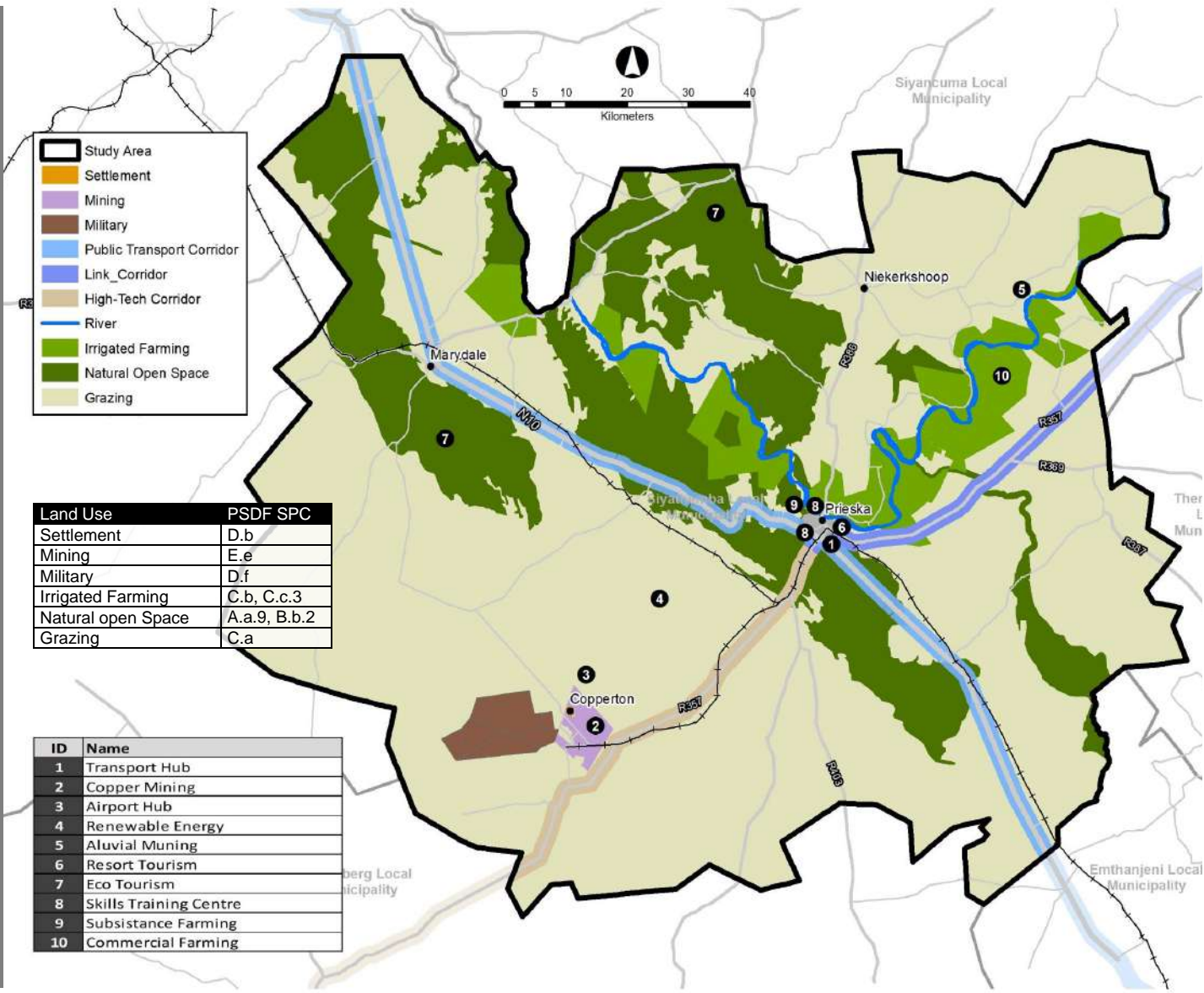
The Municipal Spatial Development Framework is presented by Figure A. The municipal structure of Siyathemba is broadly divided spatially by the N10 freeway. To the south of the N10 freeway the land use character is largely flat, sparse and rural. To the north of the N10 freeway the land use character is largely mountainous, residential and intensive farming. This broad land use pattern found within Siyathemba will remain, but a number of projects are proposed and indicated by number 1 to 10.

- Transport hub: Linking Prieska to the N10 freeway is of vital importance to the continued economic viability of Prieska. To create this linkage, it is proposed that a transport hub (1 on Figure A) be developed next to the N10 freeway at Prieska.

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- Copperton mine: Although mining at Copperton has ceased in 1991, there are current plans to reopen the mine (2 on Figure A).
- Airport link: It is proposed that an airport shuttle link (3 on Figure A) be instated between the Copperton airfield and Prieska. Establishing a shuttle link between the Copperton airfield and Prieska will ensure the personnel visiting the Copperton region uses the business tourist facilities located in Prieska, to the benefit of the Prieska economy.
- Renewable energy expansion: A small number of renewable energy projects have already been established and additional projects are in the pipeline. The development of the Copperton region for renewable energy (4 on Figure A) needs to be supported to intensify the high-tech industry clustering in the Copperton region.
- Alluvial mining: Alluvial diamonds are currently mined on the south bank of the Orange River, between Douglas and Prieska. The potential for the development of alluvial mines within Siyathemba can therefore be investigated (5 on Figure A).
- Resort tourism: The Orange River has tourist potential that can be exploited, such as developing a resort and adventure tourism along the Orange River. To fully utilize the potential of the Orange River, it is proposed that Die Bos be redeveloped into a more contemporary tourist facility (6 on Figure A).
- Eco-tourism: Much of the farmland in Siyathemba is regarded as wilderness and will therefore be suitable for the development of game farms (7 on Figure A) and associated safari lodges. In turn, these eco-tourist facilities can link to the business tourism industry in Prieska.
- Skills training centre: It is proposed that the old mill site, located on a disused park situated between the Bill Pickard Hospital and Loots Boulevard, be developed as an agri-industry and renewable energy skills training centre (8 on Figure A) to serve the Pixley Ka Seme District.
- Subsistence farming: To enable greater farming equity, it is proposed that small-scale, subsistence farms on smallholdings (8 on Figure A) be developed along the Orange River, north of Prieska. The aim of these smallholdings will be to give the local residents of Prieska and opportunity to establish irrigated farmland, small-scale commercial farming enterprises, and subsistence farming to supplement local food supplies.
- Commercial farming: It is important to protect and enhance the existing commercial agricultural industry (9 on Figure A). Partially, this can be done by maintaining and strengthen linkages between this agriculture industry and Prieska, which is the agri-service centre to the local commercial agricultural industry.

FIGURE A | SIYATHEMBA MUNICIPAL SPATIAL DEVELOPMENT FRAMEWORK



6. ROAD NETWORK

Siyathemba has a number of existing roads that provide the necessary access the municipal area requires. On the whole, this existing road network is considered to be sufficient to serve its existing and future access needs of Siyathemba. The primary roads of this road network links and provide access to all the prominent land uses within the Municipal area. For example, the R387 provides direct access to the Copperton airfield, the Copperton mine and solar plant, and the Alkantpan military testing range. The existing road network also links the remote rural towns in Siyathemba to Prieska, the primary settlement in Siyathemba. The R386 that links Niekerkshoop to Prieska and the N10 that links Marydale to Prieska.

An inter-regional road (Class 2 road) is proposed that will link Prieska to Niekerkshoop to Griekwastad to Postmasburg to Kathu. This will allow a more direct road-freight route for mining-related freight to be transported between Kathu and Port Elisabeth. The proposed road will connect to the N10 freeway, which in turn links to Port Elisabeth. In addition to the above, the Kathu to Prieska road will result in replacing the existing gravel road between Prieska and Niekerkshoop with a tar road, to the benefit of Niekerkshoop.

Locally, the Siyathemba Local Municipality proposes the development of a link road between Lemnertsville and the proposed mine township located north of the Prieska industrial area. This link road will in essence create an outer road connection, linking the various peripheral residential townships of Prieska to each other. It will also link these residential townships to the proposed Prieska industrial area, thus giving the residents of these townships access to the employment opportunities provided at the industrial area.

7. RESIDENTIAL

Figures B to D indicate the land parcels within Prieska, Marydale and Niekerkshoop that are proposed for residential development. These land parcels were identified, taking a number of factors into account, such as the potential to access collector roads and creating compact rural settlements.

Residential expansion within Prieska, Marydale and Niekerkshoop needs to occur in a controlled and consolidated manner to prevent settlement sprawl and the negative impacts associated with settlement sprawl. Some negative impacts of sprawl include high bulk services development cost due to long infrastructure runs and long walking distances to access social facilities and economic opportunities. It is therefore imperative that towns are compacted by using infill parcels of land located near the town

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centres of each respective town. The primary residential expansion areas that have been identified within Prieska, Marydale and Niekerkshoop are as follows:

a. Prieska medium-density residential development

Most of the land allocated for residential expansion has been located within Prieska, the primary town and agricultural service centre of Siyathemba. Land for medium-density residential expansion in Prieska was located along Upington Way, situated south of Lemnertsville, and along Arbeck Street, situated north of the Prieska industrial area.

b. Mine over-flow area

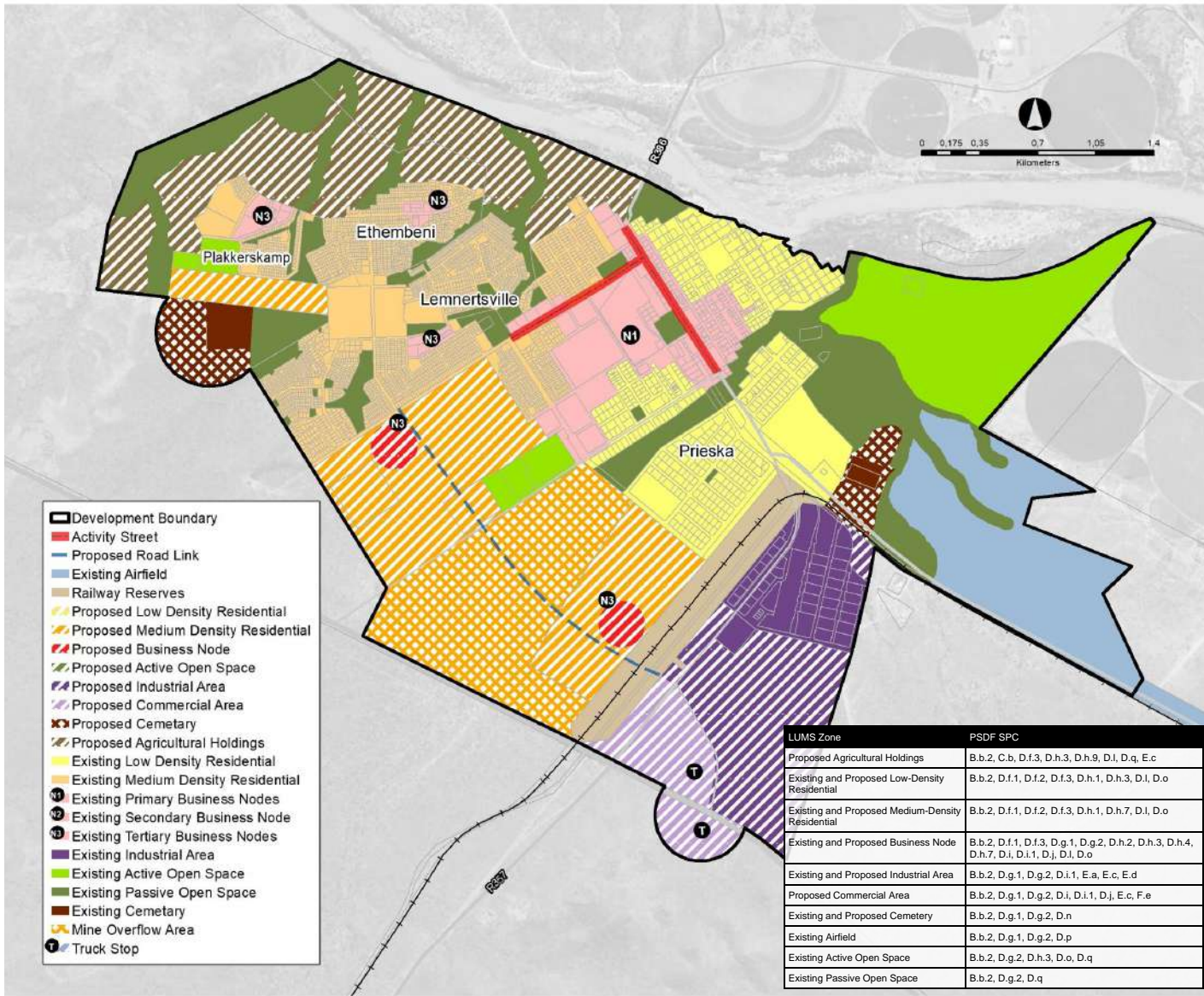
Figure B illustrates an area marked as 'mine overflow area'. This area is earmarked for the development of a residential township for mine workers, should the proposed mine township along Arbeck Street prove not to be sufficient to cater for the needs of the Copperton mine. Thus, this land can only be used if the influx of workers exceeds the current estimates of the mine and can only be developed as a last resort and if all other development areas proposed for residential development is fully developed. A Precinct Plan will need to be drafted for the area labelled 'mine overflow area' if development of this land becomes necessary.

c. Prieska smallholding development

Land was allocated for smallholdings, located north of Ethembeni. Although many of these smallholdings will be farmed on a communal bases by local communities from neighbouring residential areas (such as Ethembeni), a limited number of these smallholdings will be allocated to individual households to farm on these smallholdings. These smallholdings will therefore also have a residential function.

d. Marydale medium-density residential development

Relatively small parcels of land have been allocated for medium residential density expansion in Marydale. One such residential expansion area involves the developed of a vacant extension of Rooidal, and another involves the northward expansion of Rama Rou up to the N10 freeway.

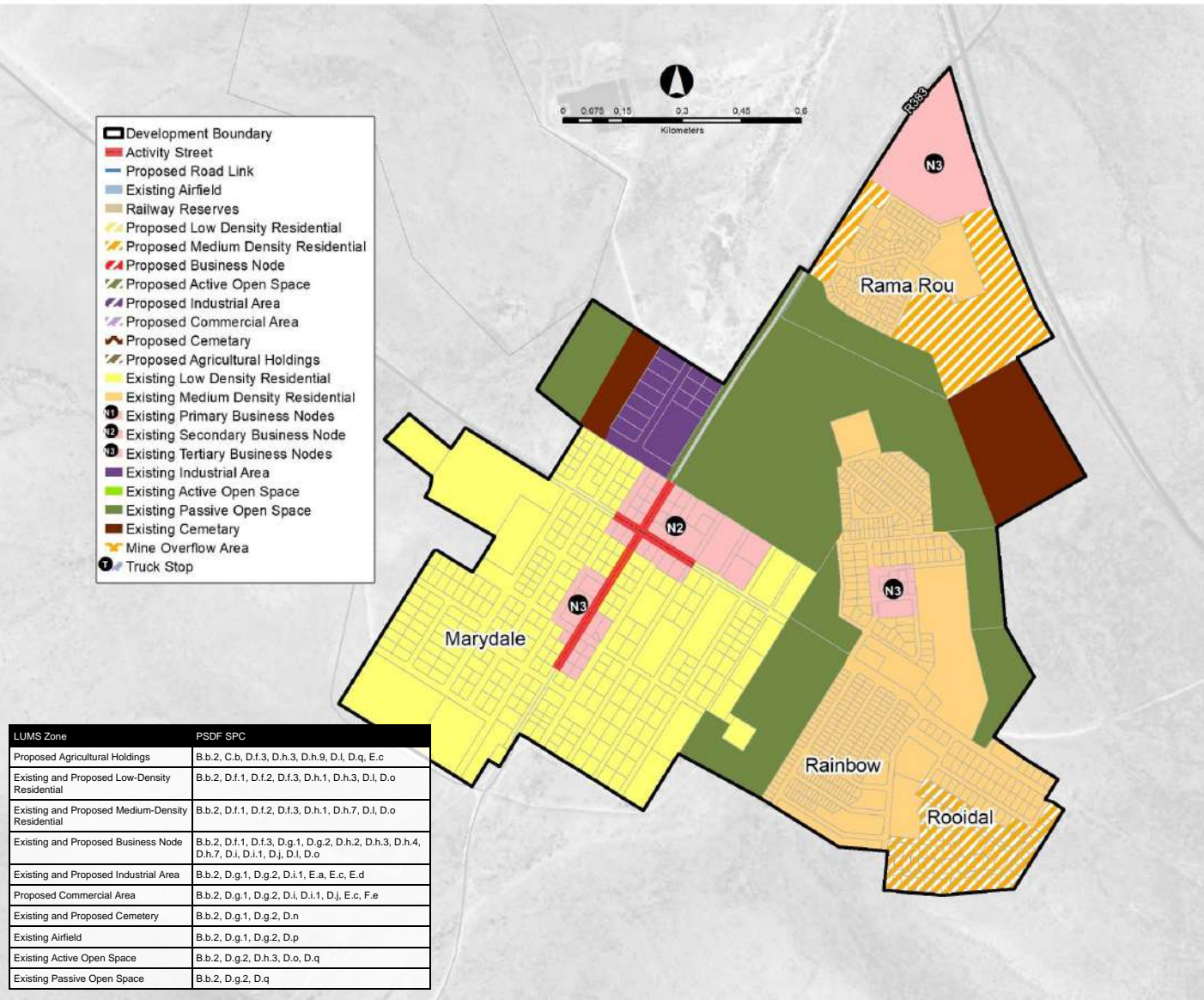


- Development Boundary
- Activity Street
- Proposed Road Link
- Existing Airfield
- Railway Reserves
- Proposed Low Density Residential
- Proposed Medium Density Residential
- Proposed Business Node
- Proposed Active Open Space
- Proposed Industrial Area
- Proposed Commercial Area
- Proposed Cemetery
- Proposed Agricultural Holdings
- Existing Low Density Residential
- Existing Medium Density Residential
- Existing Primary Business Nodes
- Existing Secondary Business Node
- Existing Tertiary Business Nodes
- Existing Industrial Area
- Existing Active Open Space
- Existing Passive Open Space
- Existing Cemetery
- Mine Overflow Area
- Truck Stop

LUMS Zone	PSDF SPC
Proposed Agricultural Holdings	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.I, D.q, E.c
Existing and Proposed Low-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.I, D.o
Existing and Proposed Medium-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.I, D.o
Existing and Proposed Business Node	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.I, D.o
Existing and Proposed Industrial Area	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Proposed Commercial Area	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Existing and Proposed Cemetery	B.b.2, D.g.1, D.g.2, D.n
Existing Airfield	B.b.2, D.g.1, D.g.2, D.p
Existing Active Open Space	B.b.2, D.g.2, D.h.3, D.o, D.q
Existing Passive Open Space	B.b.2, D.g.2, D.q

FIGURE B | PRIESKA
LOCAL SPATIAL DEVELOPMENT FRAMEWORK

FIGURE C | MARYDALE LOCAL SPATIAL DEVELOPMENT FRAMEWORK



- Development Boundary
- Activity Street
- Proposed Road Link
- Existing Airfield
- Railway Reserves
- Proposed Low Density Residential
- Proposed Medium Density Residential
- Proposed Business Node
- Proposed Active Open Space
- Proposed Industrial Area
- Proposed Commercial Area
- Proposed Cemetery
- Proposed Agricultural Holdings
- Existing Low Density Residential
- Existing Medium Density Residential
- Existing Primary Business Nodes
- Existing Secondary Business Node
- Existing Tertiary Business Nodes
- Existing Industrial Area
- Existing Active Open Space
- Existing Passive Open Space
- Existing Cemetery
- Mine Overflow Area
- Truck Stop

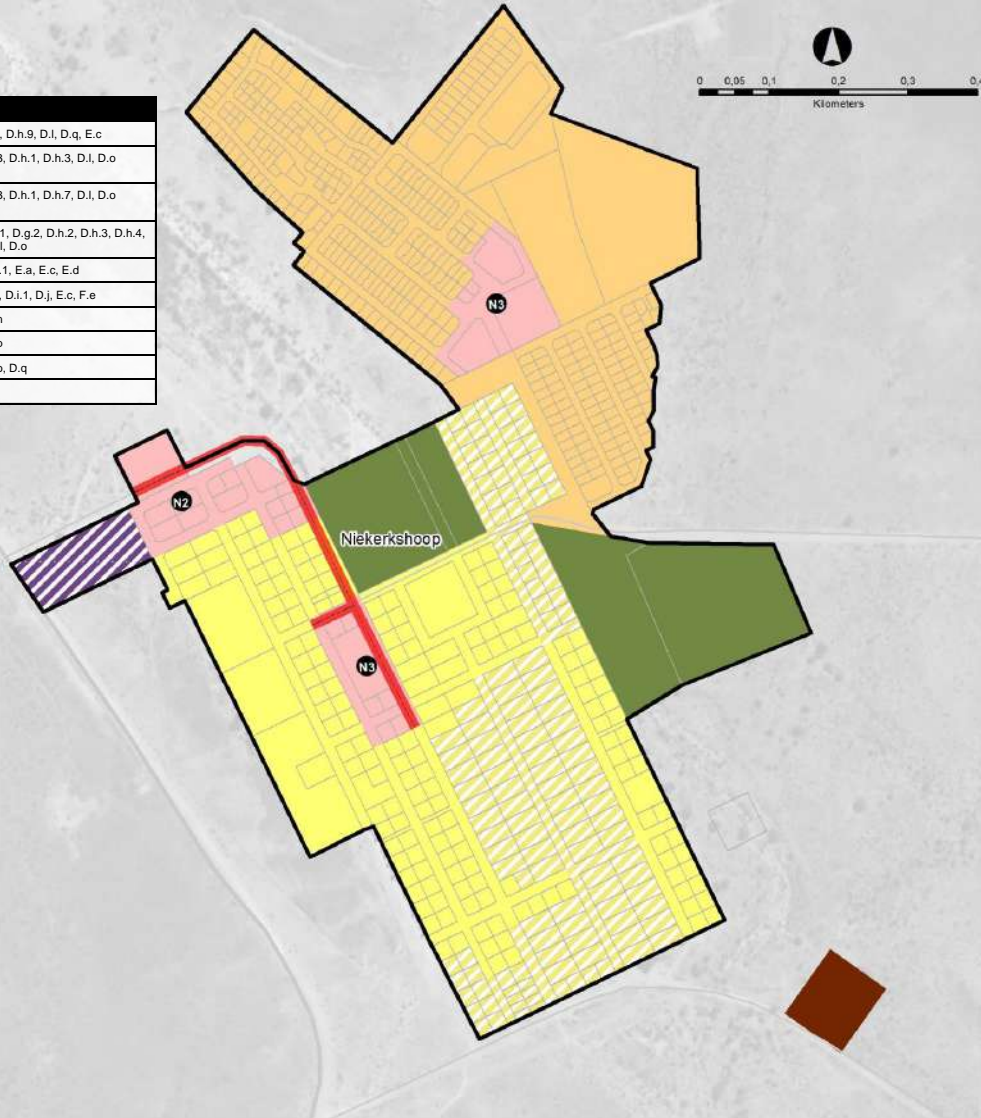
LUMS Zone	PSDF SPC
Proposed Agricultural Holdings	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.i, D.q, E.c
Existing and Proposed Low-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.i, D.o
Existing and Proposed Medium-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.i, D.o
Existing and Proposed Business Node	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.l, D.o
Existing and Proposed Industrial Area	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Proposed Commercial Area	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Existing and Proposed Cemetery	B.b.2, D.g.1, D.g.2, D.n
Existing Airfield	B.b.2, D.g.1, D.g.2, D.p
Existing Active Open Space	B.b.2, D.g.2, D.h.3, D.o, D.q
Existing Passive Open Space	B.b.2, D.g.2, D.q





LUMS Zone	PSDF SPC
Proposed Agricultural Holdings	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.I, D.q, E.c
Existing and Proposed Low-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.I, D.o
Existing and Proposed Medium-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.I, D.o
Existing and Proposed Business Node	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.I, D.o
Existing and Proposed Industrial Area	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Proposed Commercial Area	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Existing and Proposed Cemetery	B.b.2, D.g.1, D.g.2, D.n
Existing Airfield	B.b.2, D.g.1, D.g.2, D.p
Existing Active Open Space	B.b.2, D.g.2, D.h.3, D.o, D.q
Existing Passive Open Space	B.b.2, D.g.2, D.q

- Development Boundary
- Activity Street
- Proposed Road Link
- Airfield
- Railway Reserves
- Proposed Low Density Residential Infill
- Proposed Medium Density Residential
- Proposed Tertiary Business Nodes
- Proposed Active Open Space
- Proposed Industrial Area
- Proposed Commercial Area
- Proposed Cemetery
- Proposed Agricultural Holdings
- Existing Low Density Residential
- Existing Medium Density Residential
- Existing Primary Business Nodes
- Existing Secondary Business Node
- Existing Tertiary Business Nodes
- Existing Industrial Area
- Existing Active Open Space
- Existing Passive Open Space
- Existing Cemetery
- Mine Overflow Area
- Truck Stop



**FIGURE D | NIEKERKSHOOP
LOCAL SPATIAL DEVELOPMENT FRAMEWORK**

e. Niekerkshoop residential infill development

Niekerkshoop contains a number of residential townships that have large numbers of vacant stands. It is proposed that these stands be developed before any new residential townships are created within Niekerkshoop. It is proposed that the existing vacant stands within Niekerkshoop be utilised for affordable housing, but that the stands NOT be subdivided into smaller stands.

8. INDUSTRIAL AND COMMERCIAL

Industrial and commercial land was made available in Prieska. The additional industrial land in Prieska should help strengthen Prieska as the agri-industrial centre and renewable energy hub within the region. No additional industrial land was made available in Marydale. Industrial land was made available in Niekerkshoop. Figure B and D illustrates the land parcels within Prieska and Niekerkshoop that are proposed for industrial and commercial development. These industrial and commercial expansion areas are as follows:

a. Prieska industrial area expansion

The land allocated for industrial expansion was located south of the existing industrial area in Prieska, thus essentially constituting the southward expansion of this industrial area. It is proposed that the industrial area be expanded southwards towards the N10 freeway. The industrial area will also have direct access to the N10 freeway, which is the primary freight route traversing Siyathemba.

b. N10 commercial hub

The land located on the intersection of the N10 and the R387 is proposed for commercial uses. This land is proposed for a public transport stop on the N10 freeway. This public transport stop can be combined with a truck stop and can include a bus and taxi rank, a large filling station, accommodation facilities (e.g. a motel), restaurant facilities, and a small retail outlet. Other related commercial land uses, such as warehousing and vehicle and truck repair workshops, can also be included in this transport node.

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c. Niekerkshoop industrial area

Approximately 13ha of industrial land was made available in Niekerkshoop. Niekerkshoop does not have an industrial area at present and local residents have expressed a need for industrial land. This industrial land can be utilised for uses such as vehicle panel beating.

The industrial and commercial areas proposed above are intended to help generate employment opportunities in Siyathemba. Providing industrial and commercial land within Siyathemba will strengthen Prieska as the regions agri-industrial service centre, as well as the country's renewable energy hub. The location of the industrial area expansion will also enable the industrial area to utilize the exposure provided by the N10 freeway. Linking Prieska to the freeway will allow Prieska to tap into the freight transport and public transport opportunities presented by the freeway.

The Northern Cape Provincial Growth and Development Plan (PGDP) 2018 proposes that the Pixley Ka Seme District is suitable for the development of a Special Economic Zone (SEZ) linked to the renewable energy sector. This Renewable Energy SEZ can ideally be located at Prieska, which is suited for the proposed Renewable Energy SEZ for a number of reasons. These reasons include the fact that Prieska is located near existing renewable energy projects, there is an existing demand for an SEZ at Prieska, the existing Prieska industrial area can easily be expanded up to the N10 freeway, and the Siyathemba SDF focusses on skills training for the renewable energy sector.

9. BUSINESS

To ensure the viability of proposed business activities within Siyathemba, it is important to develop a retail hierarchy to ensure the orderly and logical development of retail facilities within Siyathemba. The existing and proposed business nodes for the towns in Siyathemba are depicted on Figures B to D.

The Prieska CBD is the only primary business node within Siyathemba. Prieska has 3 tertiary business nodes and 2 additional tertiary business nodes that are proposed for Prieska to cater for future residential expansion. Marydale and Niekerkshoop each have 1 secondary business node and each have 2 tertiary business nodes. The following need to be mentioned regarding business nodes:

a. Strengthen the Prieska primary node

The Prieska CBD or primary business node within Siyathemba. To strengthen its role as a service centre to the surrounding agricultural industry, it is proposed that this node be strengthened by an additional 11,100m² of retail space and 1,100m²

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of office space to this node by 2030. A significant decentralization of retail and office space to secondary or tertiary nodes must be avoided at all costs to prevent the weakening or decline of the Prieska CBD.

b. Develop tertiary node at Marydale entrance

An opportunity exists to develop a tertiary business node at the entrance to Marydale from the N10 freeway. This tertiary node will serve both Rama Rou as a local convenience centre and capture consumer traffic passing the node on the N10 freeway. The retail potential in Marydale is small, with approximately 400m² of retail space that can be added to the proposed N10 freeway tertiary node. However, more retail can be added to this node than is allocated, taking into account the potential external consumer traffic that can be captured by this node from the N10 freeway.

c. Strengthen the secondary node in Niekerkshoop

The secondary node in Niekerkshoop serve as central area within the town. It is proposed that this node be significantly strengthened by adding additional retail and office space to this node. An additional 1,700m² of retail space and 1,100m² of office space has been allocated to the Niekerkshoop secondary node.

d. Develop new tertiary nodes in Prieska

Two new residential areas are proposed for the expansion of Prieska to accommodate its growing population. The location of these new residential areas may require that these new residential areas also contain a tertiary business node each. To this end, a total of 7,200m² of retail space and 1,000m² of office space has been allocated for these new tertiary nodes within Prieska. It is important that this retail and office allocation not be exceeded to prevent these nodes becoming competing nodes to the Prieska CBD or primary node

It is important to design and develop the existing and proposed business nodes in a manner that leads to the integration of these business nodes with the surrounding residential neighbourhood that it serves. This implies developing an 'open' land use arrangement, which allows pedestrians to conveniently access walk within the business node. To enable this, the buildings will need to edge (frame) the streets and parking will need to be located at the back of the buildings.

10. SOCIAL FACILITIES

Prieska can accommodate a limited number of additional social facilities. These facilities include a tertiary education facility (no larger than a satellite campus), and an emergency service centre. These facilities are all aimed at strengthening the primary service centre role of Prieska within Siyathemba. The proposed agri-industrial and renewable energy skills training centre is a suitable tertiary educational facility that can be developed in Prieska, and can function as a satellite campus of the Sol Plaatje University or other tertiary educational institution. This skills training centre will be a district facility, thus providing skills training to the Pixley Ka Seme District population. Neither Prieska, nor Marydale and Niekerkshoop, require additional primary or secondary schools to cater for the existing or future population of Siyathemba. However, an NGO (Non-Governmental Organization) centre can be developed in Marydale and Niekerkshoop respectively. Both these towns rely heavily on NGO assistance, such as disability care, and will therefore benefit from such a facility.

11. HOUSING

Affordable housing is a critical and central component of spatial development within Siyathemba. However, rural towns such as Prieska is sprawling beyond its walk-range due to the use of detached housing typologies. The sprawling nature of these towns need to be curtailed, and this can only be done by applying higher-density housing typologies selectively. The following affordable housing approaches can be considered in this regard:

a. Town centre

The redevelopment of derelict and abandoned towns centre sites with new housing stock needs to be encouraged. In turn, these localities will place new housing within walkable proximity of existing employment opportunities and social amenities found within these town centres. Higher-density housing typologies, such as row housing and walk-ups, will also be suitable and even desirable within town centres.

b. Residential areas and nodes

The development of residential areas should be structured in a manner that places emphasis on providing a mix of housing typologies and tenure types. Detached housing will, as always, remain the primary housing typology within residential

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areas, but can be varied with row housing development. Row housing can be applied in residential area nodes to strengthen the spatial identity of these nodes.

TABLE B: AFFORDABLE HOUSING ALLOCATION

Town	Township Layout	No. of Residential Stands Available	Housing Need year 2019 to year 2030
Prieska		3319	1628
Plakkerskamp	Proclaimed	64	
Lemnertsville	Proclaimed	138	
Lemnertsville South	Planned	1255	
Prieska Mine Housing		600	600
Orion Minerals	Planned	600	
Marydale		182	250
Old town	Existing	93	
Rooidal	Proclaimed	80	
Rama Rou	Proclaimed	9	
Niekerkshoop		149	181
Old town	Existing	149	
Total Stands		4250	2659

Source: Urban Dynamics Gauteng, 2019

c. Smallholdings

Smallholdings agricultural can be done on a communal and individual household bases. On an individual household bases, smallholding stands can be allocated to individual households for subsistence farming purposes. This will require constructing affordable detached housing on these smallholdings, using the government housing subsidy scheme.

To ensure future housing development contributes to the historic and rural character of the towns in Siyathemba, it is proposed the all new housing be designed to continue the historic and rural character of the towns in Siyathemba. Compiling architectural design guidelines for Siyathemba can help blend the design of these new housing developments into the historical architectural style of the municipality.

Table B indicates the number of stands that are vacant, the stands that have been proclaimed and the stands that are planned for the towns within Siyathemba. Prieska has a number of stands that have been proclaimed in Lemnertsville and Plakkerskamp.

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It also has a large township that is planned south of Lemnertsville. This township will contain 335 bonded stands and 920 subsidized stands. This brings the total number of stands available and planned within Prieska to approximately 3,300 stands, which significantly exceeds the approximately 1,600 stands needed within Prieska up to the year 2030. In addition to the above, a township of approximately 600 stands is being planned in Prieska that will accommodate the mine worker households of the Copperton mine, should the mine be reopened.

Marydale has approximately 180 existing vacant stand and stand that already have been proclaimed. This is slightly smaller number of stands than the 250 residential housing units that will be required in Marydale by the year 2030. Niekerkshoop has approximately 150 existing vacant stands located in the old town of Niekerkshoop. This is a slightly smaller number of stands than the 180 housing units that will be required in Niekerkshoop by the year 2030.

12. OPEN SPACE

The open space network proposed for Siyathemba is depicted on Figure A. This open space network consists mountainous areas, as well as perennial rivers. The Doringberg is a mountain range that traverses the centre of the municipal areas, stretching from the southeastern corner of the municipal area to the northwestern corner of the municipal area. Apart from its ecological value, this mountain range is a significant landform defining the municipal area by giving it a specific character. It is therefore important to protect the Doringberg from settlement development, intensive farming and in particular mining activities. This does not imply that no activities or land uses can occur on this mountain range, but that all activity and land use should be done in a manner that will retain the ecological integrity and visual beauty of the mountain range.

Apart from the Doringberg, the Orange River is another significant ecological feature traversing Siyathemba. The Orange River is arguably the most ecologically valuable natural area within Siyathemba, especially when considering it is the heart of the agricultural industry of Siyathemba. The conservation of this natural open space is therefore of the utmost importance. To do this, it is necessary to protect the banks of the river, as well as the water quality of the river. Because most of the banks of the Orange River are used for intensive agricultural purposes, conservation of the Orange River will require employing responsible farming practices along the banks of the Orange River.

13. AGRICULTURE

The irrigation agriculture industry located along the Orange River is a fully established and highly-developed agricultural sector. This agricultural sector draws irrigation water from the river, which in turn allows this agricultural sector to exist in an otherwise arid environment.

Currently, only the formal, highly-developed agricultural enterprises access irrigation water from the orange River. To enable greater farming equity, the Orange River and its agricultural benefits also needs to be made accessible to small and subsistence farmers within the region. To do this, it is proposed that smallholding be developed north and northeast of Ethembeni for small-scale and subsistence farming. The aim of these smallholdings will be to give the local residents of Prieska and opportunity to establish irrigated farmland, small-scale commercial farming enterprises, and subsistence farming to supplement local food supplies.

The smallholding area proposed north of Prieska is illustrated on Figure B. This smallholding area will serve as a transition area from the denser northern suburbs of Prieska to the less dense rural areas situated along the Orange River. The extension of the smallholding area up to the Orange River enables irrigation water to be extracted from the Orange River for crop farming on the smallholdings. This will require the design and implementing of an irrigation system that extracts water from the Orange River and transports it via irrigation channels to the individual smallholdings. It is proposed that the development of the smallholdings and its irrigation system be developed by the Pixley Ka Seme District Municipality through its One Hectare One Household Strategy.

14. RENEWABLE ENERGY

Renewable energy development is driving significant changes in the rural regions of the Northern Cape, which includes Siyathemba. This trend is supported by national government who, responding to climate change, have begun adopting policies and strategies to promote the uptake of renewable energy. In response to this, it is important that land use planning provides effective guidance on the development of renewable energy plants, from the siting of plants to the alignment of electricity grids. A number of steps can be taken by the local municipality that include the following:

- The municipality must prepare a renewable energy policy on how to deal with the development of renewable energy plants within its area of jurisdiction, and its impact of local communities and the environment.

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- Support renewable energy planning at master planning stage to enable an agreed approach to the development of renewable energy in the municipality
- Bring awareness and understanding on renewable energy issues amongst the local communities and planning professionals.
- Encourage university involvement in local skills training in renewable energy technologies to empower the young generation to become involved in the local renewable energy sector.

15. MINING

The Siyathemba mining sector currently only contributes a small percentage to the local economy, with the larger mines located outside the boundary of the municipal area or mines within located within Siyathemba no longer in operation, such as the Copperton mine. However, significant copper and alluvial diamond reserves situated within Siyathemba are currently underexploited by limited mining and quarrying activity. These mining reserves represents a local resource, providing opportunities and potential for economic growth, job creation and overall development enhancement in the Siyathemba area. However, it is important to note that policies that pertain to the advancement of mining activity within municipal areas are generally outside the ambit of local governmental planning and capacity. Policy is devolved from national (mainly DME and DTI) and provincial government. Despite this, the advancement of mining related activity within a municipal area is, at times, endorsed through documents such as IDPs (Integrated Development Plans) and LED (Local Economic Development) strategies.

16. TOURISM

Prieska, the location of most of Siyathemba's tourism industry, is situated on the banks of the Orange River. Up to now, much of the town has been developed without much regard for this natural feature, therefore not fully utilizing the potential of the river. Consequently, spatial measures must be implemented, which would improve the connection between the town and the Orange River for tourism purposes.

The development of tourist accommodation is central to tourism development within Siyathemba and needs to be done in a manner that ensures a quality tourism environment is created and maintained, which at the same time addresses the needs for local economic development and job creation associated with the tourist sector. Guesthouses are the primary tourist

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accommodation facility applied within Siyathemba. Consequently, the development of guesthouses within Siyathemba needs to be guided to ensure the orderly development and management thereof. A primary goal must be to ensure that the residential character of the guesthouse property remains intact. In addition, guesthouses must not severely impact on the surrounding residential neighbourhood in terms of air pollution, noise pollution or visual pollution.

SECTION 1: INTRODUCTION

1.1. STUDY PURPOSE

The Municipal Systems Act, Act No. 32 of 2000 (MSA) requires that each Municipality prepare a Spatial Development Framework (SDF) to manage spatial development within their areas of jurisdiction. The Siyathemba SDF was prepared to comply with the Municipal Systems Act, No. 32 of 2000. In addition, the Siyathemba SDF complies in terms of its content with the Spatial Planning and Land Use Management Act, No. 16 of 2013 (SPLUMA). The Siyathemba SDF was also aligned with the Northern Cape PSDF (2018), in particular of Spatial Planning Categories (SPCs), and adheres to the requirements of the Guidelines for the Development of Municipal Spatial Development Frameworks prepared by the National Department of Rural Development and Land Reform.

The Siyathemba SDF serves as a strategic document that provides municipal-wide strategic direction in terms of spatial development patterns, the promotion of economic development, the conservation of valued environmental assets, the enhancement of the effectiveness of public capital projects, the optimization of existing and planned municipal engineering infrastructure, the promotion of tourism and agricultural industries, and the reversing of distorted spatial human settlement patterns. As such, the Siyathemba SDF represents a long term (10-year) vision and plan for the municipal area and provides a long-term spatial planning context for the IDP.

1.2. REPORT STRUCTURE

The Siyathemba SDF was written in several distinct sections, addressing amongst others the socio-economic status, spatial characteristics, housing development, infrastructure network, and environmental issues pertaining to the municipal area. Although the report weaves these elements into a coherent framework for the management of spatial development within Siyathemba, the goal of the report structure is not to compel the reader to read the entire report from cover-to-cover. Instead, the report structure is such that the reader can (using the contents page) navigate to those sections that are relevant to the readers query. Taking into account the above, the Siyathemba SDF report was divided into the following sections:

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Section 2: Status Quo

This section involved the analysis of the information obtained for Siyathemba. This status quo analysis comprised a study of the existing national, provincial and district policy documents relevant to the Siyathemba SDF, a socio-economic analysis of the study area population, an analysis of the transportation and infrastructure network serving Siyathemba, an assessment of the natural environment, a soil capability study, a land use audit, and an analysis of the housing situation within Siyathemba.

Section 3: Development Vision

The visioning section involved defining objectives for the development of Siyathemba, based on an analysis of the development challenges facing Siyathemba. In turn, these objectives were used to prepare a Development Concept for Siyathemba. This Development Concept aimed to promote positive development trends and settlement patterns within the municipal area.

Section 4: Land Use Estimates

A Land Use Budget was prepared for Siyathemba, which calculated the development need and development potential within Siyathemba over a given period. This Land Use Budget provided quantitative projections upon which the spatial proposals were based, thus providing realistic and achievable spatial development goals.

Section 5: Development Framework

This section involved preparing development proposals for Siyathemba. The development proposals were based on the information gathered and conclusion made in the previous sections of the report. Proposals were made with regard to spatial development, which included proposals for residential expansion and housing development, the development of business nodes, and the provision of social amenities. In addition, this section addressed the need for transportation and municipal service infrastructure development, enhancement of the agricultural industry (especially subsistence agriculture), and the promotion of renewable energy, mining and tourism development in Siyathemba. These proposals were alignment of the Northern Cape PSDF objectives.

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Section 6: Land Use Management

The Development Framework set out above, was translated into a Land Use Management System (LUMS) that can be used to implement the Framework proposals through applications for land use change. Detailed land use management issues pertaining to the implementation of the Development Framework proposals, such as density and land use, were addressed.

Section 7: Implementation Framework

A comprehensive Implementation Framework was prepared for the implementation of the proposals presented in the Siyathemba SDF. This Implementation Framework contained a Development Programme, a Cost Estimate, and guidelines for governmental sector integration.

1.3. STAKEHOLDER PARTICIPATION

It is considered essential to obtain buy-in into the Siyathemba SDF. To achieve this, all relevant stakeholders were consulted. Consultation was conducted on the following four levels:

a. Project Manager

Monthly progress reports were submitted to the project manager responsible for the management of the Siyathemba SDF. This enabled the project manager to keep up to date with the progress of the project.

b. Technical Committee

Consultation meetings were held with key Provincial and Municipal technical personnel regarding the Siyathemba SDF, its finding and proposals. Typically, this included the project manager, officials from the Department of Rural Development and Land Affairs, and officials from the Siyathemba Local Municipality.

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c. Steering Committee

In addition to the above, consultation meetings were held with non-technical stakeholders having an interest in the Siyathemba SDF. Typically, these included officials from Provincial departments and Siyathemba councilors.

d. General Public

Meetings were held with the general public regarding the Siyathemba SDF and its proposal. Members of the public could give their inputs and make comments regarding the SDF, which were then incorporated into the SDF.

TABLE 1: SIYATHEMBA SDF STAKEHOLDER MEETINGS

Stakeholder	Purpose	Date	Location
Steering Committee	Inception	6 February	Prieska
Technical Committee	Situational Analysis	25 March	Kimberley
Steering Committee	Situational Analysis	3 April	Prieska
Technical Committee	Development Framework	21 August	Kimberley
Steering Committee	Development Framework	26 August	Prieska
Public	Public meeting	26 September	Prieska
Public	Public meeting	27 September	Marydale + Niekerkshoop
Technical Committee	Implementation Framework	15 October	Kimberley
Steering Committee	Implementation Framework	29 October	Prieska

Source: Urban Dynamics Gauteng, 2019

Technical Committee, Steering Committee and public meetings were held as set out in Table 1. The comments made by the stakeholders were incorporated into the Siyathemba SDF.

SECTION 2: STATUS QUO

2.1. CONTEXTUAL SETTING

The Siyathemba Municipal Area (also referred to as Siyathemba) is located within the Pixley ka Seme District Municipality in the Northern Cape Province of South Africa. As depicted on Figure 1, the Municipality is located within the central eastern parts of the Northern Cape Province on the banks of the Orange River. The nearest large business centre is Kimberley, which is located approximately 220km from Siyathemba.

Siyathemba Municipality was initially made up of three entities, namely Prieska, Marydale and Niekerkshoop. After demarcation, the area was extended to include these towns, its surrounding areas, as well as Copperton. The municipal area encompasses a geographic area of approximately 8,200km². The municipality is divided into 4 Wards.

Figure 2 depicts an aerial photograph of Siyathemba. It is evident from this photograph that Siyathemba is mostly a rural area comprising irrigated and grazing farmland. Irrigation farming occurs mostly along the banks of the Orange River. Siyathemba has a number of towns that are evident on the aerial photograph, which include Prieska, Marydale and Niekerkshoop, as well as a small mining town named Copperton. Prieska is the largest and central town of Siyathemba.

2.2. EXISTING POLICY

A number of policy documents affecting spatial development within Siyathemba have been developed in recent years. These documents include the National Spatial Development Framework, the Northern Cape Spatial Development Framework 2018, the Pixley Ka Seme District SDF 2013-2018, and the Pixley Ka Seme District Rural Development Plan 2017. These policy documents are recognized as the basic points of departure in the formulation of the Siyathemba SDF 2030. This will be done to ensure that the Siyathemba SDF meets the objectives of overarching plans, such as the Northern Cape Spatial Development Framework 2018 and the Pixley Ka Seme District SDF 2013-2018, which aim to integrate spatial development on a provincial and regional level. The

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spatial policy documents are compared in Table 2 and the thread tying the key proposals of these documents together are illustrated on Diagram 1.

2.2.1. NATIONAL DEVELOPMENT PLAN 2030

The National Development Plan is a broad strategic framework and it sets out a coherent and holistic approach to confronting poverty and inequality in South Africa. It does this based on six focused, interlinked priorities, which are as follows:

- Uniting South Africans around a common programme
- Enabling citizens to become active in their own development
- Promoting faster and more inclusive economic growth
- Building capabilities in institutions, infrastructure, education, etc.
- Achieving a capable and developmental state
- Encouraging leadership and responsibility throughout society

The priorities set out above is translated into a number of actions. The actions specifically relevant for spatial development are as follows:

a. Economy and employment

This action includes reducing the cost of living for poor households and developing proposals to achieve an acceptable minimum standard of living. In addition, this action involves removing the constraints on economic growth, investment and job creation.

b. Environmental sustainability and resilience

This action involves putting in place a regulatory framework for land use, to ensure the conservation and restoration of protected areas. It also involves investment in new agricultural technologies for commercial farming, as well as developing strategies for small-scale and rural farmers.

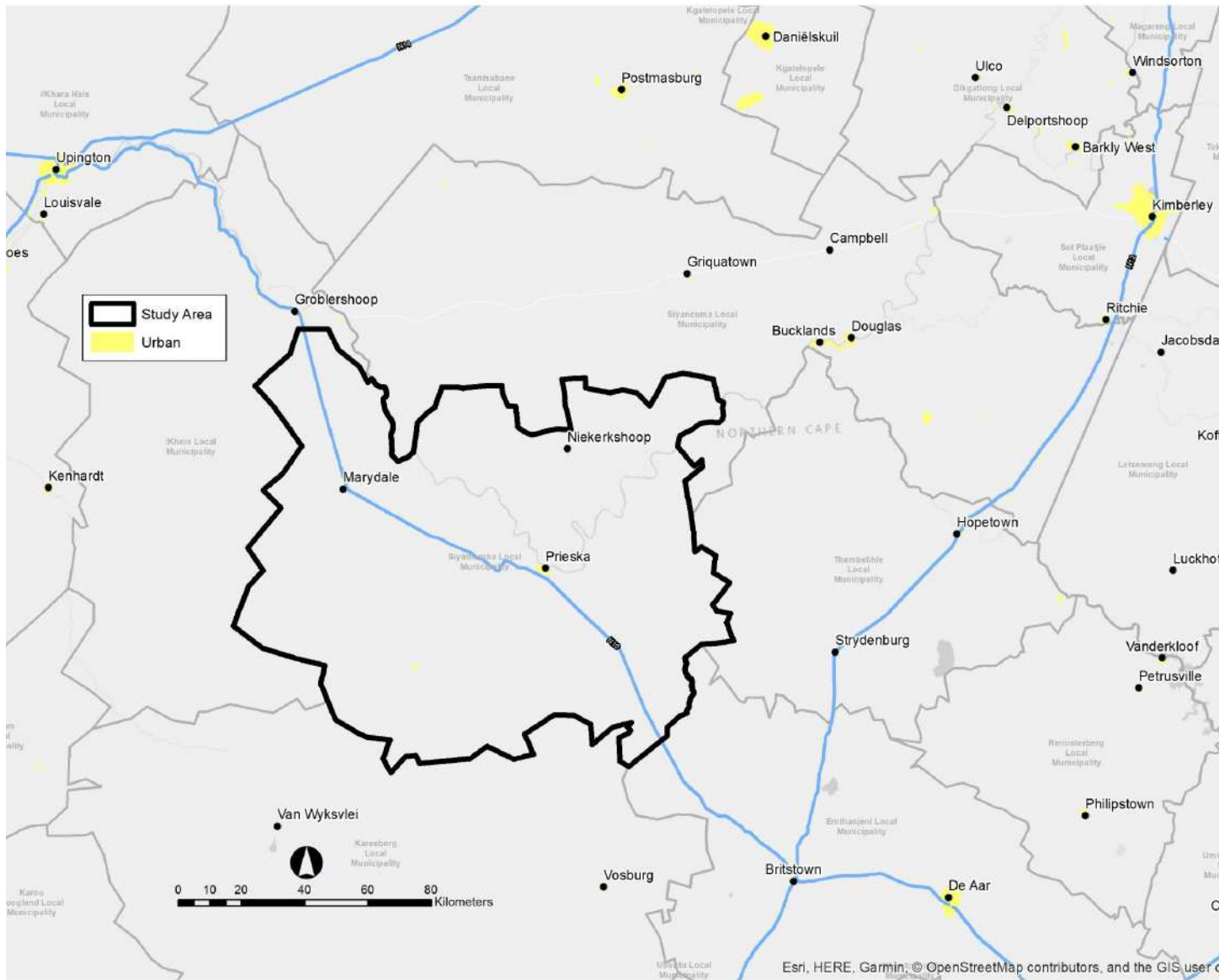
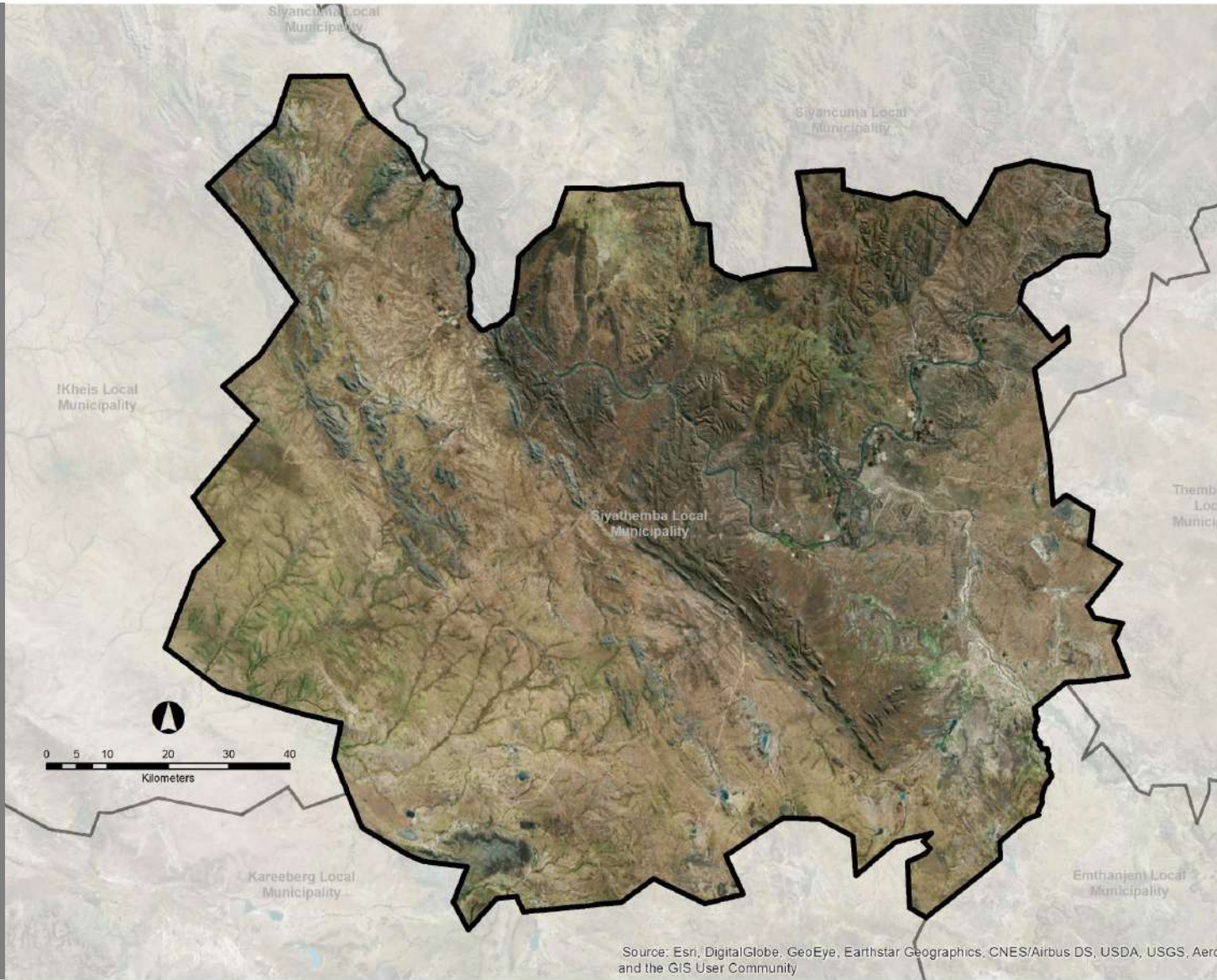


FIGURE 1 | STUDY AREA LOCALITY



FIGURE 2 | AERIAL PHOTOGRAPH



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c. Inclusive rural economy

This action involves activating rural economies through improved infrastructure and service delivery, a review of land tenure, providing services to small and micro farmers, focusing on the mining industry's commitments to social investment, and tourism investments. It also involves creating more jobs through agricultural development, based on effective land reform and the growth of irrigation agriculture and land production. Developing agri-industries include focusing on agri-industries, such as agro-processing, tourism, fisheries and small agri-enterprises where potential exists. Lastly, creating an inclusive rural economy involves enabling people to develop capabilities through skills transfer.

d. Transforming human settlements

This action involves improving the balance between the location of jobs and people. It also involves creating diverse housing options that would allow for more household choice and greater spatial mix and flexibility. In addition, it involves introducing mechanisms that would make land markets work more effectively for the poor and support rural and urban livelihoods.

2.2.2. SPLUMA 2013

SPLUMA is the primary government legislation guiding the preparation of Spatial Development Frameworks (SDFs). Following is a brief summary of the SPLUMA guidelines.

a. Principles for and SDF

Spatial Development Frameworks must comply with the principles stipulated in SPLUMA (Act 6 of 2013), which are the following:

- The principle of spatial justice, whereby:
 - Past spatial and other development imbalances must be redressed through improved access to and use of land;

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- Spatial development frameworks and policies at all spheres of government must address the inclusion of persons and areas that were previously excluded, with an emphasis on informal settlements, former homeland areas and areas characterised by widespread poverty and deprivation;
- Spatial planning mechanisms, including land use schemes, must incorporate provisions that enable redress in access to land by disadvantaged communities and persons;
- Land use management systems must include all areas of a municipality and specifically include provisions that are flexible and appropriate for the management of disadvantaged areas, informal settlements and former homeland areas;
- Land development procedures must include provisions that accommodate access to secure tenure and the incremental upgrading of informal areas;
- The principle of spatial sustainability, whereby:
 - Land development that is within the fiscal, institutional and administrative means of the Republic is promoted;
 - Special consideration is given to the protection of prime and unique agricultural land;
 - Consistency of land use measures in accordance with environmental management instruments is upheld;
 - Effective and equitable functioning of land markets are promoted and stimulated;
 - All current and future costs to all parties for the provision of infrastructure and social services in land developments are considered;
 - Land development in locations that are sustainable and limit sprawl are proposed; and
 - Result in communities that are viable;
- The principle of efficiency, whereby:
 - Land development optimises the use of existing resources and infrastructure;
 - Decision-making procedures are designed to minimise negative financial, social, economic or environmental impacts; and
 - Development application procedures are efficient and streamlined and timeframes are adhered to by all parties.
- The principle of spatial resilience, whereby flexibility in spatial plans, policies and land use management systems are accommodated to ensure sustainable livelihoods in communities most likely to suffer the impacts of economic and environmental shocks; and
- The principle of good administration, whereby:

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- All spheres of government ensure an integrated approach to land use and land development that is guided by spatial planning and land use management systems as embodied in this act;
- All government departments provide their sector inputs and comply with any other prescribed requirements during the preparation or amendment of spatial development frameworks;
- Requirements of any law relating to land development and land use are met timeously;
- Spatial plans, policies, land use schemes and procedures for development applications are prepared and amended;
- Transparent processes of public participation that afford all parties the opportunity to provide inputs on matters affecting them are enabled; and
- Policies, legislation and procedures are clearly set in order to inform and empower members of the public.

b. Generic SDF norms and standards

According to SPLUMA, the SDF must comply with the following generic norms and standards:

- Reflect the national policy, national policy priorities and programmes relating to land use management and land development;
- Promote social inclusion, spatial equity, desirable settlement patterns, rural revitalisation, settlement regeneration and sustainable development;
- Ensure that land development and land use management processes, including applications, procedures and timeframes, are efficient and effective;
- Include an analysis of existing land use patterns;
- Include a framework for desired land use patterns;
- Include existing and future land use plans, programmes and projects relating to key sectors of the economy;
- Include mechanisms for identifying strategically located vacant or under-utilised land and providing access to and the use of such land;
- Standardise the symbology of all maps and diagrams at an appropriate scale;
- Differentiate between geographic areas, types of land use and development needs; and
- Provide for the effective monitoring and evaluation system to enforcement compliance.

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c. Content of an SDF

In addition to the above, an SDF must have the following content:

- Include a written and spatial representation of a five-year spatial development plan for the spatial form for the municipality;
- Include a longer-term spatial development vision statement for the municipal area, which indicates a desired spatial growth and development pattern for the next 10 to 20 years;
- Identify current and future significant structuring and restructuring elements of the spatial form of the municipality, including Connecting Spines, activity spines and economic nodes where public and private investment will be prioritised and facilitated;
- Include population growth estimates for the next five years;
- Include estimates of the demand for housing units across different socio-economic categories and the planned location and density of future housing developments;
- Include estimates of economic activity and employment trends and locations in the municipal area for the next five years;
- Identify, quantify and provide location requirements of engineering infrastructure and services provision for existing and future development needs for the next five years;
- Identify the designated areas where a national or provincial inclusionary housing policy may be applicable;
- Include a strategic assessment of the environmental pressures and opportunities within the municipal area, including the spatial location of environmental sensitivities, high potential agricultural land and coastal access strips, where applicable;
- Identify and designate areas in the municipality where incremental upgrading approaches to development and regulation will be applicable;
- Identify and designate areas in which more detailed local plans must be developed;
- Proposed shortened land use development procedures and amend land use schemes were applicable;
- Provide a spatial expression of the coordination, alignment and integration of sectoral policies of all municipal departments;
- Determine and spatially depict a capital expenditure framework for the municipality's development programmes;

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- Determine the purpose, desired impact and structure of the land use management scheme to apply in that municipal area; and
- Include an implementation plan comprising of:
 - Sectoral requirements, including budgets and resources for implementation;
 - Necessary amendments to a land use scheme;
 - Specification of institutional arrangements necessary for implementation;
 - Specification of implementation targets, including dates and monitoring indicators; and
 - Specification, where necessary, of any arrangements for partnerships in the implementation process.

2.2.3. NATIONAL SDF 2018

The NSDF introduces five National Spatial Development Frames that set out the desired future National Spatial Development Pattern for South Africa by 2050. Amongst others, the purpose of these frames is to guide all future infrastructure investment by government and the private sector to a distinct set of nationally-significant areas. In turn, the aim of this targeted investment is to capitalise on key national spatial assets, locational potentials and agglomeration opportunities, and to bring about inclusive national development and transformation. The five national spatial development frames are as follows:

a. Frame One: Urban Regions, Clusters and Connecting Spines as the engines of national transformation and economic growth

The aim of this frame is to focus and sustain national economic growth, drive inclusive economic development and derive maximum transformative benefit from urbanisation and urban living. To this end, the NSDF proposes the development of a strong and well-functioning polycentric system of well-connected urban core areas within wider functional urban regions and corridors. These urban core areas must offer a wide range of high-order medical, education, government, safety and security services and housing types, and become the engines and drivers of national transformation.

b. Frame Two: Productive Rural Regions and Regional Development Anchors as the foundation of national transformation

The aim of this frame is to ensure national food security, rural transformation, rural enterprise development and quality of life in rural areas. This must be done through a set of strong urban-rural development anchors in functional regional-rural economies. Key to this frame is the that rural regions must be supported by urban-rural anchors and small service towns

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that support and provide access to economic, government and social services to the surrounding hinterland and provide links the rural areas to the rest of the country.

c. Frame Three: National Ecological Infrastructure System as enabler of a shared and sustainable resource foundation

The aim of this frame is to protect and enable sustainable and just access to water and other natural resources for the livelihoods of current and future generations. These shared natural resources include protected ecosystem and productive agricultural regions.

d. Frame Four: National Connectivity and Economic Infrastructure Networks as enabler of a shared, sustainable and inclusive economy

The aim of this frame is to develop, expand and maintain a transport, trade and communication network in support of national, regional and local economic development. To this end, it is necessary to capitalise on existing, and extend strategic, inter-regional and national, rail networks, ports, harbours and logistic hubs. It is also necessary to prioritise the extension of key national energy and water networks and harness renewable energy-generation opportunities.

e. Frame Five: National Social Service and Settlement Infrastructure Network as enabler of national well-being

The aim of this frame is to ensure effective access to the benefits of high-quality basic, social and economic services in a well-located system of vibrant rural service towns, acting as urban-rural anchors and rural-rural connectors.

2.2.4. INTEGRATED URBAN DEVELOPMENT FRAMEWORK 2018

The Integrated Urban Development Framework (IUDF) is a national policy framework prepared by The Ministry of Cooperative Governance and Traditional Affairs. The policy framework is designed to unlock the development synergy that comes from coordinated investments in people and places with the aim of creating inclusive, resilient and liveable cities and towns. This is done by introducing four overall strategic goals:

- Access: To ensure people have access to social and economic services, opportunities and choices.
- Growth: To harness urban dynamism for inclusive, sustainable economic growth and development.

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- Governance: To enhance the capacity of the state and its citizens to work together to achieve social integration.
- Spatial transformation: To forge new spatial forms in settlement, transport, social and economic areas.

These goals inform the priority objectives of the eight policy levers. The eight levers are premised on an understanding that (1) spatial planning forms the basis for achieving integrated urban development. These policy levers are as follows:

a. Policy lever 1: Integrated spatial planning

Integrated spatial planning is essential for coherent development. It stimulates a more rational organisation and use of urban spaces, guides investments and encourages prudent use of land and natural resources to build sustainable communities.

b. Policy lever 2: Integrated transport and mobility

Integrated transport and mobility are a vital component of South Africa's economic infrastructure investment. It contributes to a denser and more efficient urban form, supports economic and social development, and is crucial for strengthening rural-urban linkages.

c. Policy lever 3: Integrated and sustainable human settlements




Integrated and sustainable human settlements are key to redressing the prevailing apartheid geography, restructuring cities, shifting ownership profiles and choices, and creating more humane (and environment-friendly), safe living and working conditions.

d. Policy lever 4: Integrated urban infrastructure

An integrated urban infrastructure, which is resource efficient and provides for both universal access and more inclusive economic growth, needs to be extensive and strong enough to meet industrial, commercial and household needs, and should also be planned in a way that supports the development of an efficient and equitable urban form and facilitates access to social and economic opportunities.

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TABLE 2: SPATIAL POLICY DOCUMENTS COMPARED

	 Settlement	 Socio-economic	 Transportation	 Infrastructure	 Natural Resources
 NSDP	Rural regions must be supported by small service towns that provide access to economic, government and social services to the surrounding hinterland. These towns must link the rural areas to the rest of the country.	Ensure effective access to high-quality basic, social and economic services in well-located rural service towns, acting as urban-rural anchors and rural-rural connectors.	Develop, expand and maintain a transport network in support of local economic development. Capitalise on existing strategic, road and rail networks and harbours.	Prioritise the extension of key national energy and water networks, including renewable energy-generation.	Protect and enable sustainable access to water and other natural resources. These shared natural resources include protected ecosystem and productive agricultural regions.
 IUDF	Integrated spatial planning is essential to achieve a more rational use of land and to build sustainable communities.	It is important to seize the potential of new economies through technological innovation and invest in social capital and public services.	Integrated transport and mobility support economic and social development and is crucial for strengthening rural-urban linkages.	Infrastructure needs to be extensive and strong to meet household needs and support efficient and equitable settlements.	Integrated spatial planning is essential to encourage the prudent use of natural resources and to build sustainable communities.
	Develop sustainable, functional, integrated, balanced and	Promote equitable access to social services through the application of norms	Enhance the regions connectivity by maintaining and strengthening major	Manage demand, maintain, expand and refocus the infrastructure	Protect and manage biodiversity, by protecting existing parks,

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PSDF

vibrant towns and settlements. Create linkages between rural and urban areas thereby facilitating the flow of resources to between these areas. Revive rural areas into vibrant, equitable and sustainable rural communities.

and standards for social infrastructure development. Enhance the potential of young people through human capital development.

national roads and rail freight routes.

network to enable and sustain bulk water supply and energy distribution. Eradicate backlogs in water, sanitation and electricity.

expanding the protected areas network, ensuring the effective use of nature areas to support rural livelihoods, and protecting high potential agricultural resources.



DSDP

Understand the local environment to ensure consideration is given to the desirability and scale of the settlement development.

Invest in social infrastructure to address disparities and to provide access to basic social services.

Develop transport linkages to support local development and provide effective linkages to markets.

Provide adequate bulk infrastructure in the towns, smaller settlements, and the rural hinterland.

Consider bio-regions in future spatial planning, such as the Orange River Corridor.

Source: NSDF, IUDF, PSDF and DSDP

e. Policy lever 5: Efficient land governance and management

Both municipalities and private investors have a vested interest in land value remaining stable and increasing. At the same time, property values reflect apartheid patterns of segregation and mono-functional use, which need to be addressed to promote spatial transformation. Efficient land governance and management will contribute to the growth of inclusive and multi-functional urban spaces.

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f. Policy level 6: Inclusive economic development

The importance of employment creation requires seizing the potential of new economies through technological innovation, investing in social capital and public services, and focusing on spatial development. Inclusive economic development is essential to creating jobs, generating higher incomes and creating viable communities.

g. Policy level 7: Empowered active communities

Cities cannot succeed without the energy and investment of their citizens. In fact, the very power of cities stems from their unique capacity to bring together a critical mass of social and cultural diversity. This conception of democratic-citizenship is at the core of the 'active citizenship' of the NDP. Empowering communities will transform the quality of urban life.

h. Policy level 8: Effective urban governance

The complexities of urban governance include managing the intergovernmental dynamics within the city, relations with the province and with neighbouring municipalities. City governments need to manage multiple fiscal, political and accountability tensions in order to fulfil their developmental and growth mandates. The result will be inclusive, resilient and liveable urban spaces.

2.2.5. NORTHERN CAPE PSDF 2018

The Northern Cape PSDF acts as an enabling mechanism that responds and complies with, in particular, the National Spatial Development Framework (NSDF). The PSDF aims to give effect to the NSDF and at the same time address the current situation in the Northern Cape. The PSDF builds on the notion that such a scenario requires innovative economic intervention, which can only result from a dynamic and effective developmental state.

a. Approach

The PSDF aims to apply sustainability principles to all spheres of land use management throughout the Northern Cape in order to eradicate poverty and inequality and protect the integrity of the environment. Thus, the PSDF aims to serve as a mechanism to ensure that:

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- All land-uses enable people to have sustainable livelihoods and enhance the integrity of the environment; through effective resource management;
- Innovative management, skills and technologies are employed to bring human demands for resources into balance with the carrying capacity of the environment; and
- To capitalise on the comparative and competitive advantages that the Northern Cape holds over its bordering provinces and the neighbouring countries abutting the Northern Cape.

Taking into account the above, the PSDF aims to serve as a:

- Spatial land-use directive which aims to promote environmental, economic, and social sustainability through sustainable development;
- A guide towards reducing business risk (by providing clarity and certainty on where public infrastructure investment will be targeted) thereby opening-up new economic opportunities in these areas;
- A guide towards the location and form of public investment in the Northern Cape's urban and rural areas; and
- A basis for prioritising, aligning and integrating governmental programmes and projects.

b. Vision 2040

The PSDF positions the Northern Cape to transition towards a more inclusive, productive and resilient economic future with a key focus on the following key challenges restricting development in the province, namely:

- Limited accessibility and mobility in the Province;
- Limited reverse of the apartheid planning systems that manipulated urban and rural space-economies so that those enfranchised had preferential access to economic assets, particularly well located and resource endowed land;
- Being driven mostly by the primary sector (the NDP strives towards transforming the nature and performance of the economy to achieve sustained economic growth, greater environmental resilience, and much better inclusion);
- High dependency on the mining sector that proves to have only temporary investment potential (many mining towns reliant on the mining sector with limited value adding);

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- Little management and protection of local resources;
- Uncoordinated infrastructure development (economic growth is the number one priority of the Province);
- The province is subject to global environmental risks (i.e. climate change, depletion in material resources, anticipated changes to the global carbon regulatory environment, and food and water insecurity).
- Poor rural and urban linkages (the PSDF needs to take on the challenge of restructuring the urban and rural landscapes so that they offer socio-economic opportunities for all; and
- Uncoordinated spatial planning (politicians, the private sector and spatial planners have differing agendas and timelines. Political decision making often contradicts stated policies).

According to the NSDP, the Northern Cape Province comprises numerous unique and significant development potential attributes, including the environmental quality of life in certain areas, availability of resources, an extreme climate and urban and rural development opportunities. Water resources are restricted in most of the Northern Cape and is a main determinant of development trends.

A key opportunity in the Province is strengthening the core development triangle that is formed by linking Kimberley, Vryburg, Upington and De Aar. The highest population and economic concentration are located within this region. The region has good accessibility with major transport linkages towards Namibia, Gauteng, Lesotho (via Bloemfontein), Port Elizabeth (Coega) and the City of Cape Town. The development triangle sustains a diverse economy with strong mining, agricultural and renewable energy sectors. A sustainable and viable economic network must be developed within the development triangle. Siyathemba Local Municipality is located within the development triangle.

The Northern Cape Province Spatial Development Framework has the function at a provincial strategic level to plan and co-ordinate the broad spatial structure of the area. As such, the vision of the PSDF is to build a province that is abundant, unbiased and inclusive of protecting the environment, reconciling society and promoting economic development where all can participate without undermining the resources needed to sustain future generations.

c. Spatial development strategies

Four strategic objectives were identified in the PSDF that provide Strategic Focus Areas for intervention on provincial, district and local level. These are the following:

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Enhance regions connectivity, which involves:

- Compacting, densifying and diversifying urban growth in the Kimberley Urban Core and connecting it with a national network of resilient urban cores;
- Consolidating and expanding the provincial competitive advantages supporting the national competitive advantages
- Utilising the benefits of urbanisation to enhance the potential of young people through human capital development and opening-up of urban economies;
- Maintaining and strengthening international trade, ports, transport, through-routes and related infrastructure;
- Supporting international competitiveness through efficiency improvement on major national road and rail freight routes;
- Supporting diversification of economies, tourism, the knowledge economy, the entertainment industry, the green economy and alternative energy-related enterprise development;
- Managing demand and maintain, expand and refocus the infrastructure network to enable and sustain bulk water supply and energy distribution;
- Using effective land administration and urban land reform to guide and manage the interface between settlement, land-use and infrastructure planning in fast growing towns; and
- Focusing on place-making principles and green economy solutions.

Protect and manage biodiversity, which involves:

- Protecting and managing the protected national and provincial parks, as well as protected ocean areas;
- Expanding and furthering the establishment of the Protected Areas Network;
- Protecting strategic assets;
- Ensuring effective use of national protected and nature areas to support rural livelihoods, especially related to custodianship and tourism opportunities;
- Protecting and restoring Priority National Ecological Infrastructure Regions that is of national importance; and
- Protecting high potential and unique agricultural resources.

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Invest in infrastructure, which involves:

- Ensuring efficient supply of water, electricity and waste management services to sustain additional industry growth;
- Eradicating backlogs in water and sanitation, electricity, housing;
- Improving basic services;
- Providing green infrastructure, e.g. water tanks, renewable energy;
- Eradicating backlogs and maintain basic services;
- Addressing all social infrastructure, including education, health and emergency services, social and cultural facilities, social services, civil services, and recreational infrastructure;
- Eliminating inequalities among and within communities through social infrastructure investment;
- Improving the quality of life of poor communities, providing for law and order, and enhancing the stability of a community through social infrastructure investment;
- Promoting equitable access to social services for all communities and contributing to the development of integrated and sustainable human settlements through the application of norms and standards for social infrastructure requirements;
- Ensuring that sufficient land is reserved for these essential infrastructure facilities;
- Focusing on infrastructure projects identified as Strategic Infrastructure Projects (SIPs); and
- Concentrating infrastructure investment in areas with potential for sustainable economic development.

Promote urban and rural development, which involves:

- Developing sustainable urban regions, regional growth centres, towns and settlements where people, jobs, livelihood opportunities and services are aligned creating more functionally integrated, balanced and vibrant urban settlements and townships;
- Integrating urban and rural areas focusing on linkages between rural and urban areas thereby enhancing growth by facilitating the flow of resources to where they have the largest net economic and social benefits;
- Reviving rural areas into vibrant, equitable and sustainable rural communities

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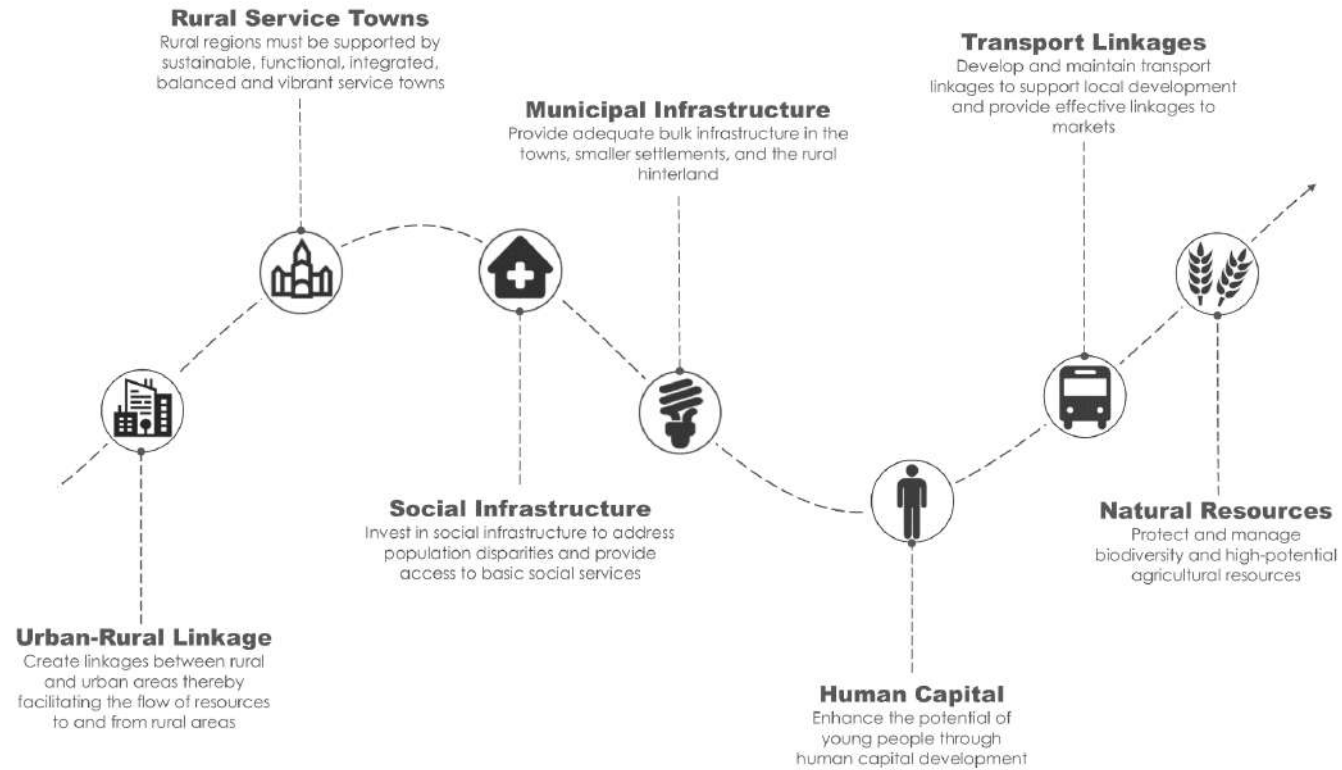


DIAGRAM 1: SPATIAL POLICY THREAD

2.2.6. PIXLEY KA SEME DISTRICT SDF 2013-2018

According to the Pixley Ka Seme District SDF, the establishment of the settlements within the rural areas and ongoing growth place continuous pressure on the environment. Future growth within the district should therefore focus on sustainable development with the focus to be placed along identified corridors and core areas. It is also important that the sensitive natural areas and productive agricultural land is protected from future development. The following spatial objectives should be employed in this regard:

- Protect and strengthen the natural environment by protecting high potential agriculture land to secure food production;
- Protect and strengthen the natural environment through the identification and protection of indigenous biodiversity and sensitive eco systems within and outside the urban areas;
- Promote and support local and regional economic development (and specific Tourism, Agriculture and Industry);
- Provide an effective social environment through planning, supplying and maintaining bulk infrastructure;
- Provide an effective social environment through equal access to all facilities enhancing integration and sustainable settlements.

The following detailed strategies are proposed by the Pixley Ka Seme District SDF for ensuring a sustainable environment that supports economic growth in the District:

a. Bio-physical Conservation

The Pixley area has a unique and important landscape and cultural history. The existing landscape and natural features within the Pixley Ka Seme district support three identified bio-regions that should be considered in future spatial planning of the district. These are the Kalahari Thornveld, located on the northern boundary of the district, the Orange River Corridor, which flows through Siyathemba, and the Nama Karoo, located in the southern parts of the District

b. Interregional linkages

The locality of Pixley Ka Seme District should be strengthened through the recognition of existing links within the district. The existing linkages and corridors with the adjoining municipalities, districts, provinces and bordering countries should be

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strengthened and further developed to enhance the potential economic that these provide the District. Due to the vast areas within the district, the effective development of transport linkages plays an important role in the support of local development and to provide effective linkages to markets.

c. Settlement development

Settlements in the Northern Cape are generally structured through the application of general standards and regulations. These regulations do not always take cognisance of the site-specific requirements to create liveable environments. It is necessary to have a thorough understanding of the local environment to ensure that consideration is given to the desirability and scale of the development.

d. Industrial Development

Industrial activities that have the potential to stimulate economic diversification and development. However, future industrial development needs to be effectively managed to ensure energy efficiency, more effective utilisation of water, reduction of emissions and pollution, reduction of electricity consumption, development of renewable energy resources, industrial development within the defined Connecting Spines and close to major transport linkages and bulk infrastructure.

e. Infrastructure Development

The development of an effective, competitive and responsive infrastructure network is imperative for the ongoing economic development within the district and local municipal areas. It is vitally important to provide the correct form of infrastructure to support development. The provision of bulk infrastructure does not only support economic development, but also housing development in these areas. The key challenge in Pixley is not only to provide adequate bulk infrastructure in the towns and smaller settlements, but also in the rural hinterland of the District.

f. Social infrastructure

The sustainable use of capital resources must unlock meaningful and lasting benefits for the people in the District. It is important for investment in social infrastructure to address disparities of the past and to provide more people access to basic social services for improved living environments.

g. Tourism development

Tourism is capable of mobilising and rejuvenating many other sectors of the economy. The promotion and development of the Northern Cape as a global competitive tourist destination must be supported on district and local municipal levels. Effective tourism development should also be supported and developed on suitable private land to further enhance this industry.

2.2.7. PIXLEY KA SEME DISTRICT RURAL DEVELOPMENT PLAN 2017

The Pixley Ka Seme District Rural Development Plan (DRDP) states that the preparation of Spatial Development Frameworks needs to take cognisance of the Rural Development policies and plans proposed and these should form part of the SDF review process as per SPLUMA Act No. 16 of 2013. The DRDP provides rural development focus areas that need to be considered when preparing SDFs for rural areas in the district. Following are extracts from the DRDP.

a. Agricultural land conservation

According to the DRDP, it is essential that agricultural lands be protected, dedicated, and committed primarily to agricultural use to ensure the successful development of diversified agriculture within the District. Rural community and agricultural boundaries need to be established to protect agricultural lands from development. Good and cohesive agricultural fields should be preserved for agricultural production and not be put to any other incompatible land use. Current impediments to diversified agriculture use or agricultural industry development should be mitigated, minimized or removed wherever possible. Agricultural land should be zoned based on land suitability to promote sustainable production systems and to preserve it for food security.

b. Urban-rural linkages

Rural-urban linkages can be defined as the structural social, economic, cultural, and political relationships maintained between individuals and groups in the urban environment and those in rural areas. Typically, rural-urban linkages are often articulated in the nature and forms of migration, production, consumption, financial and some investment linkages that occur within the rural-urban symbiosis. These factors do not only represent rural-urban dynamics but can also be an important source of rural poverty reduction in rural areas.

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The DRDP highlight the importance of looking at both rural and urban spaces as inter-related. The emphasis is upon the interplay between rural and urban areas and its potential for national poverty reduction particularly in our context of rapid urbanisation and existing rural-urban disparities. The emphasis is on highlighting how rural and urban areas intersect and how these linkages can be mobilised for positive development outcomes in both rural and urban spaces.

It is widely recognised that there exist economic, social and environmental interdependences between urban and rural areas. For example, rural areas depend on urban areas for university education, credit, agriculture-led services such as farm equipment and advice, hospitals and government services. By contrast, urban areas depend on rural areas for water resources, food production, and waste disposal. Urban waste can be used as a source of organic matter or as source of nutrients for agriculture which can help rural farmers to restore degraded soils and turn unproductive land into valuable agricultural land. Rural communities are responsible for the stewardship of ecosystem services that are essential for human survival and well-being such as clean air and water, flood and drought mitigation, pollution mitigation, bio-diversity, and climate stabilization. Therefore, the management of rural-urban linkages is necessary for the maintenance of environmental resources.

c. Small towns as catalysts

The DRDP attaches greater importance to small towns in terms of their economic and social roles in development and as entry points for policy, investment and enterprise development. Emphasis is given to the interactions between small towns, the rural villages and urban economies. The strategic importance of small towns in local development is emphasized. The potential ability of small towns to positively shape the production, employment, and marketing opportunities available within the local economy and thus act as catalysts for local economic development is intimately linked to the quality of available infrastructure and the local enterprise sector. Small towns are more likely to have close links with the rural areas and therefore can play an important role in reducing rural poverty.

The location of small towns offers an appropriate entry point for public investment and policy interventions that are targeted at rural areas. However, the ability of small towns to attract investments and other economic activities is partly a function of their size. For example, enterprises in larger towns often enjoy better access to skills, technology, transport infrastructure and services, public utilities, repair services, and other support services. According to the DRDP, there is a need to develop capabilities of small towns to play an increased role in poverty reduction and rural development. Thus, there is a need to strengthen the production structure of small towns in order for them to play an increased role in local economic development.

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d. High-value agricultural production

Agriculture remains a critical part of rural development. However, there is still only limited Agri-processing within the District. An increase in irrigated land can increase both agricultural production and transform subsistence agriculture to cash based and more market-oriented agricultural economy. This major transformation can enable the economic base of a rural area to move away from subsistence farming towards a form of agriculture that is intensive and high value. Small-farmers may find new production opportunities and transform to new patterns of production, particularly high value produce. As village inhabitants grow commercial crops, they will increasingly consider farming as a business.

e. Infrastructure as catalyst

The role of infrastructure in rural-urban linkages is critically important. Infrastructure works as a bridge between rural and urban areas and between agricultural sectors and other sectors of the economy. In particular, roads infrastructure enhance access to urban markets, as well as health and educational facilities, which have significant impact on socio-economic development. Road infrastructure can enable rural commuters to access employment in towns. This form of movement remains a vital livelihood strategy for the poor in rural areas. Furthermore, road infrastructure can enable local farmers to link up with food processing industries, thus facilitating the development of cash crops.

f. Tourism

Rural tourism, and in particular safari lodges and game farms, it is often argued could support local food production and local farmers. Many safari lodges and game farms market themselves are being responsive to community needs. But cuisine is an increasingly important aspect of tourism, and ingredients have to be of a high and reliable quality. Therefore, most of these lodges use urban-based intermediary purchasers, for the sake of convenience, quality and reliability. The majority of lodges source the bulk of their fresh produce from established urban-based distributors or suppliers.

g. Commonages

Commonage farming is rapidly growing on municipal land in peri-urban areas. Commonage farmers are very diverse, and some show signs of becoming viable small farmers, and even emerging commercial farmers. The following categories of commonage farmers can be identified:

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- Survivalists: Households with few alternative sources of income (perhaps other than social grants or pensions), and who are likely to continue using livestock to fulfil basic food security needs;
- Micro-farmers: They have other livelihoods, and want to keep only a certain limited number of live-stock as an income supplement, hobby, or for cultural purposes;
- Emergent small-scale farmers: They show signs of commercialization and they would like to farm on a larger scale. These farmers may be good candidates for ownership of small-holdings, where they could either undertake small-scale agriculture, or combine this with other income-generating activities; and
- Proto-capitalist farmers: People who may have other livelihoods, but would like to go into commercial farming on a full-time or large-scale basis. For them, acquiring property may be important. These farmers would be ideal candidates for a land reform strategy, thus opting out of commonage use and finding their own farm.

h. One Hectare One Household Strategy

The DRDP specifically deals with the identification ways of enabling sustainable livelihoods for the rural poor. A key proposal the DRDP makes to address this is subsistence farming practices through a one hectare – one household strategy. The DRDP acknowledges that the One Hectare One Household Strategy is only suitable for areas with medium to high rainfall levels. It will therefore not be suitable for the Pixley Ka Seme District. However, the DRDP states that the principles of the proposals could guide future policy makers towards sustainable solutions in the Pixley Ka Seme District.

Realistically the One Hectare One Household Strategy will only be practical areas along the Orange and Orange River basins, where water and high soil potential are evident. Other than that, the strategy will not be feasible in the Northern Cape. Where opportunities for this strategy is not feasible, the focus should rather be on minimum livestock required to sustain sufficient income levels. In turn, this would guide the hectares required to sustain small livestock. Prioritisation of the proposed One Hectare One Household Strategy requires identifying suitable locations for the implementation of this strategy based on a number of criteria. The following criteria have been identified in the DRDP:

- Water: Access towards water is a critical factor and should weigh the highest when finding suitable locations;
- Biodiversity: High biodiversity areas need to be protected and are therefore not suitable for this strategy;
- Crop suitability: High potential for crop suitability is based on the opportunity for irrigation on a subsistence farming land that could prove to be viable compared to other regions;

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TABLE 3: ONE HECTARE ONE HOUSEHOLD STRATEGY ANALYSIS

Area	Water	Biodiversity	Crop Suitability	Livestock suitability	Solid Depth	Rainfall	Collection route	Accessibility	Land Availability	Grazing Potential	Access to Markets	Poverty Pocket	Functionality Score	Total (%)
Weighting	15%	5%	10%	10%	5%	5%	5%	5%	15%	10%	5%	5%	5%	100%
Carnarvon	2	4	1	2	3	2	3	3	1	2	2	4	1	21.5
Griekwastad	4	6	2	4	5	5	4	3	7	4	4	4	1	44.5
Vanwyksvlei	1	9	4	2	2	1	3	2	5	2	1	10	1	28.5
Phillipstown	2	8	1	3	5	4	1	4	2	3	3	4	2	28.5
Loxton	2	4	1	2	2	2	3	4	1	2	2	8	2	23.0
Vosburg	1	8	1	3	3	2	3	5	5	3	3	7	3	34.0
Petrusville	4	5	2	3	5	4	6	5	3	3	4	4	3	37.5
Victoria West	2	5	3	3	3	3	4	7	1	3	4	4	3	35.0
Vanderkloof	8	4	8	4	6	4	6	5	2	4	6	3	6	51.0
Orania	7	4	7	4	6	4	6	5	1	4	4	4	6	40.5
Niekerkshoop	2	8	1	5	6	3	1	3	2	5	5	8	5	36.5
Noupoort	3	5	1	4	4	4	4	6	2	4	4	6	4	35.0
Strydenburg	1	5	1	4	3	3	5	4	2	4	3	4	4	30.0
Marydale	4	8	2	5	4	2	5	5	5	5	4	5	5	49.5
Hopetown	7	6	7	5	5	4	6	6	1	5	6	4	5	43.0
Britstown	2	9	4	3	3	3	8	8	1	3	6	3	6	35.5
Colesberg	6	5	2	3	2	4	6	7	2	3	7	4	7	40.0
De Aar	3	7	1	3	3	4	5	5	2	3	7	3	7	41.0
Prieska	8	6	7	5	6	3	8	7	4	5	8	3	7	53.0
Hanover	2	5	1	3	4	3	4	5	2	3	4	4	6	31.5
Norvalspont	6	5	2	3	2	4	1	2	1	3	4	7	2	38.0
Douglas	9	6	8	7	6	4	6	6	5	7	7	2	7	57.0

Source: Pixley Ka Seme District Rural Development Plan 2019

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- Livestock suitability: Grazing potential indicates the areas more prone or least likely to succeed for livestock farming practises;
- Soil Depth: This needs to be assessed in terms of its suitability for irrigation;
- Rainfall: Rainfall involves taking into account higher or lesser precipitation occurrence within a region;
- Collection routes: Access to markets is determined by an area's location and proximity of towns and major transportation routes;
- Access to land: Towns with commonage has a clear advantage in this regard;
- Poverty pockets: This strategy will contribute to the benefit of areas with high poverty concentrations; and
- Overall functionality: The overall functionality of towns needs to be considered.

The criteria set out above was applied to the various rural settlement areas within the Pixley Ka Seme District to determine the potential to apply and implement the One Hectare One Household Strategy in that rural settlement areas. The results of this study are depicted on Table 3. As depicted on Table 3, the study found that Prieska (Siyathemba) has the second highest potential (only after Douglas) to apply and implement the One Hectare One Household Strategy.

2.3. SOCIO-ECONOMIC

2.3.1. SOCIO-DEMOGRAPHIC PROFILE

The purpose of this section is to provide an analysis of Siyathemba in terms of its socio-demographic development, particularly with regard to population and education.

2.3.1.1. Population and Households

Siyathemba population was calculated using Census 2011 figures (see Figure 3). As depicted by Table 4, Siyathemba housed a population of approximately 22,000 people by the year 2011. It was estimated that this population had increased to

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approximately 24,000 people by the year 2019. The number of households that resided in Siyathemba area by 2011 was estimated to be approximately 6,000. This figure was estimated to have increased to an estimated 6,600 households by 2019. Siyathemba currently has approximately 500 informal households living in informal settlements and approximately 250 informal households living within backyard shacks.

TABLE 4: SIYATHEMBA POPULATION 2019

Item	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)
Total Population	21 585	23 082	23 802
Formal population	19 198	20 504	21 170
Informal population	1 609	1 721	1 775
Backyard population	778	857	857
% growth		1,35	1,03
Households	5 996	6 412	6 612
Formal households	5 333	5 695	5 881
Informal households	447	478	493
Backyard households	216	238	238
Average household size	3,60	3,60	3,60
Household growth (incl. informal)		1079	1279

Source: Estimated from Census 2011 and Stats SA Community Survey 2016

TABLE 5: SIYATHEMBA URBAN AND RURAL POPULATION 2019

Settlement	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)	%
Urban population	18 747	20 047	20 673	87
Copperton	54			
Marydale	702			
Rainbow	624			
Rama Rou	1 098			
Rooidal	195			
Niekerkshoop	1 830			
Prieska	2 541			
Ethembeni	3 498			
Lemnertsville	7 437			
Plakkerskamp	768			

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Settlement	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)	%
Rural population	2838	1538	3130	13
Copperton Mine	3			
Siyathemba NU	2763			
Westerberg	72			
Total	21585	21585	23802	100

Source: Estimated from Census 2011 and Stats SA Community Survey 2016

Table 5 illustrates that Siyathemba is a largely urban area in terms of population, with 87% of its population living within towns and settlements within the municipal area. This is despite the fact that most of Siyathemba is rural from a geographical perspective. This high level of urbanization within Siyathemba inevitably stresses the need to manage town and settlements development within this municipal area.

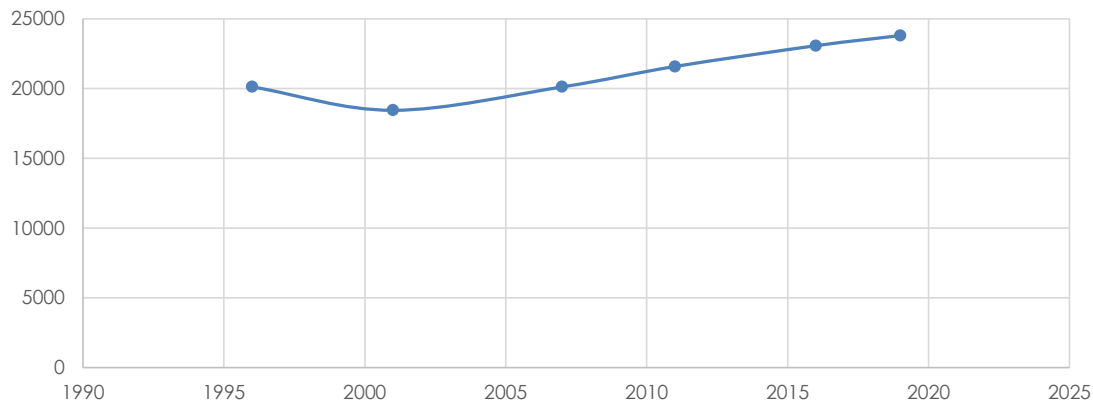
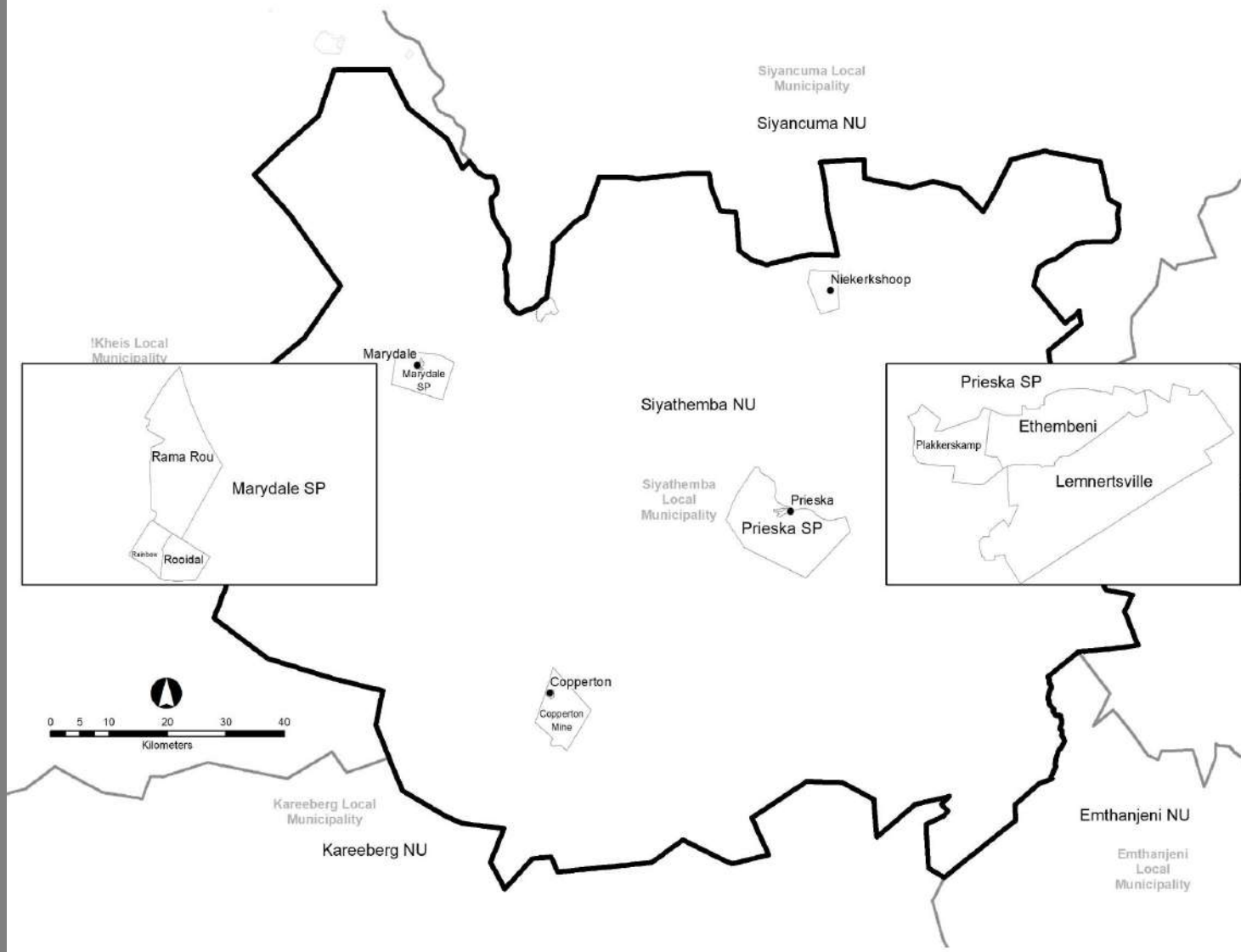


DIAGRAM 2: HISTORICAL POPULATION GROWTH TREND

Source: Census 2001, 2007 and 2011 and Stats SA Community Survey 2016

FIGURE 3 | CENSUS SUB-PLACES



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TABLE 6: SIYATHEMBA POPULATION GROWTH 1996 TO 2019

	1996	2001	2007	2011	2016	2019
Population	20126	18445	20120	21585	23075	23802
Growth		-1,76	1,46	1,77	1,35	1,03

Source: Estimated from Census 2011

The population growth figures set out above is reflected in the historical population growth trends (see Table 6). As illustrated by Diagram 2, the historical growth of the Siyathemba population has steadily increased over the past 30 years. There has been a slight decrease in the population directly after 1994, but this population decrease has since recovered with a steady population growth of around 1,5% per annum. The slight decrease in the population size directly after 1994 can most likely be attributed to the freedom of movement that was established after the abolition of Apartheid in 1994. This possibly resulted in many of the residents of Siyathemba migrating to larger urban areas within South Africa during this period.

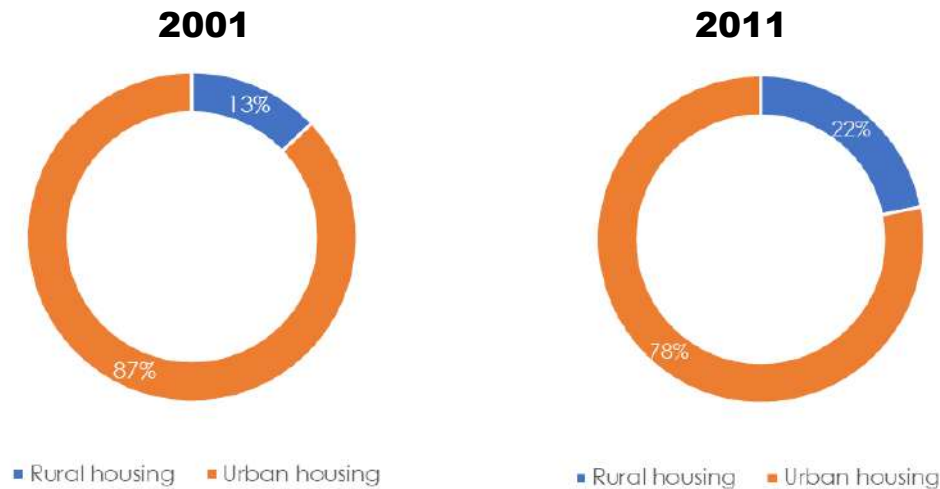


DIAGRAM 3: URBANIZATION TREND
Source: Census 2001 and 2011

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Diagram 3 compares the level of urbanization within Siyathemba between the years 2001 and 2011. This Diagram shows that the share of the urban population in Siyathemba has decreased between the years 2001 and 2011, despite the fact that the Siyathemba population has increased during this period. This implies a higher population growth rate in the rural areas of Siyathemba compared to the growth rate in urban areas. This urbanization trend also dispels the motion that there are significant farm evictions taking place within Siyathemba.

2.3.1.2. Age Profile

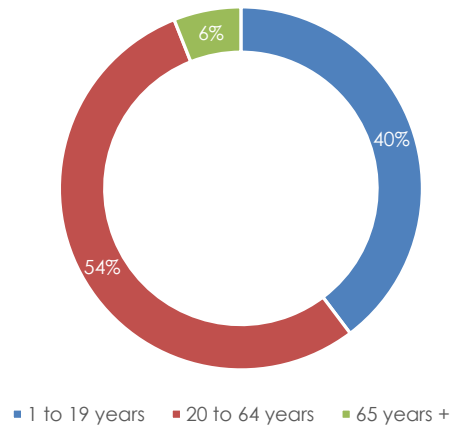


DIAGRAM 4: AGE PROFILE

Source: Census 2011

Diagram 4 reflects the age distribution within Siyathemba. Reading this Diagram, it can be concluded that Siyathemba has a predominantly young to middle-age population. The dependent and schools going population, aged between 1 and 19 years of age, constitutes 40% of the population. The working population, aged between 20 and 64 years of age, constitute 54% of the

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population. The retired and aged population constitute only 6% of the population. This Diagram shows that most people within Siyathemba can contribute to the economy and therefore, if employed, can carry the dependent sections of the population. The large component of the population under 19 years old and younger require investment in education and will want to enter the workforce in the short to medium term.

2.3.1.3. Education Level

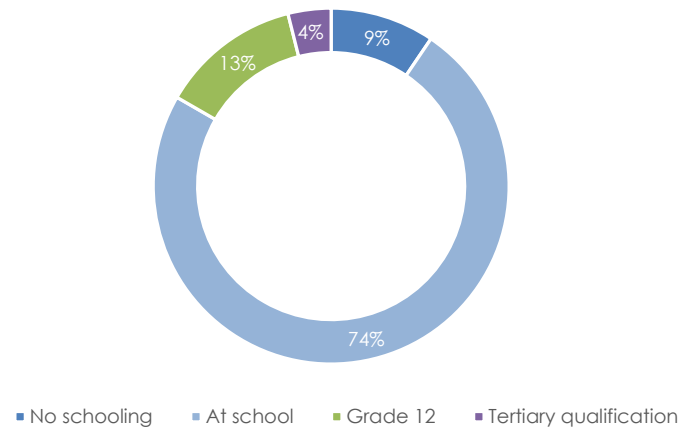


DIAGRAM 5: EDUCATION LEVEL
Source: Census 2011

Diagram 5 illustrates the education levels within Siyathemba. This Diagram shows that most of the people (74%) in Siyathemba are at school and have not yet completed Grade 12. In total, 13% of the residents living within Siyathemba have completed secondary school or Grade 12. In total, 9% of the population has no education and only 4% of the population has a tertiary educational qualification. Most of the people with a tertiary educational qualification have a diploma. The low levels of tertiary

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education within Siyathemba hinders the working population to access skilled employment opportunities. In particular, it limits their ability to access skilled employment in larger urban areas and thereby escaping poverty conditions in Siyathemba. Low skills training and tertiary education is a critical issue to address in Siyathemba.

2.3.2. ECONOMIC OVERVIEW

The purpose of this section is to perform an analysis of Siyathemba area in terms of its economic development, particularly with regard to employment, income and expenditure patterns.

2.3.2.1. Level of Employment

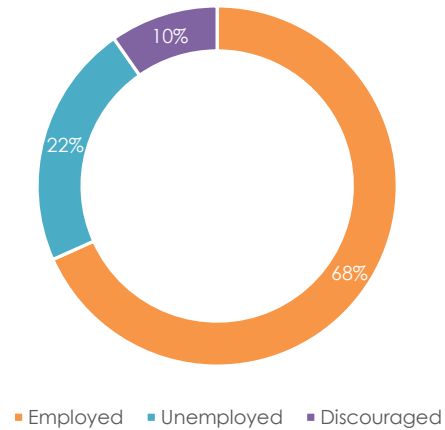
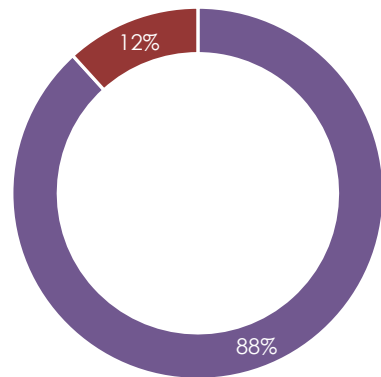


DIAGRAM 6: LEVEL OF EMPLOYMENT
Source: Census, 2011

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The unemployment rate can be expressed as the number of economically active people who are willing and able to work but do not have jobs. Unemployment is one of the major contributors to poverty as unemployed people are not able to provide for their household's basic needs due to the lack of disposable income. Diagram 6 indicates relatively high unemployment levels within Siyathemba, with 32% of the economically active population being unemployed or discouraged to continue looking for work. In total, 68% of the economically active population in Siyathemba are employed. If compared to the level of education within Siyathemba, the assumption can be made that most of the existing employment opportunities are low-skill employment, which are usually associated with low income levels.

2.3.2.2. Formal and Informal Sector



■ Formal sector ■ Informal sector

DIAGRAM 7: EMPLOYMENT SECTOR SPLIT
Source: Census 2011

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Diagram 7 depicts the occupations held in the formal and informal sectors within Siyathemba. It is evident from the Diagram that almost 90% of the population employed in Siyathemba are employed in the formal sector of the economy. Only 12% of the population employed in Siyathemba work in the informal sector of the economy.

2.3.2.3. Sector Employment

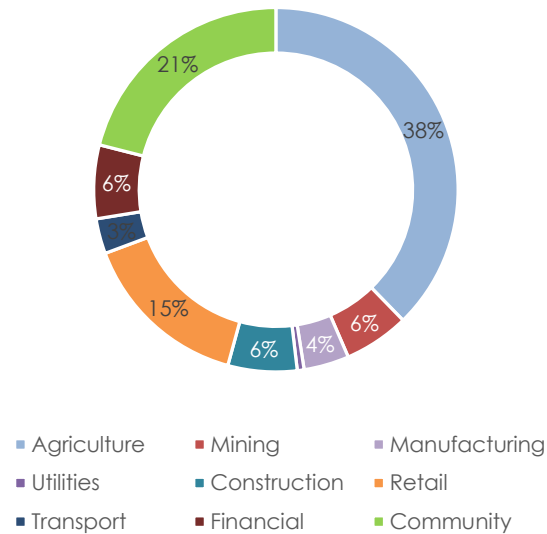


DIAGRAM 8: EMPLOYMENT BY SECTOR
Source: Census, 2011

Diagram 8 shows major employment sectors that employ residents living within Siyathemba. The key sectors employing Siyathemba residents are the agricultural sector (38%), community sector (21%), and retail sector (15%). The agricultural sector is the largest employer within the municipal area and it is clearly the mainstay of Siyathemba. This statistic shows that Siyathemba

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remains a predominantly agricultural area and Prieska remains an agricultural service centre. This emphasizes the need to continue to support the commercial agricultural industry within Siyathemba to ensure its long-term viability. Considering the community services sector and retail sector are the second and third largest employers in Siyathemba, illustrated the importance of Prieska town as a geographical location of employment in Siyathemba. The relatively low contribution of the manufacturing sector to employment in Siyathemba suggests that the industrial area is merely an extension of the agricultural industry.

2.4. TRANSPORTATION

2.4.1. MOVEMENT PATTERN

Movement patterns provide an understanding of how an area functions, because it illustrates the spatial relationships between towns and settlements and the linkages that exist between such spatial entities. Diagram 9 depicts the movement of people within Siyathemba and between Siyathemba and the neighbouring municipal areas. Four towns and settlements are located within Siyathemba, namely Prieska, Marydale, Niekerkshoop and Copperton. In addition, a number of towns surround the municipal area of which the 2 largest towns are Kimberley (population 142,000 people) and Upington (population 71,000 people). These towns have a significant impact on the movement within Siyathemba.

Movement within Siyathemba largely occurs along 2 axes that cross each other at Prieska. The first axis links Prieska to the northeast to Kimberley and southwest to Vanwyksvlei. The southwestern part of the axis also links Prieska to Copperton, located within the municipal area. The second axis links Prieska to the northwest to Upington and to the southeast to De Aar. The northwest section of the axis links Prieska to Marydale. A third, smaller axis, links Prieska to Niekerkshoop located in the northern parts of the municipal area.

Taking into account the movement pattern set out above, it can be assumed that the strongest movement of people and goods occurs along the N10 freeway because of the road's hierarchy and the fact that this axis connects Namibia and Upington in the northwest to De Aar and Port Elisabeth in the southeast. Movement along the axis is supported and strengthened by an existing freight railway line. A strong movement of people and goods also occurs between Prieska and Kimberley, largely because of the

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size of Kimberley. This implies strong movement along the R357. Movement along this axis is supported by military and chartered flights to Copperton airfield.

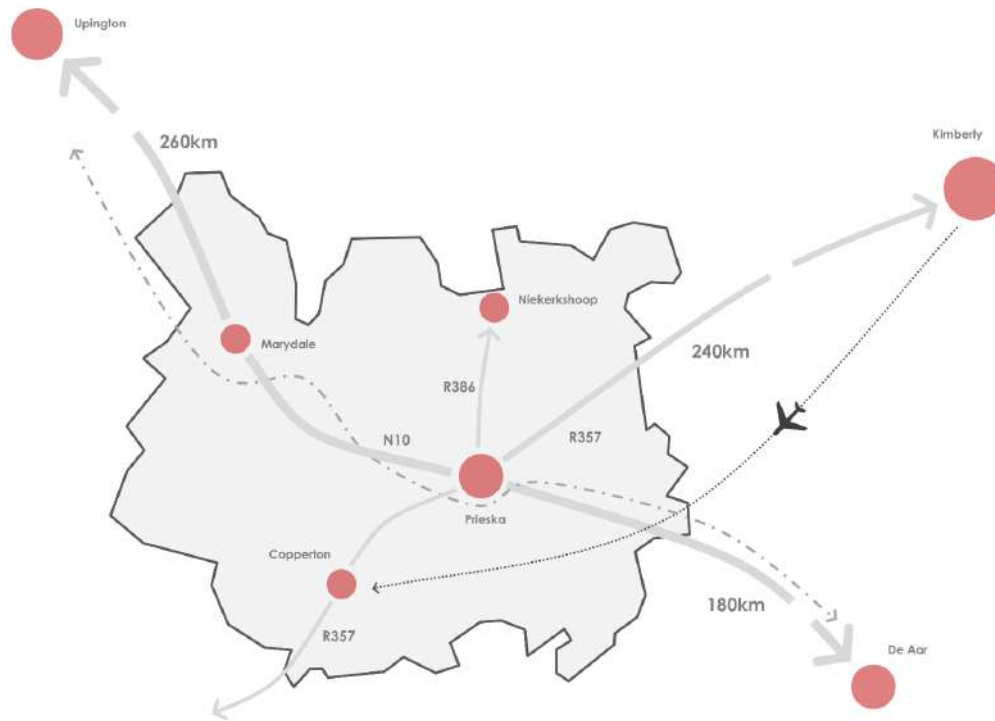


DIAGRAM 9: MOVEMENT PATTERN

2.4.2. ROAD NETWORK

Road classification in South Africa typically functions on 5 levels. The first level consists of national freeways and trunk roads. These are classified as Class A roads. These roads provide national and regional access, connecting an area to neighbouring countries and cities. The second and third levels comprises trunk roads, main roads and divisional roads, which aim to provide better access between towns and cities. These are classified as Class B and C roads. The fourth level comprises main roads, divisional roads and minor roads, which are classified as Class D roads. These roads typically connect rural areas to rural towns within a region. On the fifth level, minor roads provide direct access to land uses, such as those found within towns. These are classified as Class E roads.

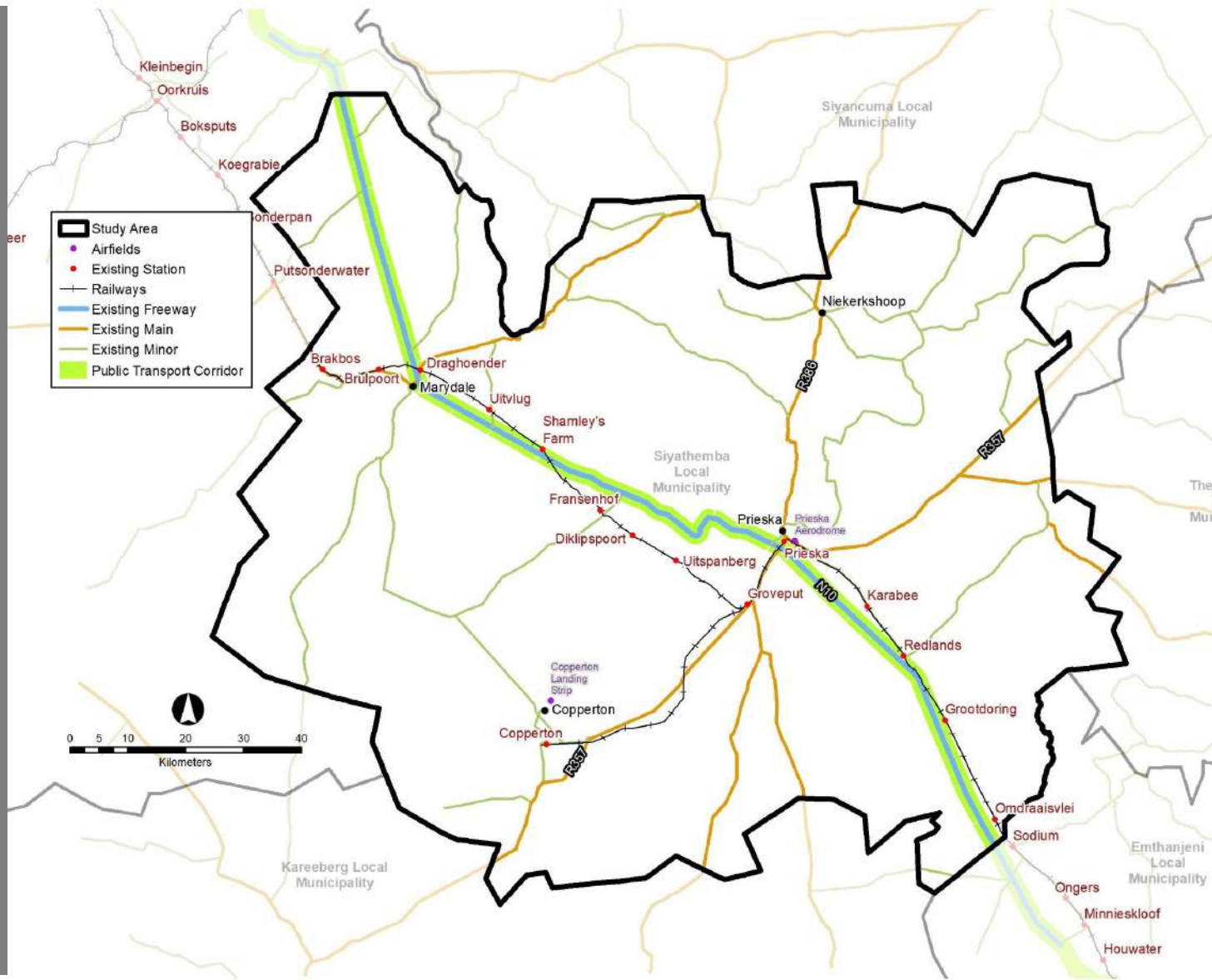
Classes A and B roads can be regarded as the primary network and Classes C and D as the secondary network. Class E is part of the tertiary network and should not provide short-cuts between destinations from higher order roads. The tertiary road system should only provide access onto the secondary and primary network. However, due to the large sparsely populated areas within Siyathemba, Class E roads form an important role in serving an access function within the municipality.

Figure 4 depicts the transport network serving Siyathemba municipal area. The N10 freeway passes through the centre of Siyathemba, linking Prieska to Marydale and Upington in the north and the N1 Freeway and Port Elisabeth in the south. The primary role of this freeway is to link Northern Province to the Eastern Cape Province and therefore fulfills a through-traffic function, rather than serving Siyathemba specifically. The R357 Main Road, on the other hand, primarily serves Siyathemba, linking Siyathemba to Douglas and Kimberley in the east. Other main roads include the R386, which links Prieska to Niekerkshoop and Griekwastad in the north, and the R387, which links Prieska to Copperton and Vanwyksvlei in the south. Taking into account the above, it can be said that the Siyathemba Municipality is fairly well covered by major roads, which is a benefit to the development of the area.

2.4.3. RAIL NETWORK

As depicted by Figure 4, a freight rail line traverses the Siyathemba municipal area. The rail line links Upington in the north to harbours of Port Elisabeth and Ngqura in the south. The railway line passes through De Aar, which forms the focal point in the Northern Cape rail network. Many of the railway lines within the country radiate from this point. The freight rail line has an existing station at the industrial area of Prieska. This rail line also has a siding that link the Prieska industrial area to Copperton located within the southwestern part of the municipal area. There are no commuter rail services operating on the abovementioned freight railway line.

FIGURE 4 | TRANSPORT NETWORK



2.4.4. PUBLIC TRANSPORT

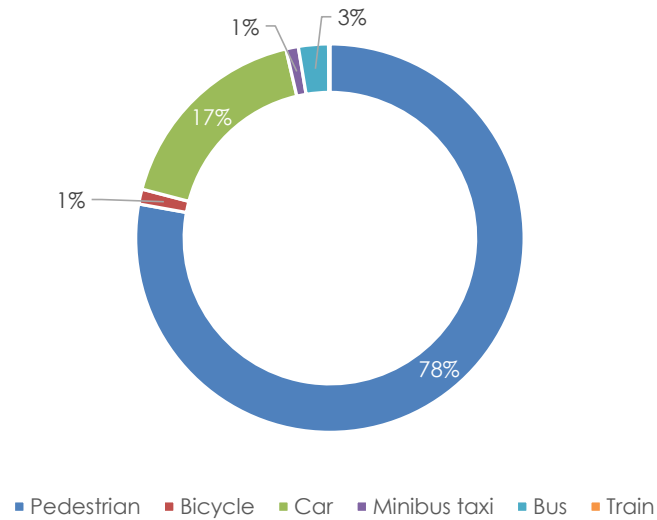


DIAGRAM 10: MODE OF TRANSPORT
Source: Census 2011

Diagram 10 provides an indication of the modes of transport that residents of Siyathemba use to access employment opportunities and social amenities. According to this Diagram, most people (78%) within Siyathemba access employment opportunities and social amenities by walking to these facilities. This is indicative of the fact that all the towns (Prieska included) within Siyathemba as small, walkable settlement, thus not requiring motorized transport to access employment opportunities and social amenities within these towns. This also accounts for the low level of minibus taxi (1%) use within Siyathemba. Diagram 10 suggests that where residents need to access employment opportunities and social amenities in more remote locations, they tend to use bus services (3%). In total, 1% of residents within Siyathemba bicycle to their places of employment or to access

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community facilities. As with pedestrians, bicycles are a non-motorised mode of transportation. The car (or private vehicle) is the mode of transport used most to access employment opportunities and social amenities after walking. The assumption can be made that many of these vehicles are farm vehicles, such as bakkies.

The modes of transport used (as set out above) shows that residents of Siyathemba are very reliant on a good pedestrian environment to access employment opportunities and social amenities. Such an environment requires, for example, good and direct pedestrian sidewalk, pedestrian facilities, such as seating, lighting, trees lanes and rubbish bins. Creating a safe pedestrian environment is also important to ensure their safe access of employment opportunities and social amenities.

The Siyathemba municipal area is a dominantly rural area and therefore does not have a dedicated public transport system serving the towns within the municipality. However, the towns within the municipal are linked to a provincial public transportation network that links the various towns within the province to each other. The Karoo District Integrated Transport Master Plan (2005) identified main public transport corridors within the district, which were based on roads carrying more than 70 passengers in rural areas and more than 17 000 passengers in urban areas. The plan identified the N10 route, linking Hanover, Britstown, Prieska, Marydale and Upington as an important public transportation corridor in terms of the number of passengers this route carries. This public transportation corridor is depicted on Figure 4,

According to the Karoo District Integrated Transport Master Plan (2005), the provision of public transport for rural populations in the rural areas of the Northern Cape is particularly relevant. Issues such as the availability of alternative modes of public transport and the co-ordination of taxi and bus services are relevant and important. Also, alternative routes need to be used by public transport to better serve rural communities. In particular, it is important that transit transport learners to schools within rural areas of the province. The public transportation corridor using the N10 through the Siyathemba municipality is utilised by the following modes of public transportation:

a. Mini-bus taxis

The N10 public transportation corridor is used by mini-bus taxis. The service provided is characterised by mini-bus taxis linking dispersed settlements along the N10 corridor with commuters travelling long distances to access services, such as shops and government offices. In general, minibus taxis pick up passengers along streets within rural towns and they also provide services on demand. The low demand levels result in taxis not able to fill up before making a trip and hence utilisation levels are low. The taxi routes connect all the main towns along the N10 freeway. According to the Karoo District Integrated Transport Master Plan (2005), the capacity of mini-bus taxis is largest in the vicinity of Britstown along the N10 corridor.

b. Busses

The bus services within the province also use the N10 public transportation corridor linking Hannover, Prieska and Upington. As such, the bus services run parallel to the taxi routes. Integration of bus and taxi services along this route is important, depending whether they serve different markets or not. Problematic is the fact that the bus industry competes for the same market as the taxi industry.

c. Light delivery vehicles

Light delivery vehicles (LDVs) are used as a public transportation system within the rural areas of the Province, such as Siyathemba. The reason being is that the Northern Cape Province has strongly dispersed rural settlements. As a result of the poor road conditions and lack of rural public transport infrastructure have created a unique public transport market for LDVs and some areas even donkey carts are used and part of this system. Typically, the donkey cart provides a feeder service to the LDVs. The LDVs which bring commuters into rural towns and other activity centres are not considered as mass passenger movers in the public transport planning process of the Province.

2.4.5. NON-MOTORISED TRANSPORT

According to the Karoo District Integrated Transport Master Plan (2005), South Africa has over concentrated on providing infrastructure facilities for motorized, as compared to non-motorised transport. This has resulted in a situation where the benefits of non-motorised transport, especially for the poor and rural poor, have not been capitalized upon. For example, non-motorised transport increases personal and economic profitability for many people in the rural areas of South Africa. Despite the fact that non-motorised transport has been neglected in South Africa, many people in the rural areas rely on this form of transport for their daily access needs. The following non-motorised vehicles are commonly used within the rural areas of the Northern Cape Province, such as Siyathemba:

a. Bicycles

Bicycles are one of the most commonly used forms of non-motorised transport in the rural areas of the Northern Cape. This is because the people in these areas find it physically difficult to transport of goods and services in and out of the area, thus requiring some form of transport to ease the effort.

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b. Donkey cart

Donkey-drawn carts are commonly used in the rural areas of the Northern Cape. These donkey-drawn carts are for leisure and for economic benefits. When the pensioners go to their pension pay points, they use donkey drawn carts. In many rural areas of the Northern Cape, donkey-drawn carts may be the only mode of transport.

c. Walking

Walking is another form of non-motorised transport. In the rural areas women still walk long distances to fetch water or to collect firewood. Children walk long distances to schools. In some of the rural areas in the Northern Cape there is no other mode of transport, except for people to walk long distances.

d. Wheelbarrows

Wheelbarrows are also commonly used within the rural areas of the Northern Cape. It is used to buy household goods, to fetch water and in some cases to transport a sick person to the clinic.

2.4.6. AIRPORT

Siyathemba has a light aircraft airfield located near Prieska. According to the Siyathemba IDP (2018), this airfield is suitable for light aircraft to land and take off. There are 2 graveled runways that are regularly maintained. This airfield is registered with the Civil Aviation Authority and is inspected by them every year after which a license is issued to the Municipality. The airfield is located approximately 4km from the Prieska business centre and is accessed via the on the R357, which links Prieska to Douglas and Kimberley.

TABLE 7: AIRPORTS AND RUNWAYS

Airport	Location	Runway Material	Runway Length	Registered
Prieska Airfield	Prieska	Gravel	1,600m	Yes
Copperton Airfield	Copperton	Gravel	1,700m	Unknown

Source: Urban Dynamics Gauteng, 2019

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The Copperton mine at Copperton also has an airfield. This airfield has a 1,700m gravel landing strip. The Copperton airfield is often used the South African Air Force and chartered aircraft to bring in military equipment for testing (as well as the people and instruments needed) at the Alkantpan Amcor military testing facility. Detailed of the airports are depicted on Table 7.

2.5. MUNICIPAL SERVICES

The primary municipal services (water, sanitation, waste and electricity) are broadly discussed below. It illustrates the level of municipal services provision within Siyathemba, as well as the bulk network serving Siyathemba. The level of service is derived from Census 2011. It does not show the capacity of the bulk municipal services network to accommodate settlement expansion and densification.

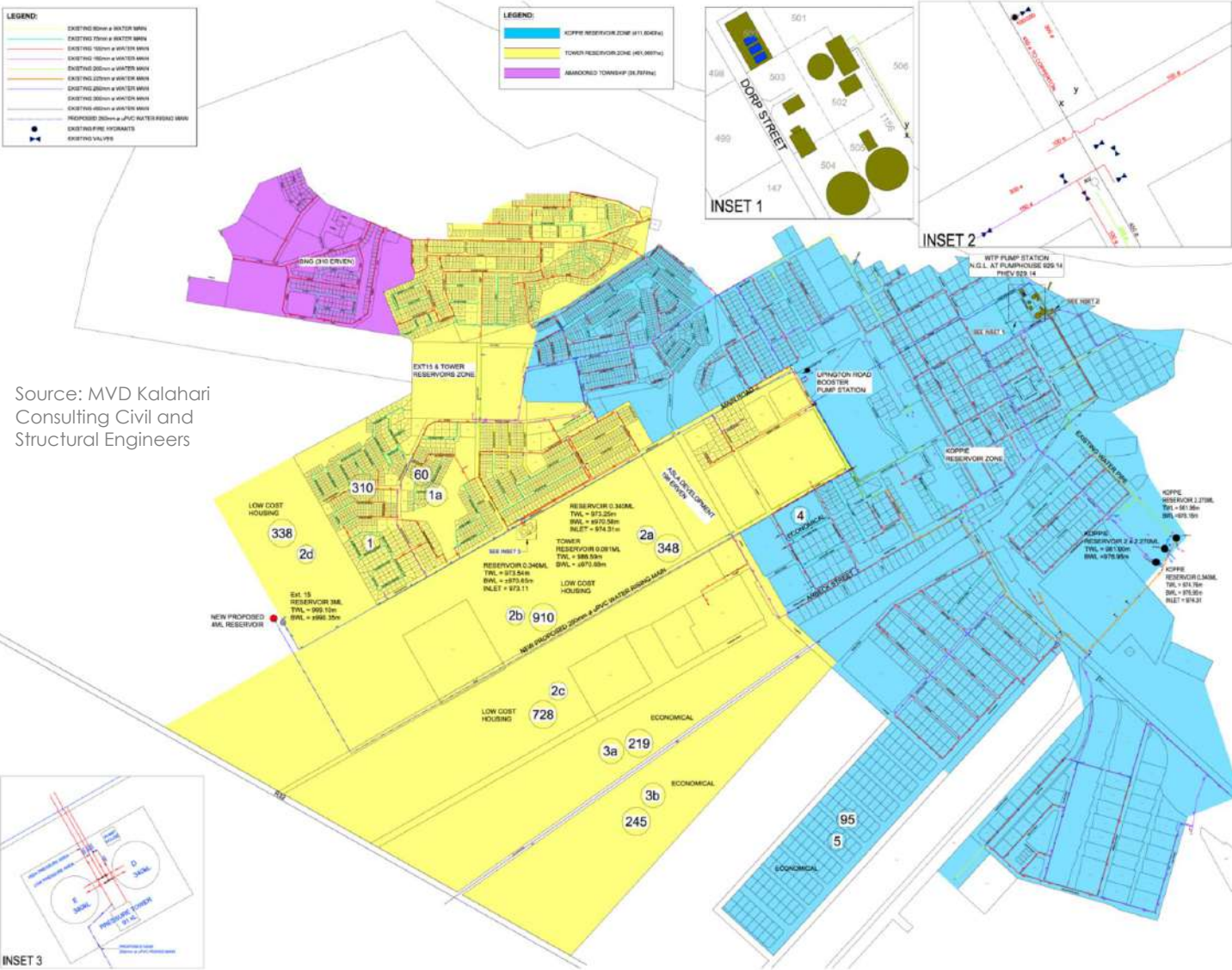
2.5.1. WATER SUPPLY

According to Diagram 11, the majority of households (94%) that reside in Siyathemba have access to piped water. Only a relatively small number of households (3%) acquire water from boreholes. This statistic is largely due to the farming community residing within Siyathemba. Using boreholes for farming communities is typical and completely acceptable.

According to the Siyathemba IDP (2018), significant progress has been made in recent years regarding the provision of water within the municipal area. The Municipality aims to have a basic level of service on erven before the occupation of the erven. In informal areas, standpipes are provided as an interim service. The Municipality has recently installed bulk water infrastructure for 40 households in Niekerkshoop. The bulk water network of Prieska is illustrated on Figure 5.

According to the Siyathemba IDP (2018), the Siyathemba Municipality is the Water Services Authority (WSA) and Water Services Provider (WSP) for the 3 towns within the municipal area. Water services are rendered in Prieska, Niekerkshoop and Marydale. The Municipality also supplies bulk water to Copperton, but Alkantpan (Amcor) is responsible for the delivery of water, sanitation, and electricity services. No services are currently being rendered on farms. The following information on the bulk water network serving Prieska, Marydale, Niekerkshoop and Copperton is directly extracted from the Siyathemba IDP (2018).

FIGURE 5 | PRIESKA BULK WATER



Source: MVD Kalahari Consulting Civil and Structural Engineers



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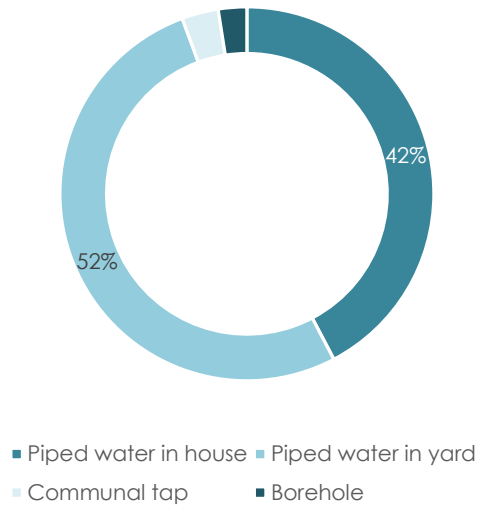


DIAGRAM 11: WATER SUPPLY
Source: Stats SA Community Survey 2016

a. Prieska

The total volume of potable water for Prieska is supplied from the Flippie Holtzhauzen Water Treatment Plant that extracts all its raw water from the Orange River. Electrically driven pumps (4) which can deliver up to 200l/s to a purification plant, are used. The purification plant has a capacity of 6 Ml/day and potable water is stored in two potable water reservoirs. Water is pumped by two pumps (that operate alternately) from the water treatment plant via a 150mm, a 200mm and a 300mm pipeline to three nearby distribution reservoirs. Two of the reservoirs have a volume of 2.27 Ml and the third, 0.34 Ml. These reservoirs are referred to as the Koppie Reservoirs. The 300mm pipeline is a dedicated line from the pumps at the water treatment plant to the reservoirs. The 200mm pipeline has a connection to a 300mm line that supplies the other reservoirs in the system from the Koppie Reservoirs. The 150mm pipeline connects the water treatment plant to the smaller

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0.34 Mℓ capacity reservoir. This reservoir is located next to, but slightly lower than the two larger reservoirs. The 150mm pipeline has many direct connections with the distribution system and is not a dedicated supply to the reservoir. There is a bulk water meter at the water treatment plant that measures all the fresh water pumped from the water treatment plant. The water treatment works is in a good condition and not used at its full capacity.

b. Marydale

In Marydale, water supply is obtained from 6 production boreholes. The rated capacity of the boreholes is 8.9 ℓ/s. The safe yield of the 6 boreholes per year is 276,820.80m³. Submersible pumps withdraw the water from 6 production boreholes and pump the water to two high lying water distribution reservoirs. The reservoirs store water for use during periods of peak demand and provide the pressure needed to reticulate water to the town. There is no water treatment works facility in Marydale. Water is disinfected in the two reservoirs by adding floating chlorinators.

c. Niekerkshoop

Water delivery to the community for human consumption at Niekerkshoop consists of ground water from five boreholes. The water is abstracted with supply lines to the existing two reservoirs with a combined capacity of 0.4 Mℓ. From these reservoirs water is distributed to the water reticulation system to the consumers of Niekerkshoop. There is no water treatment works facility in Niekerkshoop. Water is disinfected in the two reservoirs by adding floating chlorinators.

d. Copperton

A 450-mm diameter concrete lined steel pipeline, together with a dedicated water treatment works, was constructed by the Copperton Mine in 1970's for supplying water from Prieska to the Mine. After the Mine was closed down in 1988, the ownership of the pipeline was transferred to Alkantpan. Alkantpan uses the pipeline to supply water to their testing facilities close to Copperton. Alkantpan is the Owner of the pipeline and also operates and maintains the pipeline.

The total length of the pipeline is approximately 52 km and the first approximately 40 km of the pipeline is a pumping main, from Prieska Water Treatment Works to a set of reservoirs from where it gravitates for approximately 12 km to the Mine in Copperton. The water demand on the pipeline in 2008 was estimated at 0.45Mℓ/day, and includes the provision to Alkantpan, Copperton and some of the farms on the pipeline route.

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The (steel) reservoirs are located at the end of the pumping main, approximately 40 km from the Prieska WTW. These reservoirs have a total capacity is 10,9ML. The reservoir near Copperton has a capacity of 2 ML. The set of reservoirs at the end of the pumping main consist of five reservoirs, two of which are 4 ML each and three of which are 0.5 ML each.

According to the Siyathemba IDP (2018), the bulk water supply to Prieska is sustainable. It is envisaged that bulk water supply to Marydale and Niekerkshoop could become a problem within the next 15 to 18 years. The Municipality is in the process of upgrading the Water Supply Network, include boreholes to the 2 reservoirs in Marydale. One of the reservoir's capacity will also be increased.

2.5.2. SANITATION SUPPLY

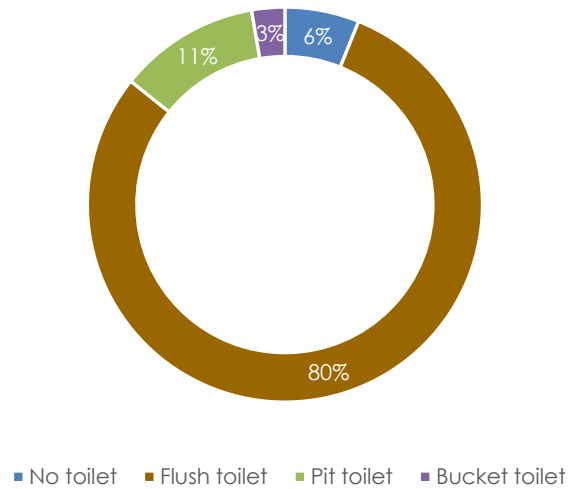


DIAGRAM 12: SANITATION SUPPLY
Source: Stats SA Community Survey 2016

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As depicted by Diagram 12, flush toilets are the most common (80%) form of sanitation provision within Siyathemba. However, 11% of the Siyathemba population still use pit toilets. This statistic could largely be attributed to the use of this system on farms. Of greater concern is the fact that 6% of households within Siyathemba do not have access to any form of sanitation system and 3% of the households are still using the bucket system. The bulk sanitation network is illustrated on Figure 5.

According to the Siyathemba IDP (2018), sanitation services are rendered in Prieska, Niekerkshoop and Marydale. No services are rendered to Copperton, because Alkantpan (Amscor) is responsible for the delivery of water, sanitation, and electricity services to Copperton. No services are currently being rendered on farms.

TABLE 8: BULK WASTEWATER INFRASTRUTURE

	Prieska	Niekerkshoop	Marydale
Wastewater treatment works	Anaerobic digesters / Oxidation ponds	Oxidation ponds	Oxidation ponds
Design capacity	3Mℓ	3Mℓ	6.5Mℓ
Operate within design capacity	Yes	Yes	Yes
Collection services	1 pump station and approx. 57.3 km pipework		

Source: Siyathemba Local Municipality IDP, 2018

The sanitation systems in the 3 towns is summarised in Table 8 and can be described as follows, as directly extracted from the Siyathemba IDP (2018).

a. Prieska

The sanitation system in Prieska consists of an internal sanitation system with waterborne sanitation network and onsite sanitation facilities. In addition, there are some septic tanks in areas that are not serviced by the sewer network. The waterborne sewage gravitates through a network of underground sewer pipes to various sewage pump stations. These sewage pumps transfer the sewage to a main sewer pump station. From this pump station, another set of sewage pumps pump the sewage to the Prieska Wastewater Treatment Plant. The Wastewater Treatment Plant is an Anaerobic Oxidation Pond System. The current capacity of the ponds is 2.2 Mℓ/day and it is used at 95% capacity. The ponds were upgraded during 2008.

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b. Marydale

The sanitation system in Marydale consists of VIP toilets, a conservancy tank and some flush toilets. The WWTW oxidation pond in Marydale is utilised for the sewer effluent from the conservancy tanks and are transported to the works by tankers. The WWTW is in a process of being upgraded.

c. Niekerkshoop

The sanitation system of Niekerkshoop consists of VIP and UDS, a conservancy tank and some flush toilets. The WWTW oxidation pond in Marydale is utilised for the sewer effluent from the conservancy tanks and are transported to the works by tankers. The WWTW is in a process of being upgraded.

During the 2011/12 financial year, the Municipality received funds from DWA from the Accelerated Community Infrastructure Programme (ACIP). This grant was utilised to refurbish sanitation infrastructure and equipment. According to the Siyathemba IDP (2018), challenges still faced with the sanitation system include the wastewater treatment facility in Marydale, which does not function as a proper wastewater treatment works, the fact that there are still bucket toilets in the area, which needs to be eradicated as a matter of urgency, and that households in the informal area in Prieska do not have access to proper sanitation facilities.

2.5.3. WASTE MANAGEMENT

As depicted by Diagram 13, the municipality of private company remove the waste of most of the households (81%) residing within Siyathemba. Approximately 16% of the households residing within Siyathemba dump their waste onto a communal or private refuse dump. This statistic could largely be attributed to the use of refuse dumps on farms. Approximately 3% of the households residing within Siyathemba do not have access to a waste disposal system.

According to the Siyathemba IDP (2018), the Municipality renders its waste management service internally. The service is coordinated from Prieska, but the service delivery for the various towns is managed from the Local Service Delivery Centres due to the distances involved. A regular waste removal service is provided to all the settlement areas within the Municipality. The farming areas do not receive a waste removal service. Each town has its own solid waste disposal site, as described on Table 9.

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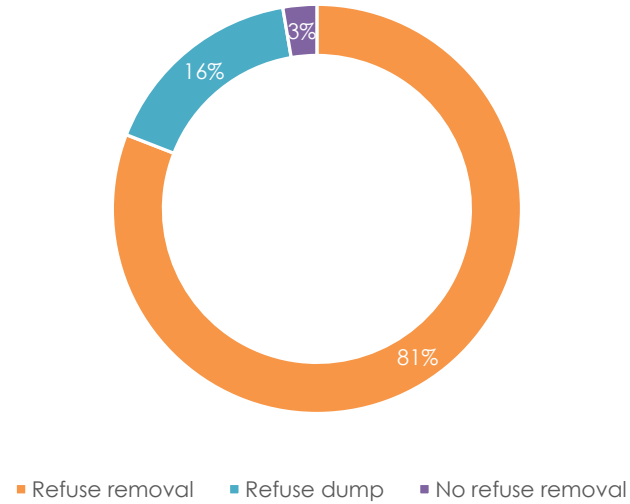


DIAGRAM 13: WASTE MENAGEMENT
Source: Stats SA Community Survey 2016

TABLE 9: WASTE DISPOSAL INFRASTRUTURE

	Site	Estimated size of site	Estimated remaining life of site
Prieska	Existing permitted landfill site	2ha	20 years
Marydale	Existing unauthorised landfill site	2,5ha	20 years
Niekerkshoop	Existing unauthorised landfill site	1,5ha	20 years

Source: Siyathemba Local Municipality IDP, 2018

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a. Prieska

The landfill in Prieska is a permitted site. The site has enough airspace for the next 20 years. The site is not well managed due to certain financial and personnel constraints. The waste is not covered on a regular basis and is burned once disposed of. The site is not fenced and access is not controlled. Wind-blown litter is a serious problem at the site.

b. Marydale

The Marydale landfill site is located 3 km north of town. The site is not fenced and access is not controlled. Wind-blown litter is also a serious problem in the vicinity of the site. There is no landfill equipment on the site and therefore covering of the waste does not occur at all. The site is not properly operated with waste being disposed of haphazardly and burned after disposal.

c. Niekerkshoop

The landfill site at Niekerkshoop is located 7 km outside town. The site is fenced, but access is not controlled. The open burning of waste in a pit forms part of the operational procedure for the site. The waste is not covered on a daily basis due to the absence of proper landfill equipment.

The Siyathemba Municipality has no transfer stations within the municipal area. MIG projects are ongoing in Prieska and Marydale to upgrade the landfill sites in order to comply with legislation.

According to the Siyathemba IDP (2018), challenges regarding waste management in Siyathemba include illegal dumping of waste in outlying and township areas, the Niekerkshoop and Marydale disposal sites are not authorized, and the Prieska Disposal Site needs to be upgraded and operated in accordance with the site's permit conditions.

2.5.4. ENERGY SUPPLY

As depicted by Diagram 14, Siyathemba population mostly (90%) uses electricity as their source of energy supply. A relatively small portion of the population (10%) uses other sources, such as candles as their primary source of energy. The use of other sources can most probably be attributed to households that are not connected to the electricity grid because they live on farms.

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According to the Siyathemba IDP (2018), the proportion of households using electricity for lighting in Siyathemba has increased from 57% in 1996 to 86% in 2011.

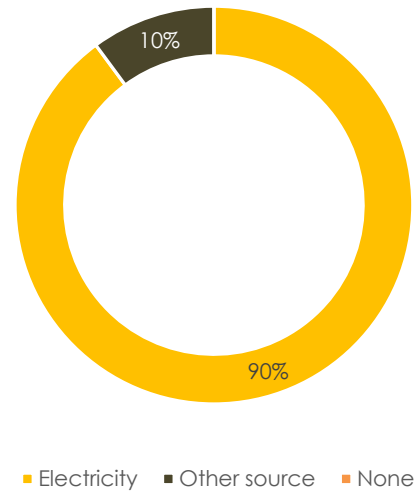


DIAGRAM 14: ENERGY SUPPLY
Source: Stats SA Community Survey 2016

TABLE 10: BULK ELECTRICAL INFRASTRUCTURE RESPONSIBILITY

	Internal network	Public lighting
Prieska	Siyathemba LM and ESKOM	Siyathemba LM
Niekerkshoop	ESKOM	Siyathemba LM
Marydale	ESKOM	Siyathemba LM

Source: Siyathemba Local Municipality IDP, 2018

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According to the Siyathemba IDP (2018), the Municipality, together with ESKOM, is responsible for electricity supply in the 3 towns of Siyathemba. The largest part of Prieska, as well as the whole of Marydale and Niekerkshoop, is supplied by ESKOM directly. The entities responsible and the areas they are responsible for, are depicted by Table 10.

The Municipality has an Electricity Master Plan available which was developed in the early 2000. The Municipality works according to this plan to upgrade electricity infrastructure, as well as to develop new infrastructure. Two areas in Prieska still need to be upgraded, because the electricity network is old and power failures occur within these areas. Apart from meter inspections and new installations, maintenance work is done to the electrical network that relate to complaints received or faults that occur.

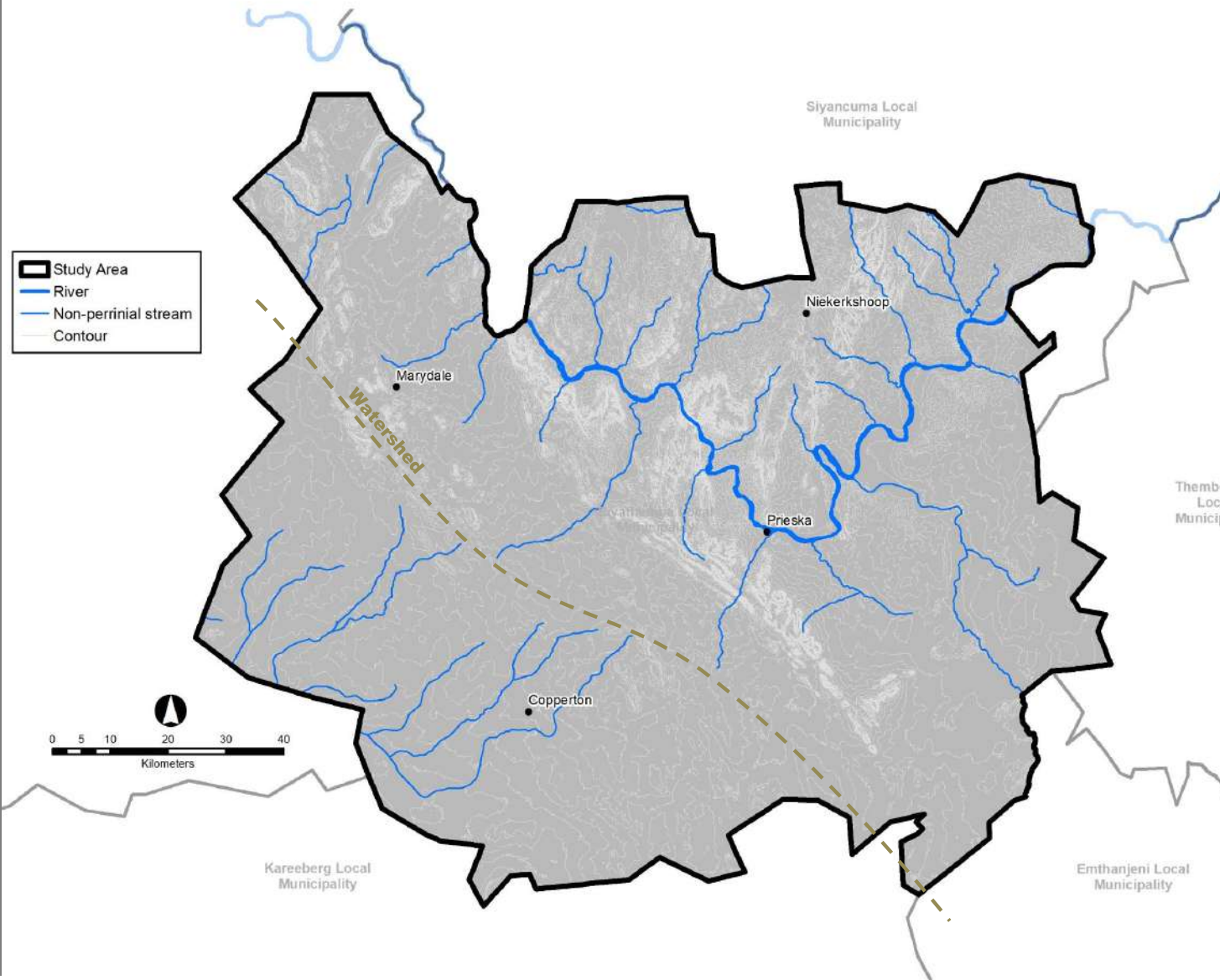
2.6. NATURAL ENVIRONMENT

The following section discusses the natural environment and environmental elements found within Siyathemba. This includes hydrology, land form, geotechnical suitability and environmental sensitivity. The section hereafter discusses the soils found within Siyathemba separately due to its importance of natural element as an agricultural determinant in this largely agricultural region.

2.6.1. HYDROLOGY

As depicted by Figure 6, Siyathemba has an undulating, comprising mountainous and relatively flat topography. The Doringberg is the landform with the highest elevation in the municipal area. This mountain range traverses the centre of the municipal areas, stretching from the southeastern corner of the municipal area to the northwestern corner of the municipal area. A watershed runs parallel to this mountain range, on the southwestern side (or top) of the mountain range. The hydrological system of the municipal area drains from this watershed in a northeasterly direction into the Orange River, which flows through the northern parts of the municipal area. The hydrological system also drains from this watershed in a southwesterly direction towards Verneukpan. Verneukpan is a widespread dry salt pan located south of Kenhardt. Apart from the Orange River, the Brak River is the only other perennial river flowing through Siyathemba. The Brak River flows north and parallel to the N10 freeway and flows into the Orange River. A number of non-perennial streams also feed the Orange River from the Doringberg Mountain Range. A number of non-perennial streams also flow southwestwards towards Verneukpan.

FIGURE 6 | HYDROLOGY



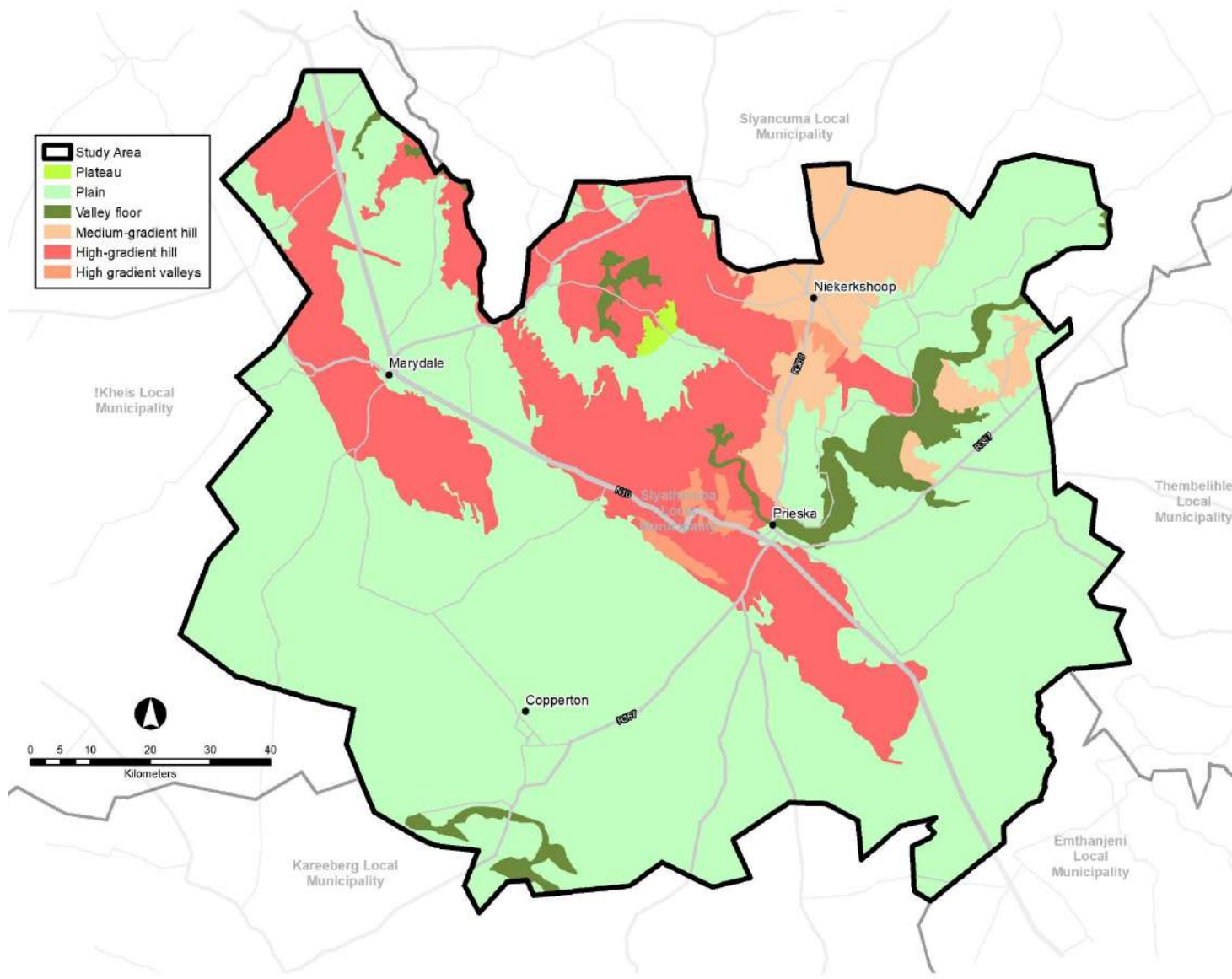
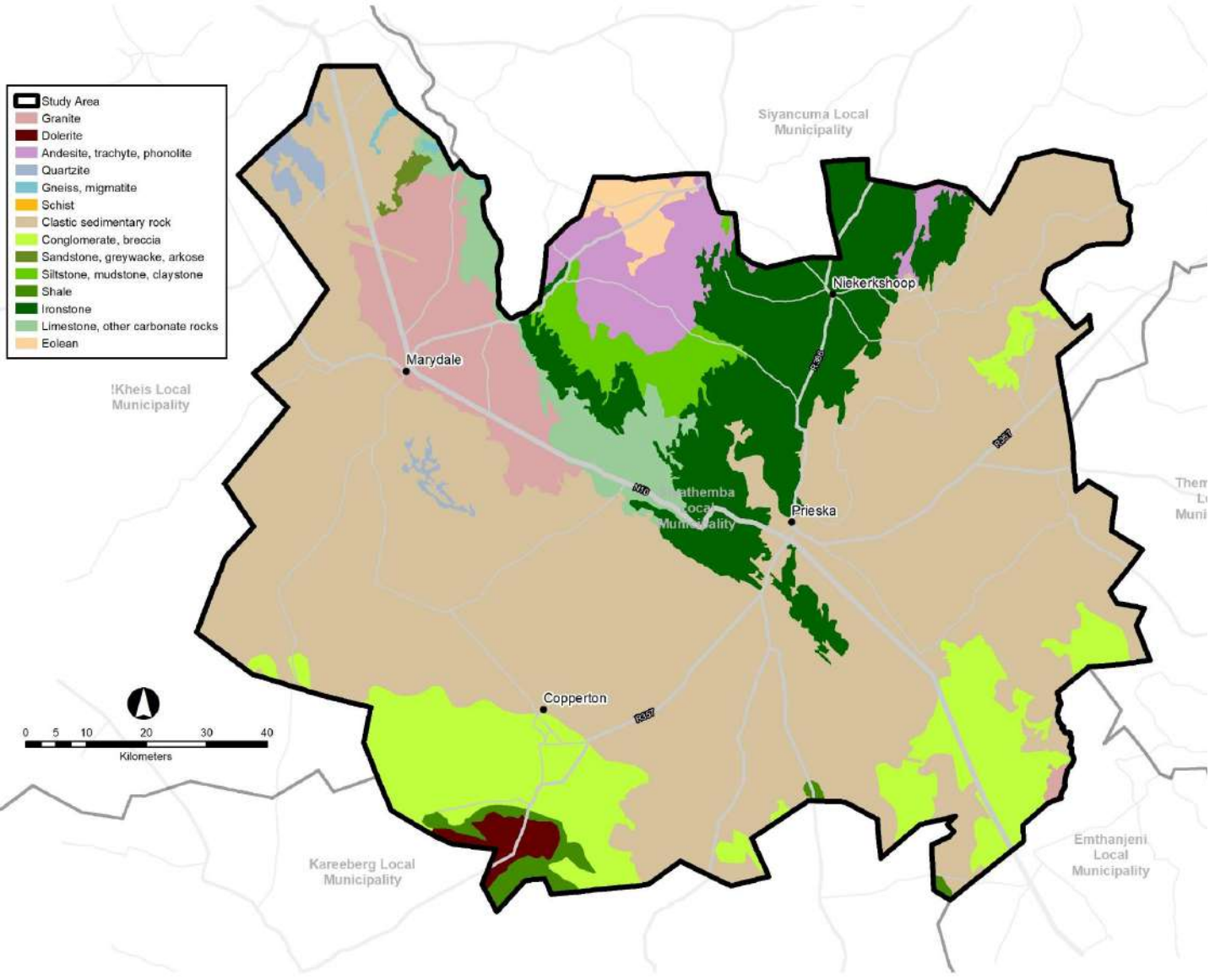


FIGURE 7 | LAND FORM

FIGURE 8 | GEOLOGICAL PROFILE



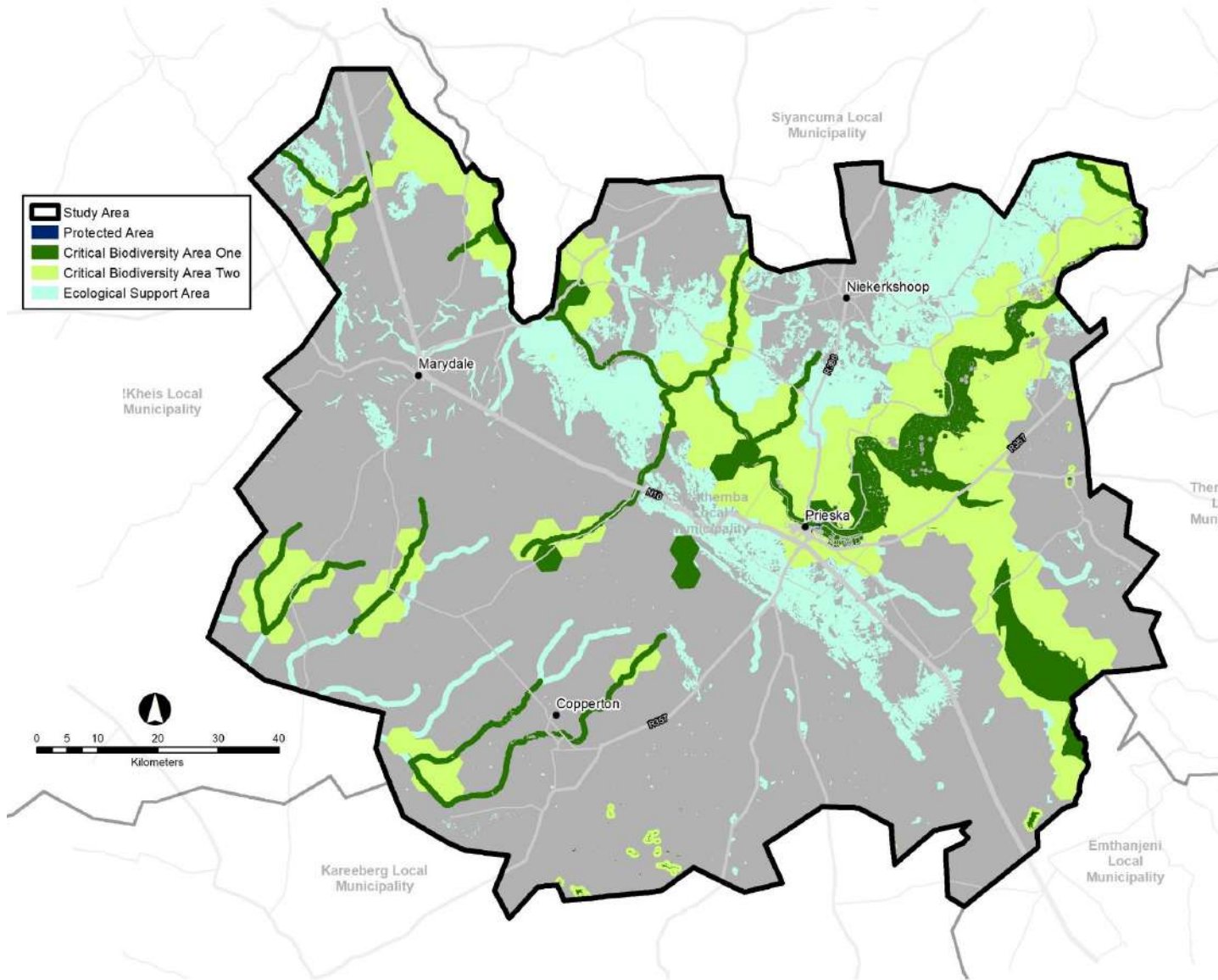


FIGURE 9 | ENVIRONMENT



2.6.2. LAND FORM

Siyathemba comprises a relatively flat topography, with most of the landform comprising plains. In fact, most of the southern (south of the N10 freeway) and eastern parts of the municipal area are plains. In addition, a valley floor or flood plain is located on the banks of the Orange River, flowing through the eastern parts of the municipal area. The flat topography of the municipal area is interrupted by the Doringberg mountain range that stretches through the centre of the municipal area. This mountain range is depicted on Figure 7. This mountain range basically follows the N10 freeway and provides a definite scenic element to the municipal area. The Doringberg mountain range and the Orange River are the 2 natural elements that attribute the municipal area a scenic quality.

Due to the scenic quality of the Doringberg mountain range, as well as the environmental value of this mountain range, it can be categorized as a high priority topographical feature that needs to be protected. Only low-impact developments on must be considered on this mountain range, and only after submission of a specialist impact study. Such a specialist impact study should include a Red Data study for both fauna and flora, an invertebrate study, a hydrological study, a geotechnical study, a pollution study, a social study, and a visual study.

2.6.3. GEOTECHNICAL SUITABILITY

Figure 8 shows that Siyathemba is largely underlain by 14 different geological formation. Most of the municipal area is underlain by Clastic Sedimentary Rock. Both Prieska and Copperton are located on this geological formation. Other significant geological formation in Siyathemba include Ironstone (on which Niekerkshoop is located), Granite (on which Marydale is located) and Andesite. The Clastic Sedimentary Rock is located within the central and eastern parts of the municipal areas, whereas the Ironstone, Granite and Andesite are located within the northern parts of the municipal area, north of the N10 freeway. Descriptions of the 4 primary geological formations found within Siyathemba are as follows:

a. Clastic Sedimentary Rock

Sedimentary rocks are formed by the accumulation of sediments. There are three basic types of sedimentary rocks, of which Clastic Sedimentary Rocks are one and the other two being igneous and metamorphic rocks. Common sedimentary rocks include chalk, limestone, sandstone, and shale. Clastic Sedimentary Rocks form as the result of weathering and

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erosion of source rocks, which turns them into pieces (clasts) of rocks and minerals. Once they become pieces, these are often transported by water and deposited as layers of sediment. Clastic Sedimentary Rocks are widely used as construction material. Both Prieska and Copperton are located on Clastic Sedimentary Rock.

b. Granite

Granite is a hard, tough, igneous rock that is widely distributed. It is medium- to coarse-grained and consists of a number of minerals, especially members of the feldspar group and quartz. It varies in composition and comes in a range of colors, such as white, pink, buff, gray, and black, often occurring in combination. Given its ruggedness and wide distribution, it has been used as a construction stone since antiquity. Today, granite continues to be used as a dimension stone (stone available in large quantities cut to specific sizes) in buildings and monuments. In addition, given its strength and aesthetic appeal, it is used for kitchen countertops and flooring tiles. Marydale is located on Granite.

c. Ironstone

Ironstone is a sedimentary rock, either deposited directly as a ferruginous sediment or created by chemical replacement, that contains a substantial proportion of an iron compound from which iron can be smelted commercially. The iron minerals comprising ironstones can consist either of oxides or carbonates or some combination of these minerals. Freshly cleaved ironstone is usually grey. The brown external appearance is due to oxidation of its surface. Ironstone, being a sedimentary rock, is not always homogeneous, and can be found in a red and black banded form. Ironstone can be used as a building material in construction. Niekerkshoop is located on Ironstone.

d. Andesite

Andesite is the name used for a family of fine-grained, extrusive igneous rocks that are usually light to dark gray in color. They often weather to various shades of brown. Andesite is rich in plagioclase feldspar minerals and may contain biotite, pyroxene, or amphibole. Andesite usually does not contain quartz or olivine. Andesite is typically found in lava flows produced by volcanoes. Because these lavas cooled rapidly at the surface, they are generally composed of small crystals. Some specimens that cooled rapidly contain a significant amount of glass, while others that formed from gas-charged lavas have a vesicular or amygdaloidal texture.

The geotechnical information presented above is only based on a broad desktop analysis of the geotechnical conditions affecting Siyathemba. Consequently, it cannot be determined conclusively whether land parcels within Siyathemba are

conclusively deemed suitable or unsuitable for settlement development. Such an assessment can only be done through a detailed and comprehensive geotechnical survey. Such a detailed study will have a decisive influence on the typology and intensity of land uses allowed on these geological formations.

2.6.4. ENVIRONMENTAL SENSITIVITY

Critical biodiversity areas can be defined as natural areas that are essential for the conservation of biodiversity. As illustrated by Figure 9, there are a number of critical biodiversity areas located within Siyathemba that contain conservation-worthy habitats. Most of these sites are located along the Orange River and Brak River embankments. The embankments of the Orange River are particularly important, because the Orange River is South Africa's largest river and is therefore of national significance. The Orange River is supported ecologically by the Doringberg mountain range, which straddles the southern banks of the Orange River. This mountain range is considered to be an ecological support area worth conservation and includes the mountainous area located north of the Orange River as well. In addition to the above, a number of non-perennial streams in Siyathemba, flowing southwestwards towards Verneukpan, are considered critical biodiversity areas.

The environmental quality of the Orange River, Brak River and the Doringberg mountain range, requires the conservation of these areas, especially from inappropriate agricultural practices. Consequently, these areas need to be included in an open space lattice of Siyathemba. These ecological areas need to be linked to enable fauna migration environmental corridors and this can be done by utilizing rivers and tributaries as corridors linking critical biodiversity areas.

According to the Pixley Ka Seme District SDF, the unique and important landscape and cultural history of the Pixley Ka Seme District supports three identified bio-regions that should be considered in future spatial planning of the district. These are the Kalahari Thornveld, located on the northern boundary of the district, the Orange River Corridor, which flows through Siyathemba, and the Nama Karoo, located in the southern parts of the District. The Orange River Corridor is the only bio-region that affects Siyathemba. The Pixley Ka Seme District SDF proposes the following strategies for the protection and enhancement of the Orange River Corridor:

- Protect Orange River as an important River corridor that not only supports regional sustainable development in rural and urban areas, but also forms an important Provincial and National resource.
- Promote tourism along the river, with due consideration to the irrigation farming and mining in the area.

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- Support sustainable development around the Vanderkloof and the Gariep Dams to utilise the opportunities of tourism and agricultural development without jeopardising the sensitive nature of the areas.
- Tourism Corridors along Orange River and Orange River Gariep Dam links.
- Promote tourism linkages with adjoining municipalities and countries to strengthen the corridor and bio- regional connections.
- Implement an effective water management plan for the area to ensure optimal use and conservation of water as a very scarce resource in this arid region.
- Investigate the implementation of an Orange River Authority, under protection of the Department of Water Affairs, to coordinate and effectively manage the river across the different municipalities and regions. This will provide a combined approach with regards to infrastructure, tourism and agriculture.
- Precinct planning of the Orange River corridor.
- Branding of agricultural products produced in the region.
- Support and extend the Agri Hub along the river interface.

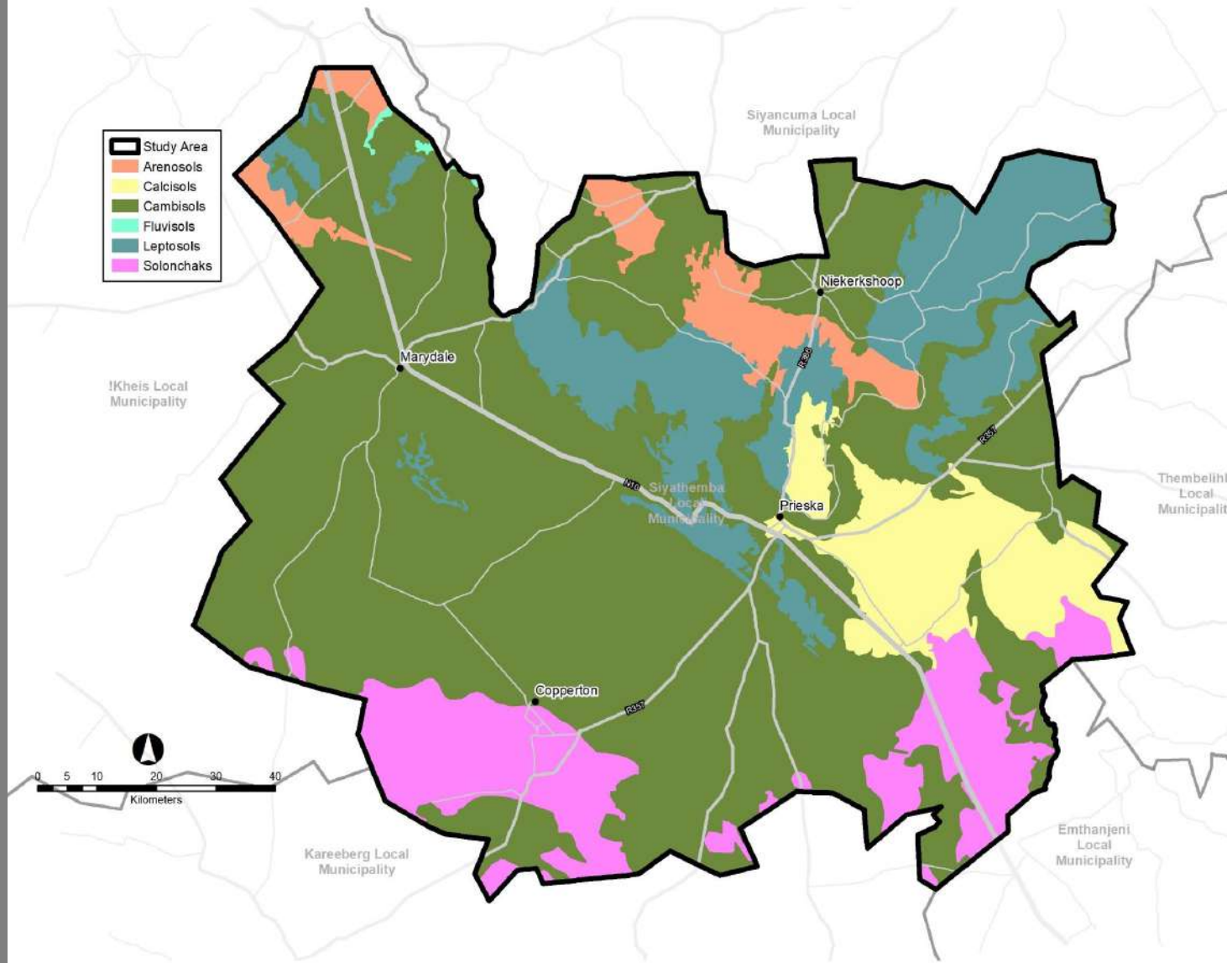
2.7. SOIL CAPABILITY

A soil capability study was conducted for the Siyathemba Municipal Area. This soil capability study was a desktop study and therefore did not involve site investigations to determine on-site soil conditions. This desk-top study will utilise all resources available for Siyathemba.

2.7.1. SOIL TYPES

The two principal systems of soil classification in use today are the soil order system of the United States Soil Taxonomy and the soil group system developed by the Food and Agriculture Organization (FAO) of the United Nations. Both of these systems use the structural properties of soils as the basis of classification. The soil group system developed by the Food and Agriculture Organization (FAO) of the United Nations was used in this soil capability study for Siyathemba. In order to describe the soils within Siyathemba, two concepts need to be defined:

FIGURE 10 | SOIL TYPES



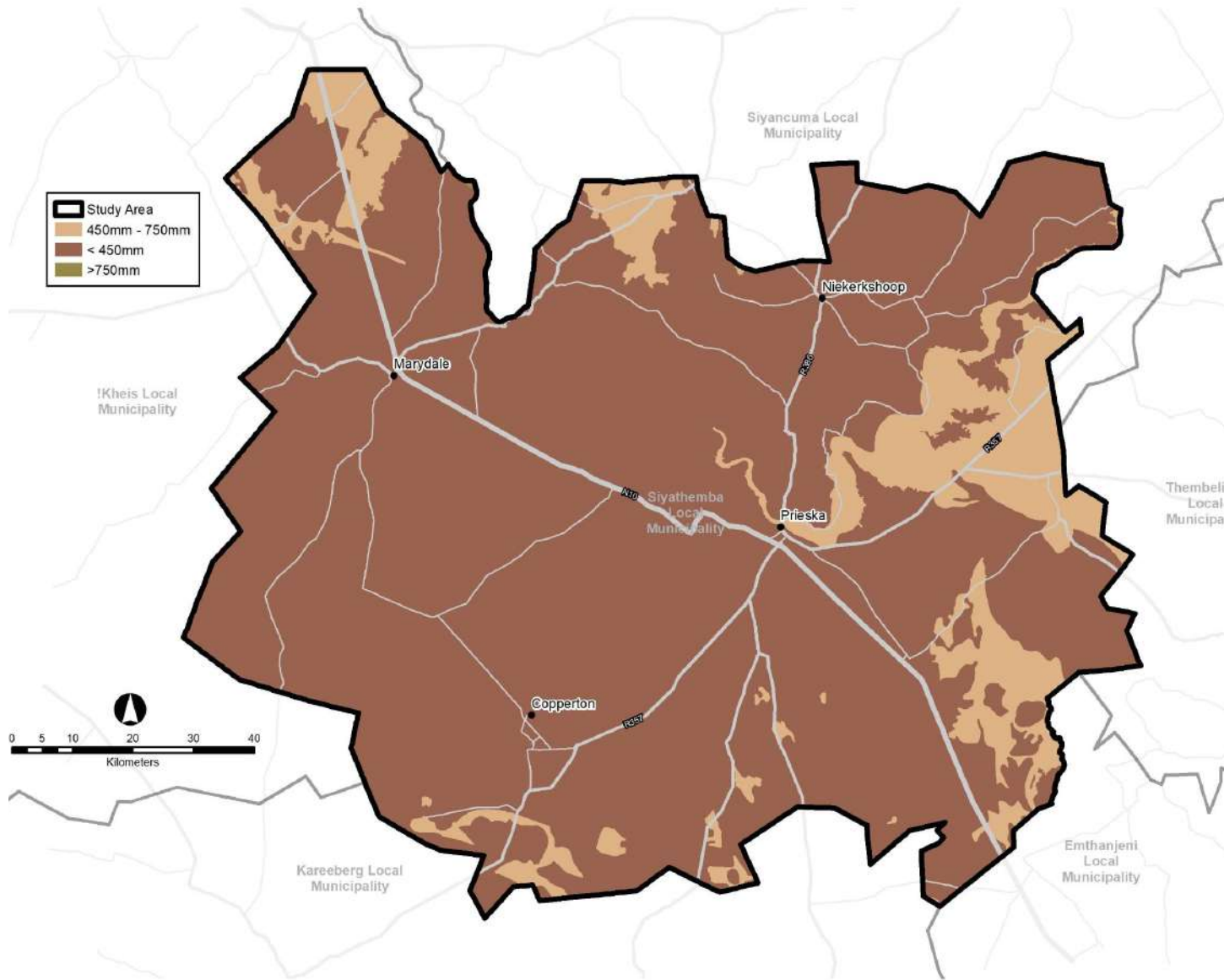
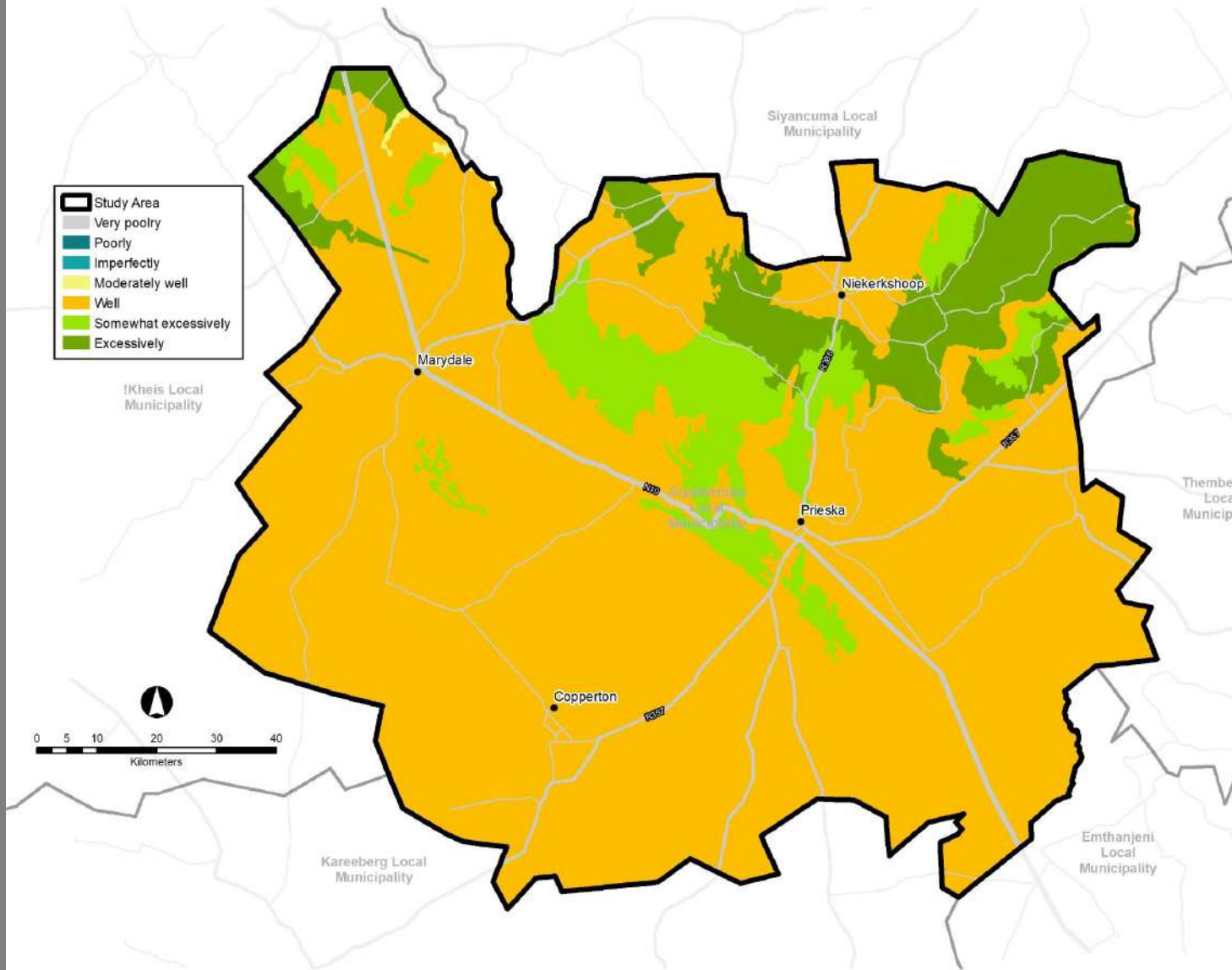


FIGURE 11 | SOIL DEPTH

FIGURE 12 | SOIL DRAINAGE



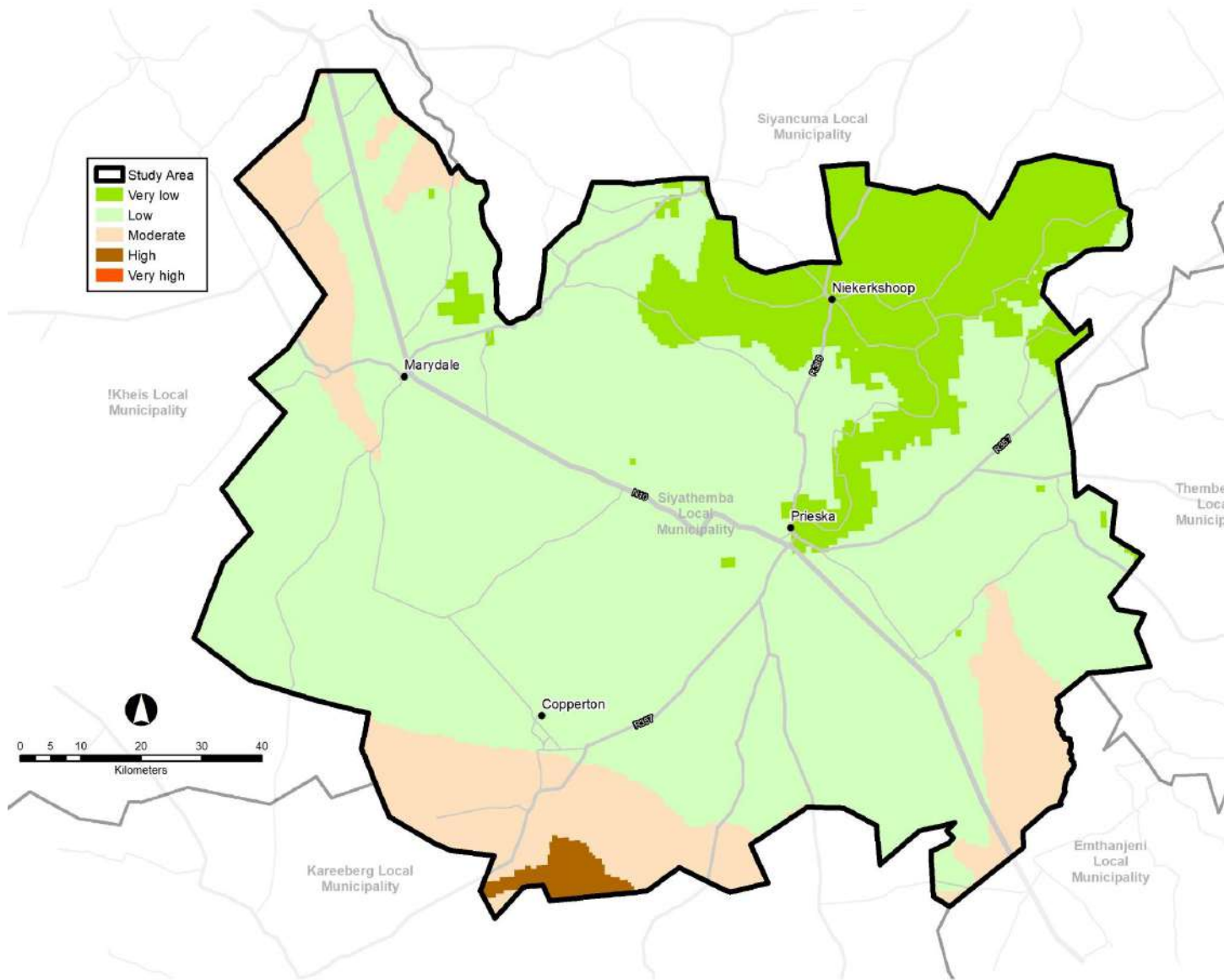
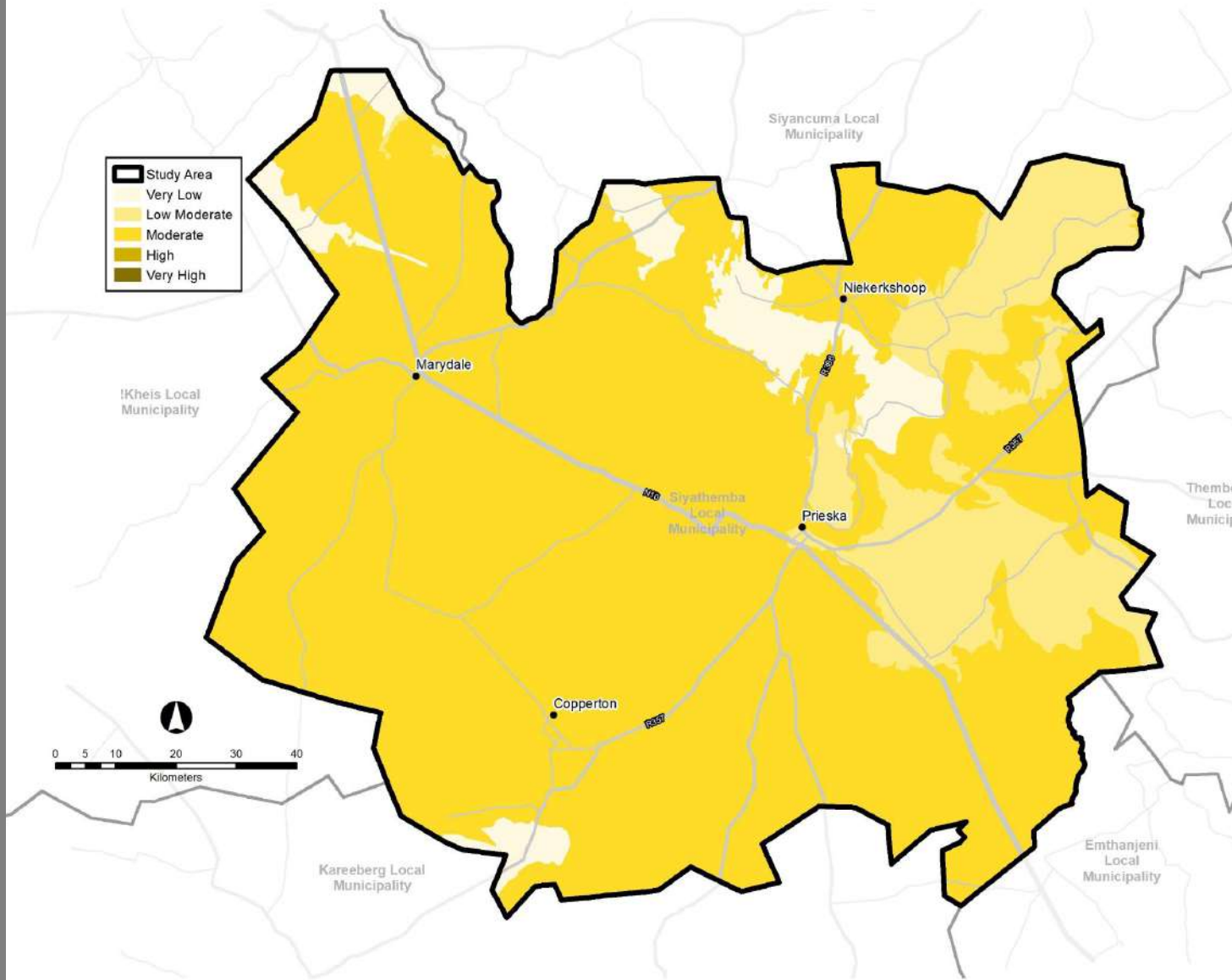


FIGURE 13 | SOIL LOSS

FIGURE 14 | SOIL CLAY CONTENT



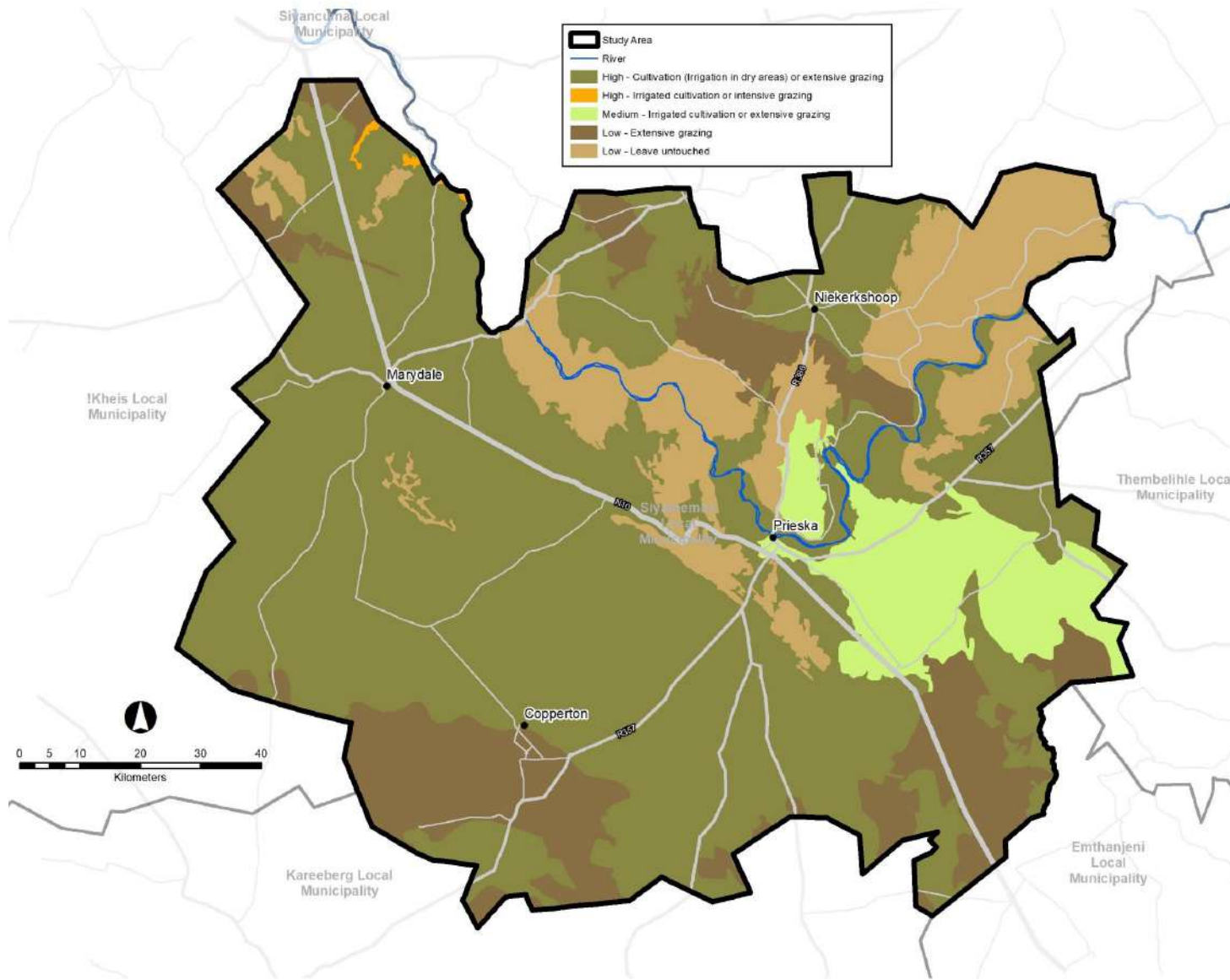
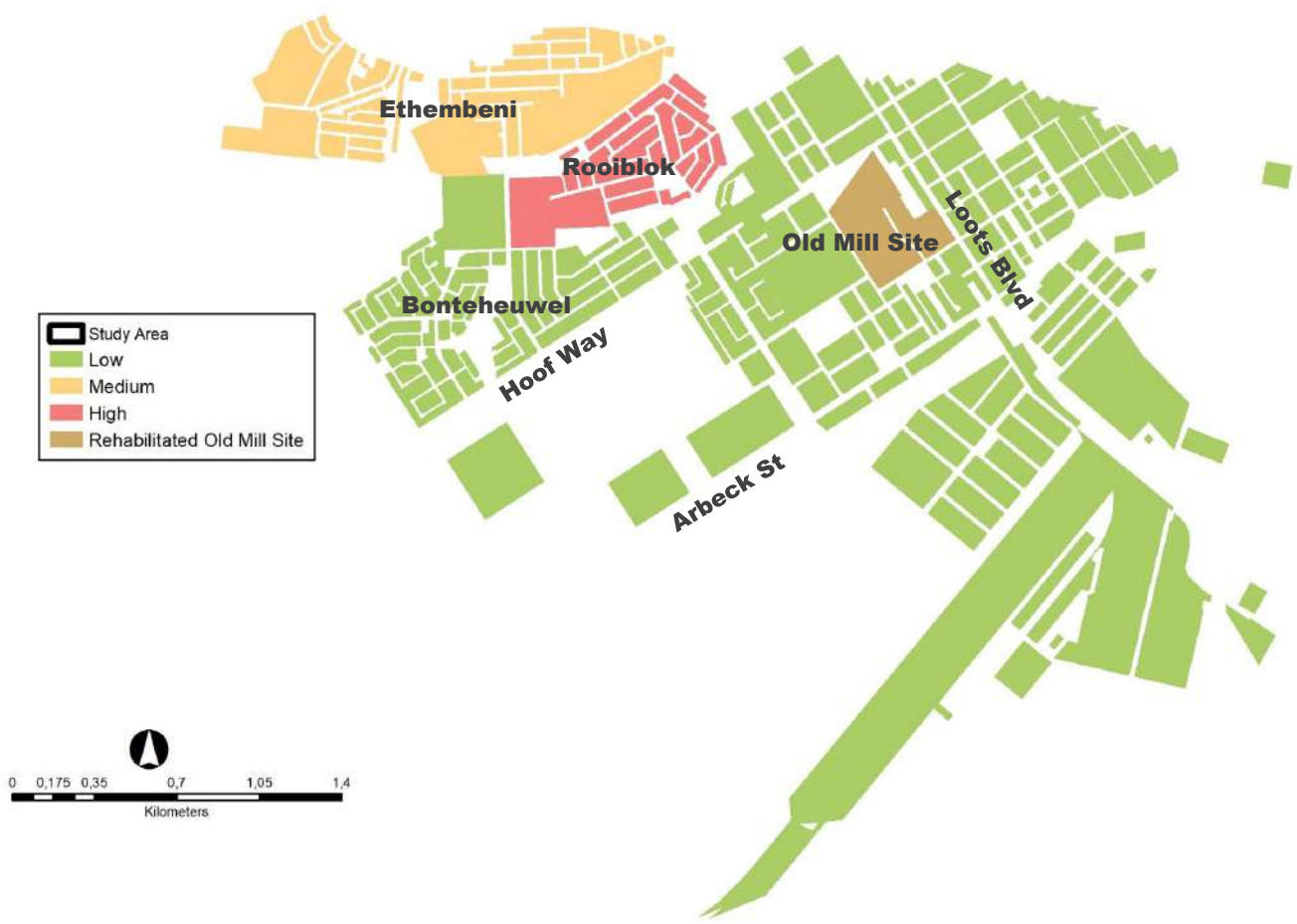


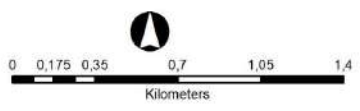
FIGURE 15 | AGRICULTURAL POTENTIAL

FIGURE 16 | ASBESTOS CONTAMINATION



Study Area

- Low
- Medium
- High
- Rehabilitated Old Mill Site



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a. Horizon

The Horizon is a distinct layer of soil, approximately parallel with the land surface, whose properties develop from the combined actions of living organisms and percolating water. Because these actions can vary in their effects with increasing depth, it is often the case that more than one horizon exists beneath the surface of any soil area, at depths ranging from only a few centimeters to several metres. One or more horizons make up what is known as the soil profile, the vertical sequence of distinct layers that is unique to each soil type.

b. Humus

Humus is a nonliving, finely divided organic matter in soil, derived from microbial decomposition of plant and animal substances. Humus, which ranges in colour from brown to black, consists of about 60 percent carbon, 6 percent nitrogen, and smaller amounts of phosphorus and sulfur. As humus decomposes, its components are changed into forms usable by plants.

The soil types found within Siyathemba are depicted on Figure 10. In total, 7 main categories of soils are found within Siyathemba. To a large extent, these soils impact the agricultural industry within the municipal area and what potential exists to develop the agricultural industry within the municipal area. The following soils are present within Siyathemba:

a. Arenosols

Arenosol, one of the 30 soil groups in the classification system of the Food and Agriculture Organization (FAO). Arenosols are sandy-textured soils that lack any significant soil profile development. They exhibit only a partially formed surface horizon (uppermost layer) that is low in humus, and they are bereft of subsurface clay accumulation. Given their excessive permeability and low nutrient content, agricultural use of these soils requires careful management. They occupy about 7 percent of the continental surface area of the Earth, and they are found in arid regions such as western Africa and the deserts of western Australia, as well as in the tropical regions of Brazil.

b. Calcisols

Calcisols are characterized by a layer of translocated (migrated) calcium carbonate (whether soft and powdery or hard and cemented) at some depth in the soil profile. They are usually well-drained soils with fine to medium texture, and they are relatively fertile because of their high calcium content. The chief use of Calcisols is for animal grazing. Occupying about

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6.4 percent of the continental land surface of the Earth, these soils are typically encountered in arid or Mediterranean climatic zones, such as the southwestern United States and northern Africa.

c. Cambisols

Cambisols are characterized by the absence of a layer of accumulated clay, humus, soluble salts, or iron and aluminum oxides. They differ from unweathered parent material in its aggregate structure, colour, clay content, carbonate content, or other properties that give some evidence of soil-forming processes. Because of their favourable aggregate structure and high content of weatherable minerals, they usually can be exploited for agriculture, subject to the limitations of terrain and climate. Cambisols are the second most extensive soil group on Earth, occupying 12 percent of the total continental land area. These areas include the polar regions, in landscapes with high rates of erosion, and in regions of parent material resistant to clay movement. They are not common in humid tropical climates. In order for a soil to qualify as a Cambisol, the texture of the subsurface horizons must be sandy loam or finer, with at least 8 percent clay by mass and a thickness of 15cm or more. These soils naturally form on medium- to fine-textured parent materials under any climatic, topographic, and vegetative-cover conditions.

d. Fluvisols

Fluvisols are found typically on level topography that is flooded periodically by surface waters or rising groundwater, as in river floodplains and deltas and in coastal lowlands. They are cultivated for dryland crops or rice and are used for grazing in the dry season. They occupy about 2.8 percent of the continental land area on Earth, mainly in the great river basins and deltas of the world, such as the Nile delta. Fluvisols are technically defined by a weak or non-existent surface horizon and by parent material derived from river, lake, or marine sediments that have been deposited at regular intervals or in the recent past. These soils exhibit a stratified profile that reflects their depositional history or an irregular layering of humus and mineral sediments in which the content of organic carbon decreases with depth. Wide variations in texture and mineral composition are observed.

e. Leptosols

Leptosols are soils with a very shallow profile depth (indicating little influence of soil-forming processes), and they often contain large amounts of gravel. They typically remain under natural vegetation, being especially susceptible to erosion, lack of moisture, or waterlogging, depending on climate and topography. Leptosols are approximately equally distributed among high mountain areas, deserts, and polar regions, where soil formation is limited by severe climatic conditions. They

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are the most extensive soil group worldwide, occupying about 13 percent of the total continental land area on Earth. Because of continual wind or water erosion or shallow depth to hard bedrock, Leptosols show little or none of the horizonation, or layering, characteristic of other soils.

f. Solonchaks

Solonchaks are defined by high soluble salt accumulation within 30 cm of the land surface and by the absence of distinct subsurface horizonation (layering), except possibly for accumulations of gypsum, sodium, or calcium carbonate or layers showing the effects of waterlogging. Solonchaks are formed from saline parent material under conditions of high evaporation. These are conditions encountered in closed basins under warm to hot climates, with a well-defined dry season, as in arid Mediterranean or subtropical zones. Occupying about 2.6 percent of the continental land surface on Earth, they are found principally in Chad, Namibia, Australia, Paraguay, and Uruguay. Owing to their high soluble salt accumulations, Solonchaks require irrigation and drainage if they are to be used for agriculture.

2.7.2. SOIL CHARACTERISTICS

Soil characteristics influence the suitability of soils for agricultural development, but also influence the foundation condition of buildings and therefore influence settlement development and expansion. The agricultural potential of the soils within Siyathemba will be discussed in detail in the following section. Therefore, in this section of the SDF the other characterizing of soils will be briefly addresses, such as depth, drainage and clay content.

a. Soil depth

The depth of soil is the area from the top of the bedrock or to the layer of roots. It differs significantly for different soil types. It is one of basic criterions used in soil classification. Soils can be shallow (<450mm), moderately deep (450mm-750mm), and deep (>750mm). Soil depth is very critical for plant growth. Any discontinuities in the soil profile, from layers of sand or gravel to even bedrock, can physically limit root penetration. It can also create problems when using irrigation.

As depicted of Figure 11, most of Siyathemba has a moderate soils depth, making it suitable of agriculture. There are only a few pockets of soils with low depth and these are all located on the peripheral areas of Siyathemba. Ironically, the largest

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parcel of low-depth soil is located on the southern banks of the Orange River, northeast of Prieska. The Orange River is the only viable source of irrigation water in Siyathemba.

b. Soil drainage

Soil drainage, or how well the soil holds water, is determined by soil texture. Soil drainage may determine which types of plants grow best in an area. Many agricultural soils need good drainage to improve or sustain production or to manage water supplies. Poor drainage can cause water-logged areas and thereby deprives roots of oxygen. As water leaves the soil, air moves into the space previously occupied by the water; this process is called aeration. Adequate soil aeration is vital for maintaining healthy plant roots. Well-drained soils are therefore soils which allows water to percolate through it reasonably quickly and not pool.

As illustrated on Figure 12, most of the soils within Siyathemba as well-drained. There are soils within Siyathemba that drain excessively. These soils are all located on the northern banks of the Orange River. However, as will be shown in a following section, these are also soils with poor agricultural potential, thus not resulting in a loss of agricultural potential due to excessive drainage.

c. Soil erosion

Soil erosion, affects agriculture. These impacts include compaction, loss of soil structure, nutrient degradation, and soil salinity. But the effects of soil erosion go beyond the loss of fertile land. Soils erosion leads to increased pollution and sedimentation in streams and rivers, clogging these waterways and causing declines in fish species. Degraded lands are also often less able to hold onto water, which can worsen flooding. In its extreme, the loss of valuable soil can lead to desertification.

As illustrated on Figure 13, most of Siyathemba has very little soils erosion, especially in the area surrounding the Orange River. Some soil erosion occurs south of Copperton.

d. Clay content

Clay is a fundamental driver of many soil properties and in many ways defines what a soil is capable of growing and storing. Soils with high levels of clay are not suitable for growing crops, because clay are often poorly drained. The ideal soil is

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considered to be a loam, which is a mix of sand, silt and clay. Loams take advantage of the balance of water holding and nutrient availability between the three.

As illustrated on Figure 14, the soils in Siyathemba has a moderate to low clay content. These soils clay conditions can be considered suitable drainage conditions for crop production

2.7.3. AGRICULTURAL POTENTIAL

The agricultural potential of Siyathemba varies from high to low potential. As illustrated on Figure 15, most of the soils in Siyathemba is considered high-potential agricultural soils. These soils are mostly found within central and southwestern parts of Siyathemba, in the vicinity of Copperton and Marydale. Although these soils have a high agricultural potential, they are not located near a water source for irrigation. Siyathemba has a rainfall of less than 300mm per annum, which makes cultivating dryland crops impossible. As a result, most of the high-potential agriculture soils have not agricultural value, other than for extensive grazing purposes. The Northern Cape Province has a mean rainfall of only 202mm per annum.

Most of the poor agricultural soils are located within the northeastern parts of Siyathemba and around Prieska. Ironically, this is also the area through which the Orange River flows, which is the only source of irrigation water within Siyathemba. There are relatively small portions of high-potential agricultural soils along the Orange River, directly northwest and northeast of Prieska. These areas are extensively and completely used for commercial irrigation farming. The only way to overcome this disjunction between the location of high-potential soils and the Orange River irrigation water source, will be the channel water from the Orange River to inland farmland comprising high-potential soils.

The agricultural potential of Siyathemba was based on the agricultural potential of the soils. Table 11 depicts the agricultural potential of each soil type, the agricultural characteristics of each soil type and the best agricultural use of each soil type. The agricultural potential of the soils are as follows:

a. Arenosols

Arenosols occur in vastly different environments and possibilities to use them for agriculture vary accordingly. Arenosols in dry areas are mostly used for little more than extensive grazing, but they could be used for arable cropping if irrigated. If

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they cannot be irrigated, they are best left untouched. All Arenosols have a coarse texture, resulting in generally high permeability and low water and nutrient storage capacity.

Arenosols in arid lands, where the annual rainfall sum is less than 300mm per annum, are predominantly used for extensive grazing. Dry farming is possible where the annual rainfall exceeds 300mm per annum. Low coherence, low nutrient storage capacity and high sensitivity to erosion are serious limitations of Arenosols in dry areas. Good yields of small grains, melons, and fodder crops have been realized on irrigated Arenosols, but high percolation losses may make surface irrigation impracticable. Drip or trickle irrigation, combined with careful dosage of fertilizers, may remedy the situation. Many areas with Arenosols in 300 to 600 mm rainfall per annum areas are transitional. Uncontrolled grazing and clearing for cultivation without appropriate soil conservation measures can easily make these soils unstable and soils erosion.

b. Calcisols

Dryness and stoniness limit the suitability of Calcisols for agriculture. If irrigated, drained (to prevent salinization) and fertilized, Calcisols can be highly productive under a wide variety of crops. Hilly areas with Calcisols are predominantly used for low volume grazing of cattle, sheep and goats.

Vast areas of Calcisols are typically used for extensive grazing. Drought-tolerant crops, such as sunflower, might be grown rain-fed on Calcisols, but Calcisols only reach their full productive capacity when irrigated. Calcisols can be used for production of irrigated wheat, melons, and cotton. Fodder crops, such sorghum bicolor, can also be planted on Calcisols. A wide range of vegetable crops can also be grown on irrigated Calcisols, when fertilized and irrigated. Furrow irrigation is superior to basin irrigation on slaking Calcisols because it reduces surface crusting and seedling mortality. Arable farming is hindered by stoniness of the surface soil and shallow depth of soil.

c. Cambisols

Cambisols are suitable for a wide variety of agricultural uses. However, climate, topography, soil shallowness and stoniness may pose restrictions on agricultural use. Cambisols on steep areas are mainly used for grazing or forestry.

By and large, Cambisols make good agricultural land and are intensively used for such. Cambisols in temperate zones are among the most productive soils on earth. Cambisols in dry zones are less fertile and are typically used for mixed, arable farming, grazing and forest land. Cambisols on steep slopes are best kept under forest. Cambisols on irrigated, alluvial plains in dry zones are intensively used for the production of food crops.

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TABLE 11: AGRICULTURAL POTENTIAL OF SIYATHEMBA SOILS

Soil type	Agricultural potential	Agricultural characteristics	Best agricultural use
Arenosols	Low	Most Arenosols in the dry zone are used for little more than extensive grazing, but they could be used for arable cropping if irrigated. Arenosols are best left untouched.	Extensive grazing
Calcisols	Medium	Areas of dryness and stoniness limit the suitability of Calcisols for agriculture. If irrigated, drained (to prevent salinization) and fertilized, Calcisols can be highly productive under a wide variety of crops. Hilly areas with Calcisols are predominantly used for low volume grazing of cattle, sheep and goats.	Irrigated cultivation Extensive grazing
Cambisols	High	Cambisols are good agricultural land and are intensively used for cultivation. Climate, topography, shallowness, stoniness, or low soil depth pose restrictions agricultural use. In steep topography Cambisols are mainly used for grazing or forestry.	Cultivation (irrigation in dry areas) Extensive grazing
Fluvisols	High	Fluvisols are planted with food crops and orchards and many are used for grazing. Flood control, drainage and irrigation is normally required.	Irrigated cultivation Intensive grazing
Leptosols	Low	Leptosols are unattractive soils for arable cropping; limited potential for tree crop production or extensive grazing. Leptosols are best kept untouched.	Leave untouched
Solonchaks	Low	Solonchaks have limited potential for cultivation of salt tolerant crops. Many are used for extensive grazing or are not used for agriculture at all.	Extensive grazing

Source: Urban Dynamics Gauteng, 2019

d. Fluvisols

Fluvisols are planted for food crops and orchards and many are used for grazing. Flood control, drainage and irrigation is normally required. Fluvisols suffer from severe soil acidity. The good, natural fertility of most Fluvisols and attractive dwelling location near to rivers make these suits very suitable of small-scale farming associated with rural settlements.

e. Leptosols

Leptosols are unattractive soils for arable cropping. Leptosols only have limited potential for tree crop production or extensive grazing. Consequently, Leptosols are best kept untouched by agriculture. Leptosols have the potential for wet-season grazing and as forest land. Erosion is the greatest threat to Leptosol areas, particularly in mountainous regions under deforestation pressure. Leptosols on slopes are generally more fertile than these soils on more level land. Crops could

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possibly be grown on such slopes, but at the price of severe erosion. The excessive drainage of Leptosols can cause drought, even in a humid environment.

f. Solonchaks

Solonchaks have limited potential for cultivation of salt tolerant crops due to its high salt content. The excessive accumulation of salts in soil can affect and aggravate drought stress in plants. Typically, Solonchaks are used for extensive grazing or are not used for agriculture at all. They are used for extensive grazing of sheep, goats, camels and cattle or lie idle.

Strongly salt-affected soils have little agricultural value. Only after the salts have been flushed from the soil may these soils yield crops. Application of irrigation water to these soils must not only satisfy the needs of the crop, but excess water must be applied above the irrigation requirement to maintain a downward water flow in the soil and flush excess salts from the root zone. Irrigation of crops in arid and semi-arid regions must be accompanied by drainage to keep the groundwater table below the critical depth.

2.7.4. SOIL (ASBESTOS) CONTAMINATION

Siyathemba is affected by asbestos contamination caused by asbestos extraction. Although the extraction of asbestos ceased a long time ago, the residents of Prieska continue to live and work in an asbestos-polluted environment. Consequently, there is a need to rehabilitate the contaminated areas of Prieska to address the health risk associated with asbestos contamination.

A key aspect of the rehabilitation process was the rehabilitation of the Old Mill Site at Prieska, an area in the town where asbestos was received for processing. Mintek was appointed by the Department of Mineral Resources' programme to rehabilitate derelict and ownerless mines in South Africa, including the Old Mill Site at Prieska. Mintek successfully completed the rehabilitation of the Old Mill Site by 2011.

The Old Mill Site was covered with a layer of soil and strong Polysoil (a commercial soil bonding agent) to ensure a stable, hard cover layer that encapsulates the asbestos underground. The wall was subsequently erected to control access to the site. The project also included the construction of stormwater drainage structures around the perimeter of the site.

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Asbestos has been mined in the Prieska area from as early as the 1890s. The Old Mill Site was in operation from the early 1970s until it was closed down in 1986. The completion of this work allowed the Siyathemba Municipality to safely develop the Old Mill Site as a memorial park to victims of asbestosis. Unfortunately, this memorial park has since deteriorated due to a lack of maintenance.

Rehabilitation of the Old Mill Site does not imply that all the asbestos contamination has been curtailed in Prieska. In order to address the remained asbestos problem in Prieska, a study was conducted to determine the extent of the problem. The objectives of the study were to determine the exact levels of asbestos contamination in Prieska, determine how big the risk is of exposure to asbestos contamination in Prieska, and what the options are for the rehabilitation of contaminated areas in Prieska. The study area was divided into 4 sub-areas: Rooiblok (Lemnertsville), Ethembeni, Bontheuwel (Lemnertsville) and the town of Prieska.

The levels of asbestos contamination in the areas mentioned above were determined by the study and the risk of exposure for its residents was quantified. The levels of contamination were presented in terms of an Asbestos Priority Index (API), which indicated the priority in which the abovementioned areas should be rehabilitated. As depicted on Figure 16, the results of the study have shown that Rooiblok and Ethembeni had the highest need for rehabilitation, while Bontheuwel and the town of Prieska has low levels of contamination. The detailed conclusion drawn by the study were as follows:

Rooiblok

- Can be regarded as the highest priority area
- Most of area falls in the highest two API categories
- The need for rehabilitation is significant
- Most of the asbestos pollution comes from soil and building materials

Ethembeni

- It is the second highest priority area
- The API is the highest in two categories
- A portion of the area (southern part near to Rooiblok) should be dealt with as one contaminated block

Prieska

- Most of API is in the lowest class

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- The highest API stands are located to the west (old station) and north near Rooiblok

Bontheuwel

- Most of stands are in the lowest class (i.e. asbestos was not detected in samples)
- Several open stands showed contamination (this poses a risk when developed in future)
- Large open areas should be tested further

The study concluded that the whole of Prieska should be approached carefully for any future developments and that an asbestos risk assessment should form part of any planning of new township extension in Prieska. The study also advised that there are several large open areas that should be investigated in more detail for asbestos contamination to support any future developments or other activities. These investigations need to determine the level of asbestos pollution on these envisaged areas and give a recommendation whether it is feasible to proceed with development on these areas or not. If feasible the outcome of these investigation must result in detailed specifications to comply with when development new townships on these areas.

2.8. LAND USE

Although Siyathemba contains a number of towns, it is largely rural in character in terms land use and coverage. Consequently, the broad land use structure needs to be described to illustrate this rural land use character of the municipal area. The land use character of the individual towns will be described in a following section to illustrate the rural settlement character of the land uses in these towns.

2.8.1. BROAD LAND USE STRUCTURE

Figure 17 illustrates the broad land use pattern found within Siyathemba. This land use pattern is broadly divided spatially by the N10 freeway. To the south of the N10 freeway the land use character is largely flat, sparse and rural. To the north of the N10 freeway the land use character is largely mountainous, residential and intensive farming. The following broad land uses occur within Siyathemba:

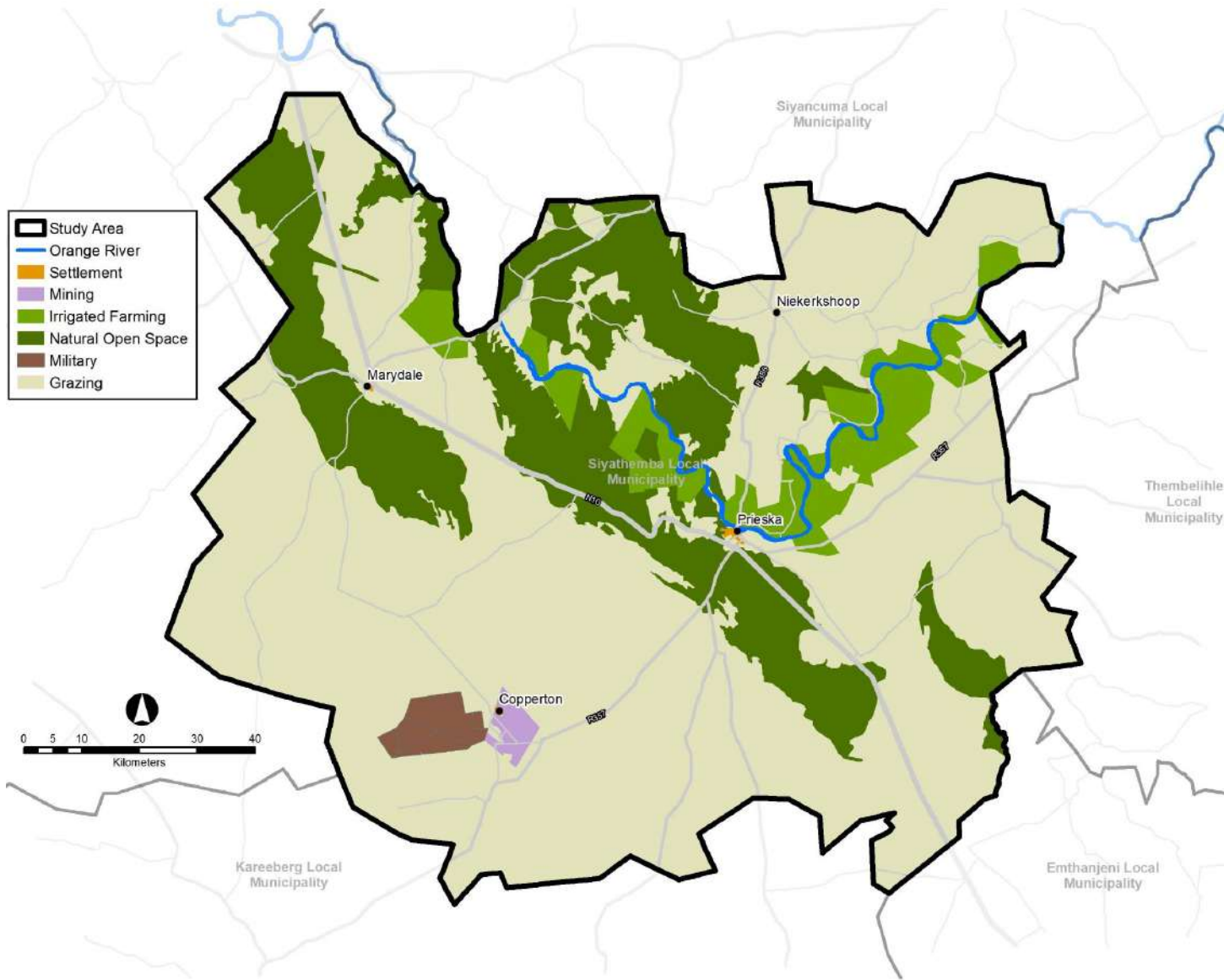
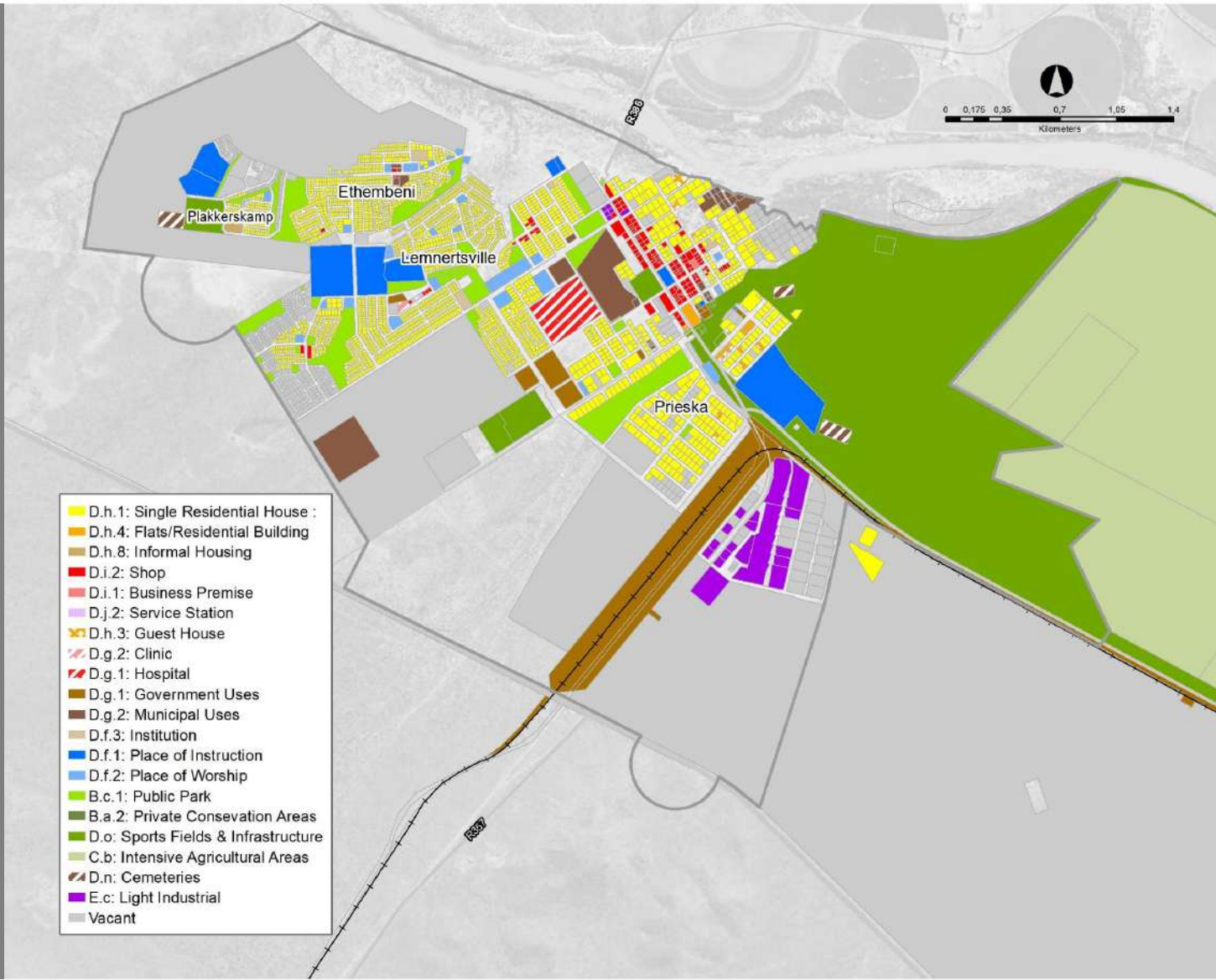


FIGURE 17 | BROAD LAND USE

FIGURE 18 | PRIESKA LAND USE



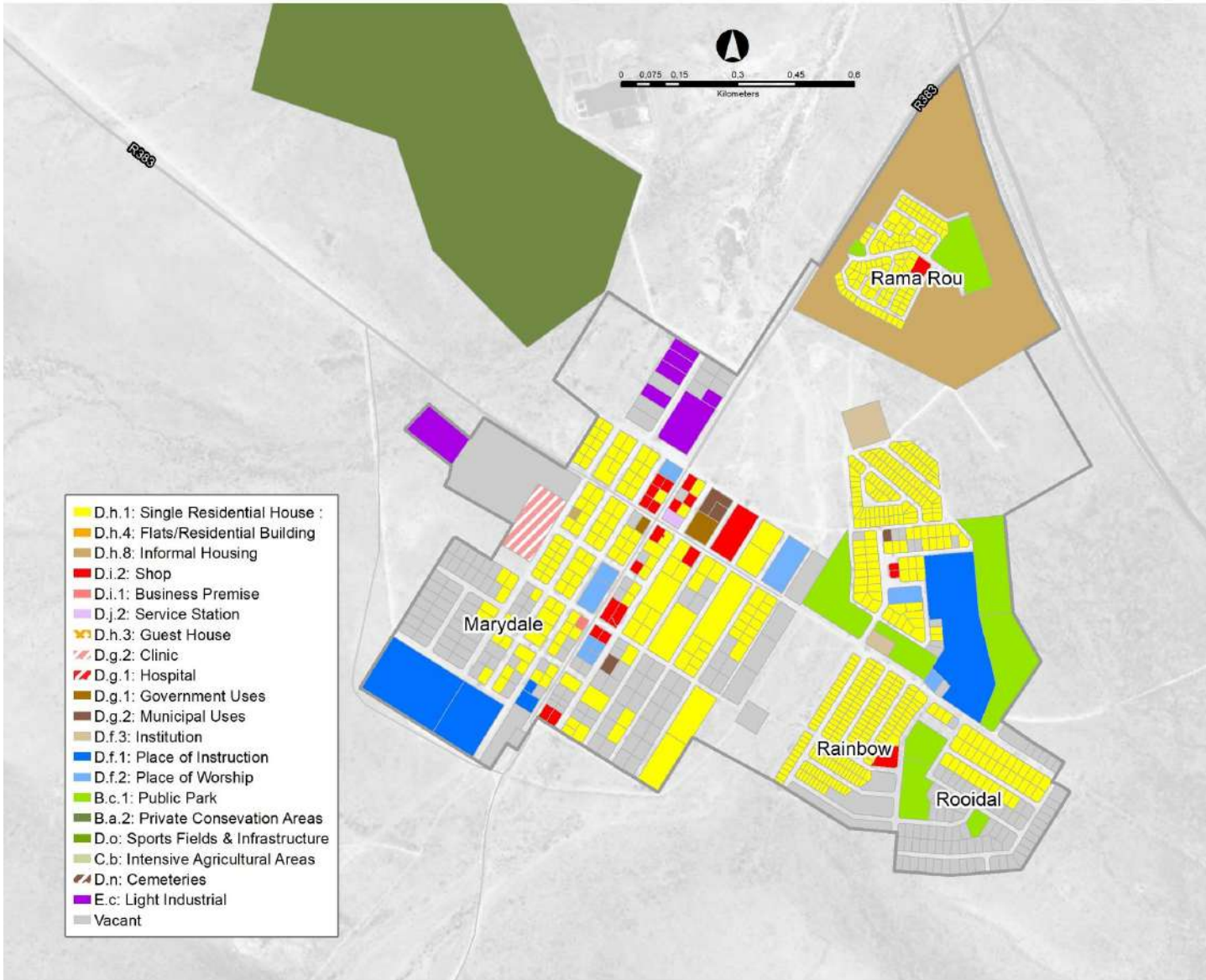


FIGURE 19 | MARYDALE LAND USE

FIGURE 20 | NIEKERKSHOOP LAND USE



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a. Settlement

Siyathemba has 4 towns that house the majority of the municipal area's population. These towns include Prieska, Marydale, Niekerkshoop and Copperton. Prieska is the main town and contains most of the municipal area's population and contains most of the municipal area's community facilities. The Prieska population resides in a number of suburbs, including Lemnertsville and Ethembeni. Prieska functions of the primary service centre to the local commercial agricultural industry and contains the only agri-industrial area within Siyathemba.

Marydale and Niekerkshoop also function as local rural service centres, but albeit smaller than that of Prieska. Niekerkshoop comprises the suburbs Rainbow, Rooidal and Rama Rou. Copperton is an old mining town that was sold to a private owner after the closing of the mine. Most of the houses were demolished. The few houses that have been retained are now mostly occupied by pensioners.

b. Agriculture

Although Siyathemba has a number of settlements, most of its land surface is used for intensive and extensive agricultural purposes. Intensive and extensive farming areas in Siyathemba are roughly separated by the N10 freeway. Intensive, irrigation farming occurs north of the N10 freeway along the Orange River. The Orange River is used for the extraction of irrigation water. Irrigation farms along the Orange River are mostly used for the cultivation of grains and vegetables. Extensive, grazing farms are located south of the N10 freeway. The livestock on these farms include cattle, sheep and goats. Whereas the intensive farms are in the order of 1000-3000ha in size, the extensive farms are on average 5000ha and larger in size.

c. Military and mining

The Copperton mine and the Alkantpan military test site are the only two non-agricultural land uses within Siyathemba that are visible at the scale of the broad land use structure illustrated on Figure 17. Mining at Copperton lasted for two decades until it was stopped in 1991. Presently, a small part of Copperton town still exists and the mine's airfield is used by the Alkantpan military test site to transport military personnel and equipment. A portion of Copperton mine is also used for a large solar plant. The Alkantpan military test site located west of Copperton town. This test site is actively used by Armscor and international militaries for hardware testing.

2.8.2. DETAIL LAND USE STRUCTURE

Figure 18-21 illustrates the detailed land use pattern found within Prieska, Marydale, Niekerkshoop and Copperton respectively. The towns largely comprise residential, community, retail, industrial and open space uses. The following detail land uses occur within these towns, as set out statistically on Table 12:

a. Prieska

The detailed land uses of Prieska are illustrated on Figure 18. Prieska is the main town, contains most of the municipal area's population and functions of the primary service centre to the local commercial agricultural industry. Apart from the size of this town, what distinguished it from the other towns within Siyathemba is its business centre (or CBD), which contains retail establishments, office, community facilities and agri-industries. The business centre is located on a strip along Loots Boulevard and clustering in the intersection of Loots Boulevard and Church Street.

Residential areas surround the abovementioned business district to the north up to the Orange River and southeastwards up to the R357. The largest residential suburbs are located to the west of the Prieska business centre and include the suburbs of Lemnertsville and Ethembeni. All the suburbs within Prieska have community facilities, such as schools and clinics.

The agri-industrial area, located southeast of the R357, is a prominent land use within Prieska. This agri-industrial area comprises the GWK silo, which is a prominent landmark within Prieska. This industrial area has access to the freight railway line linking Upington to Port Elisabeth. Other prominent land uses within Prieska include the Bill Pickard Hospital, located southwest of the business centre, the Dutch Reformed Church, located northeast of the business centre, the sports stadium, located on Arbeck Street, and the Prieska airfield, situated at the entrance to the town on the R357 from Kimberley.

d. Natural Open Space

Siyathemba has an undulating, mountainous topography. The Doringberg is the landform with the highest elevation in the municipal area. It stretches from the southeastern corner of the municipal area to the northwestern corner of the municipal area. This mountain range forms part of the natural open space system of Siyathemba. In addition to the Doringberg, the Orange River and the Brak River forms part of the natural open space system of Siyathemba. These rivers are located north and parallel to the N10 freeway. The Doringberg mountain range and the Orange River are the 2 natural elements within Siyathemba that attribute most to the municipal area's scenic quality.

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TABLE 12: DETAILED LAND USE

Land Use	Prieska	Marydale	Niekerkshoop	Total
Residential	159,2	60,3	25,8	245,3
Single Residential House	154,4	39,5	20,2	214,1
Flats/ Residential Building	1,3	0,0	0,0	1,3
Guest House	2,5	0,0	0,0	2,5
Informal Housing	1,0	20,8	5,6	27,4
Community	66,2	17,3	3,7	87,1
Place of Instruction	40,5	13,1	1,9	55,5
Place of Worship	11,1	2,6	1,7	15,4
Clinic	0,5	1,6	0,0	2,2
Hospital	9,8	0,0	0,0	9,8
Cemeteries	4,2	0,0	0,0	4,2
Business	12,5	3,4	1,3	17,2
Business Premise	0,3	0,1	0,0	0,3
Shop	12,2	3,2	1,3	16,7
Service Station	0,0	0,2	0,0	0,2
Authority	107,9	2,5	0,9	111,3
Municipal Uses	26,1	0,7	0,3	27,1
Government Uses	79,9	0,5	0,3	80,8
Institution	1,9	1,3	0,3	3,5
Industrial	22,9	3,7	0,0	26,6
Light Industrial	22,9	3,7	0,0	26,6
Agriculture	1492,1	0,0	0,0	1492,1
Intensive Agricultural Areas	1492,1	0,0	0,0	1492,1
Open Space	1327,6	70,7	3,8	1402,2
Private Conservation Areas	0,0	52,0	0,0	52,0
Public Park	45,3	18,7	0,2	64,2
Sports Fields & Infrastructure	1282,3	0,0	3,6	1286,0
Vacant	2332,9	31,5	20,7	2385,1
Vacant	2332,9	31,5	20,7	2385,1
Total	5295,9	111,9	26,8	5434,6

Source: Urban Dynamics Gauteng, 2019

FIGURE 21 | COMMUNITY FACILITIES PRIESKA

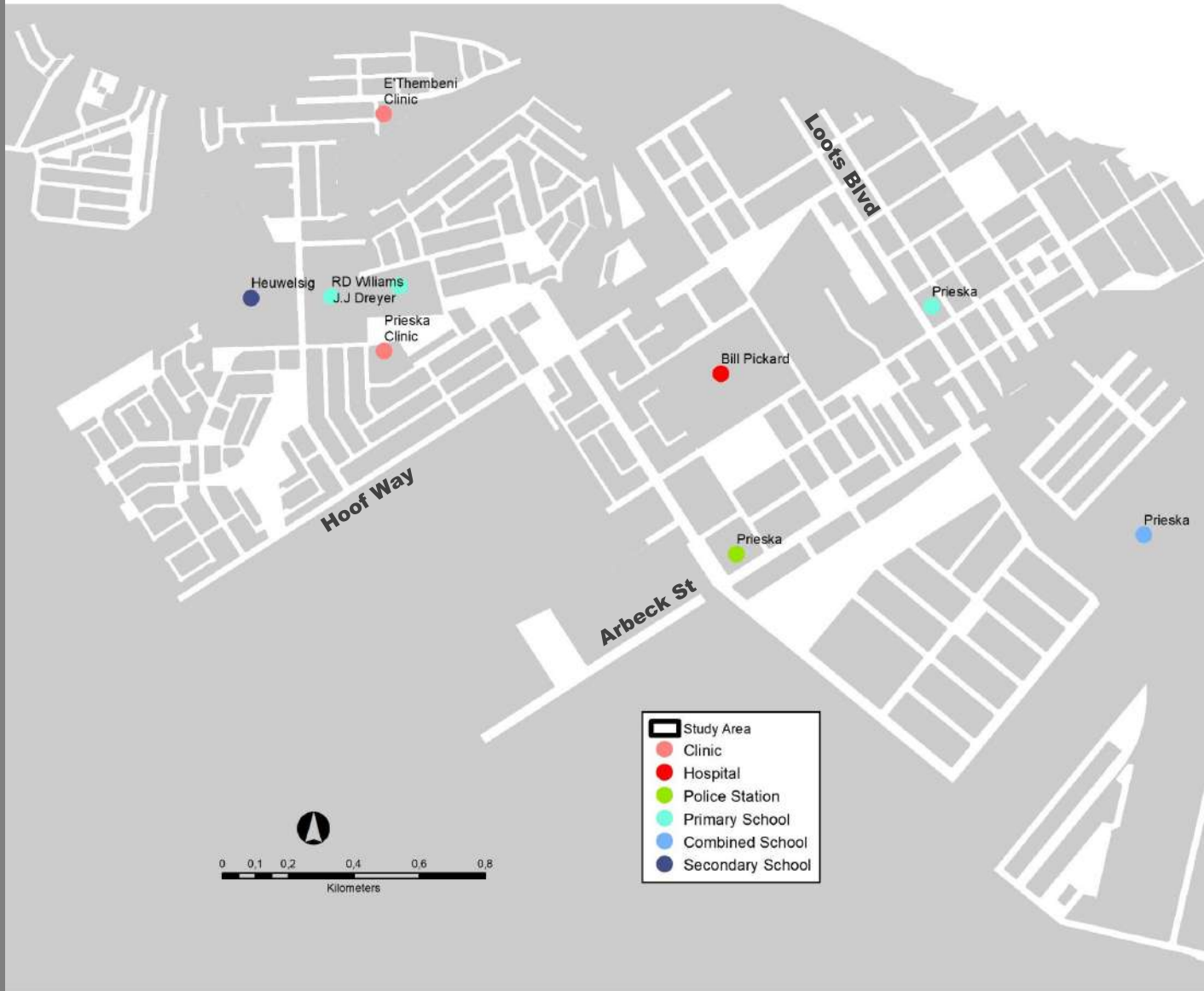
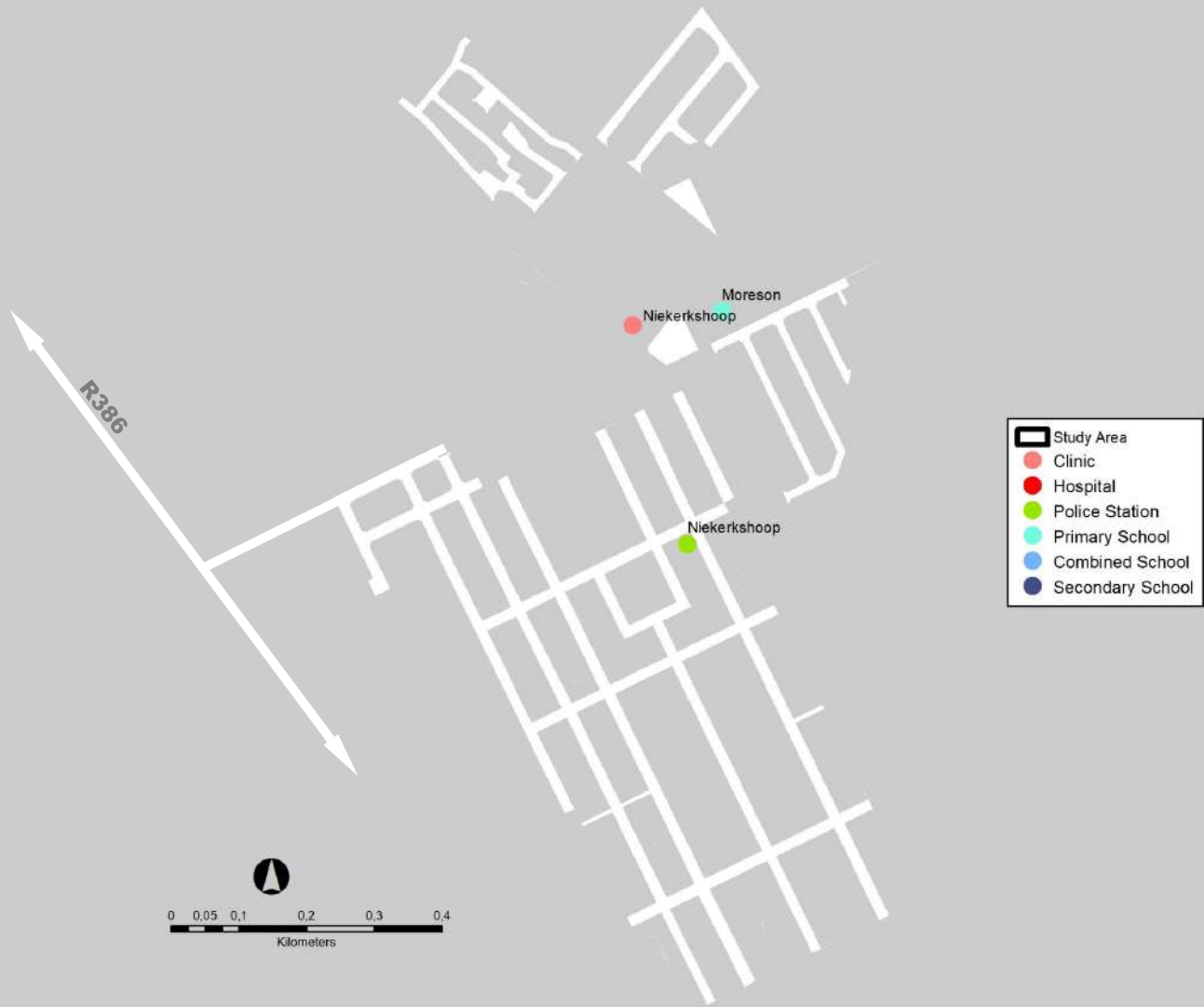




FIGURE 22 | COMMUNITY FACILITIES
MARYDALE

FIGURE 23 | COMMUNITY FACILITIES NIEKERKSHOOP

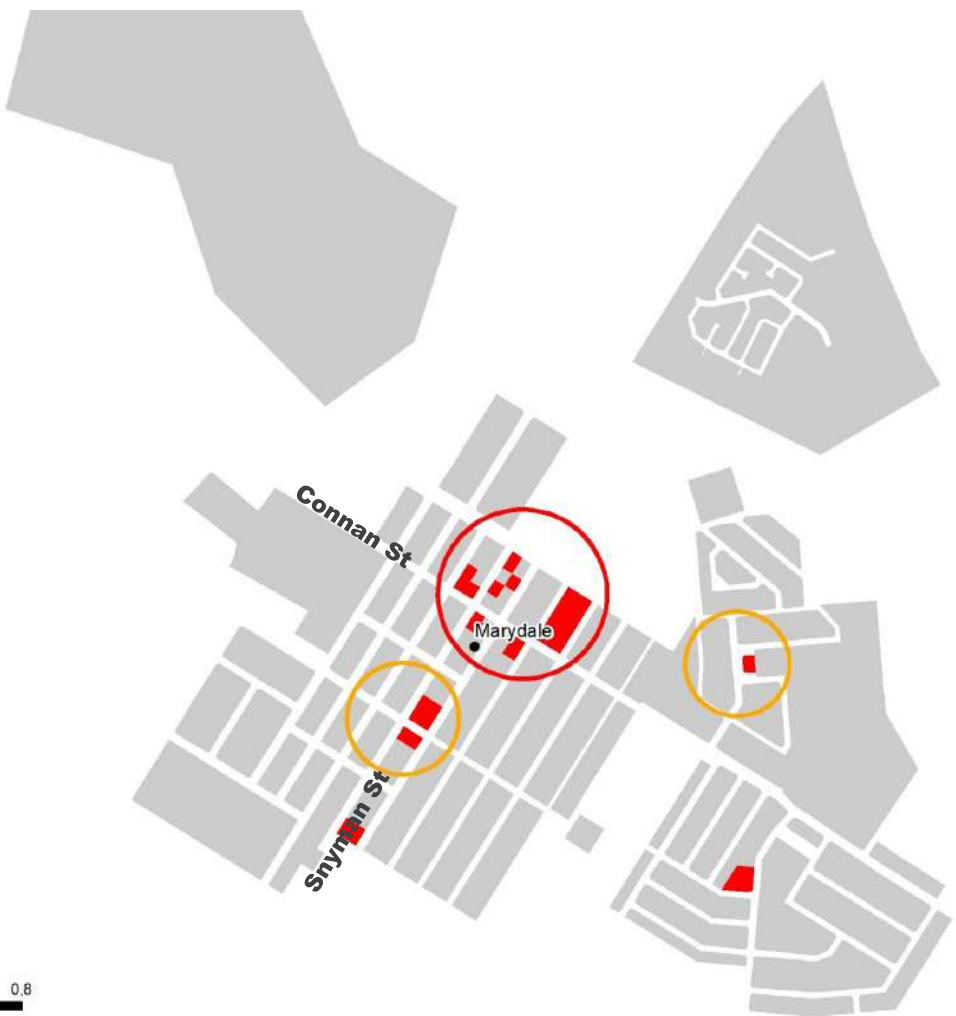
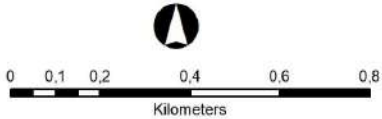


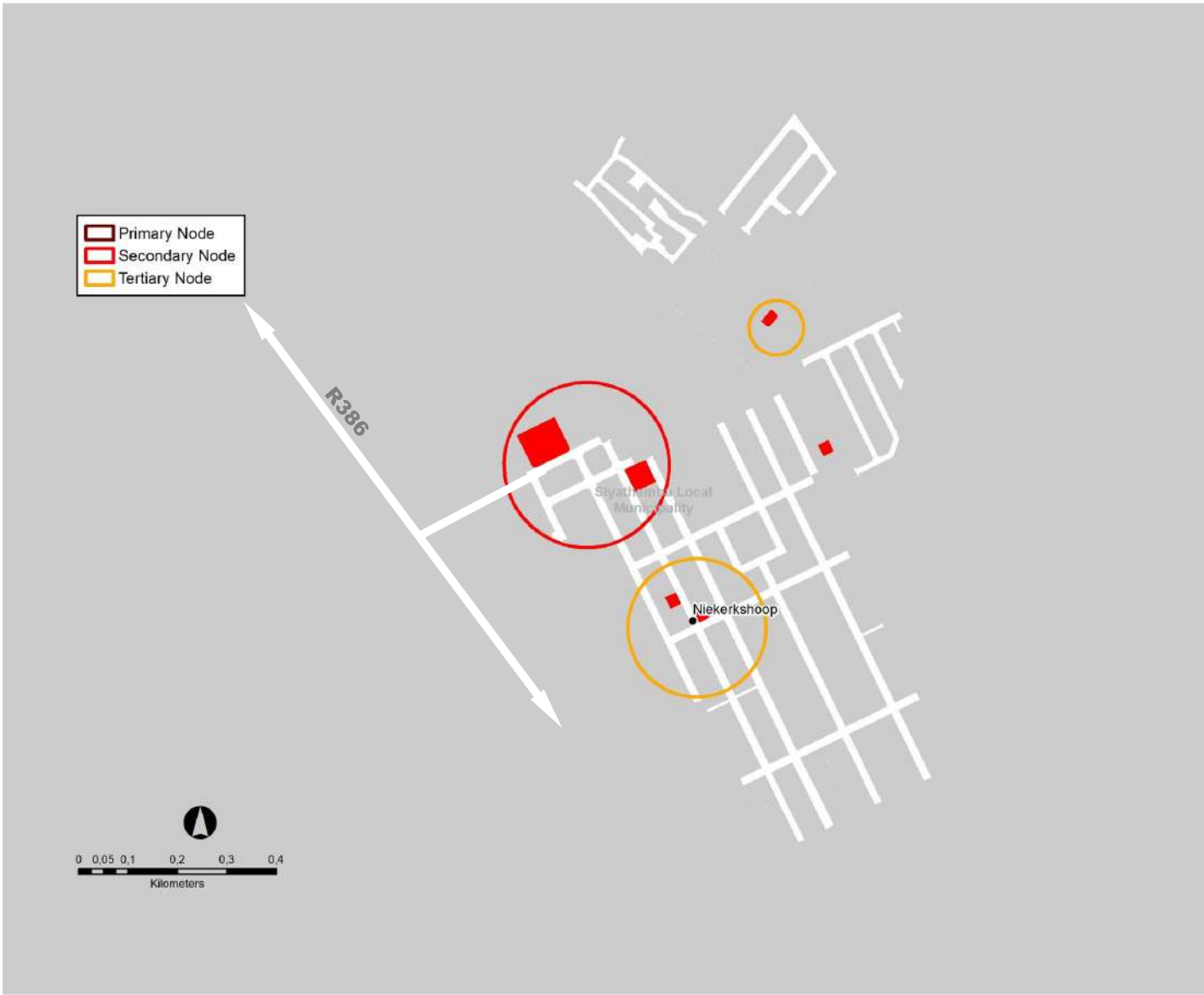


**FIGURE 24 | BUSINESS NODES
PRIESKA**

FIGURE 25 | BUSINESS NODES MARYDALE

- Primary Node
- Secondary Node
- Tertiary Node





**FIGURE 26 | BUSINESS NODES
NIEKERKSHOOP**

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Prieska does have an open space network. However, due to the arid nature of the Siyathemba climate, most of the open space are poorly landscaped and maintained. Prominent open spaces include Die Bos resort, situated northeast of the business centre on the banks of the Orange River, the Prieska Golf Course (also situated next to the Orange River), and the Koppies Nature Reserve, situated at the entrance to the town on the R357 from Kimberley.

b. Marydale

The detailed land uses of Marydale are illustrated on Figure 19. Marydale also functions as local rural service centre to the local commercial farming industry, only smaller than Prieska's service centre function. The centre of Marydale is located on Connan Street and Snyman Street, which is also the road linking Marydale to the N10. The town's business centre is located on this intersection and mostly comprises small convenient stores. A small industrial area, which is mostly vacant, is located at the entrance to the town.

Marydale have a number of community facilities. These include a police station, a clinic and a combined primary and secondary school. The clinic and primary school are located within the Rama Rou suburb of Marydale. Other suburbs within Marydale include Rainbow and Rooidal. The Dutch Reformed Church on Snyman Street is a prominent land use feature within Marydale.

c. Niekerkshoop

The detailed land uses of Niekerkshoop are illustrated on Figure 20. Niekerkshoop also plays an rural service centre function to the local commercial farming industry, but much less so than Prieska and Marydale. It is largely a residential community containing all the community facilities needed to support its residential population. These community facilities include a police station, clinic and primary school. Businesses, most comprising local convenient stores, are located at the entrance to the town. The Dutch Reformed Church in the centre of town is a prominent land mark within the town.

d. Copperton

The town Copperton used to be a fairly large mining town that housed approximately 3000 mine workers and their families. It comprised a school and excellent recreation facilities, including a nine-hole golf course. However, since the closure of the mine in 1991, the town was sold to a private owner and most of the houses and facilities have been demolished. The few houses that have been retained are now mostly occupied by pensioners.

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2.8.3. COMMUNITY FACILITIES

Siyathemba has a well-developed community infrastructure network, providing educational, health and other essential social services. Figure 21-23 illustrates the location of the community facilities within Prieska, Marydale and Niekerkshoop. The community facilities found within these towns are as follows:

a. Education

The educational infrastructure of Siyathemba comprises primary schools, secondary schools, and combined primary and secondary schools. It is estimated that Siyathemba currently has an adequate supply of primary and secondary schools. Consequently, the Municipality does not experience many challenges with regards to the availability of schools. The support services serving the schools, such as roads, electricity, water and sanitation, are also sufficient. According to the Siyathemba IDP (2018), the schools serving the Siyathemba municipal area and their enrollment numbers and listed on Table 13.

TABLE 13: EXISTING EDUCATIONAL FACILITIES

School name	Town or area	Learner enrolment	Educators	Support staff	Type of school
Bloukrans School	Farm	78	3	2	Combined
Modderfontein School	Farm	35	1	0	Primary
Sonskyn School	Marydale	678	19	4	Combined
Môreson School	Niekerkshoop	473	15	4	Primary
Hoërskool Prieska	Prieska	378	20	9	Combined
J.J. Dreyer School	Prieska	830	24	6	Primary
R.D. Williams School	Prieska	980	27	9	Primary
Prieska School	Prieska	330	11	5	Primary
Redlands School	Prieska	42	2	0	Primary
Heuwelsig School	Prieska	990	29	8	Secondary

Source: Siyathemba Local Municipality IDP, 2018

b. Health

Siyathemba has a limited number of clinics that serves the Siyathemba population. The municipal area does not have a hospital. The nearest hospital is located in Kimberley, which is 240km apart. Clinics are located in all the major settlements

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within Siyathemba, including Prieska, Marydale and Niekerkshoop. Most of the clinics are capable of providing comprehensive primary health care services. The health facilities available within the Siyathemba municipal area are listed on Table 14.

TABLE 14: EXISTING HEALTH FACILITIES

Type of Clinic	Clinic name	Town	Sufficient sanitation services	Sufficient water services
Hospital	Bill Pickard Hospital	Prieska	Yes	Yes
Permanent Clinic	Niekerkshoop Clinic	Niekerkshoop	Yes	Yes
Permanent Clinic	Ethembeni Clinic	Prieska	Yes	Yes
Permanent Clinic	Marydale PHCC	Marydale	Yes	Yes
Permanent Clinic	Prieska Clinic	Prieska	Yes	Yes

Source: Siyathemba Local Municipality IDP, 2018

According to the Siyathemba IDP (2018), the Municipality does not experience many challenges with regards to the availability of clinics within the municipal area. The support services servicing the clinics, such as roads, electricity, water and sanitation, are also sufficient. According to the Service Transformation Plan of the Provincial Department of Health, Prieska qualifies for a Community Health Centre. No information is however available on when such a facility will be constructed. The only challenges with regard to the health sector in Siyathemba is the fact that Niekerkshoop does not have an ambulance service.

c. Safety and Security

A police station is located within each of the 3 towns within the Siyathemba municipal area. There is no fire brigade in the municipal area. The police stations are distributed across Siyathemba and this may result in poor response times in certain areas due to topography and distances.

d. Cemeteries

Siyathemba has 3 cemeteries in Prieska where burials take place. According to the Siyathemba IDP, the Municipality is busy with a MIG project to upgrade one of the cemeteries due to the need for more burial space. Niekerkshoop and Marydale each also have 2 cemeteries where burials take place. MIG project have also been implementation in 2 of the Niekerkshoop and Marydale cemeteries to create more space for burials.

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2.8.4. RETAIL AND OFFICE FACILITIES

As depicted by Table 15, Siyathemba has a total retail floor area of approximately 56200m². and office floor area of approximately 2100m². The total retail floor area is divided into a number of retail facilities located on individual retail premises of varying sizes. Most of the retail facilities are found within the business centre of Prieska. Siyathemba does not have a shopping mall, as typically found within metropolitan areas.

TABLE 15: EXISTING RETAIL FLOOR AREA 2019

Town	Retail		Office	
	Stand Size (ha)	Estimated Floor Area (m ²)	Stand Size (ha)	Estimated Floor Area (m ²)
Prieska	10,8	43120	0,3	1620
Primary Node	9,4	37400	0,3	1620
Tertiary Node	1,4	5720	0,0	0
Marydale	2,2	8640	0,1	480
Secondary Node	1,1	4240	0,1	480
Tertiary Node	1,1	4400	0,0	0
Niekerkshoop	1,1	4440	0,0	0
Secondary Node	0,9	3480	0,0	0
Tertiary Node	0,2	960	0,0	0
Siyathemba Total	14,1	56200	0,4	2100

Source: Urban Dynamics Gauteng, 2019

As depicted on Figures 24-26, Siyathemba has 1 primary business node, located in Prieska, and 2 secondary business nodes, located Marydale and Niekerkshoop. The Prieska CBD is the primary business node within Siyathemba and is located on the intersection of Loots Boulevard (R386) and Church Street. Most of the businesses straddle Loots Boulevard in a linear pattern, simply because this road is a regional connector road, connecting Copperton in the south to Niekerkshoop in the north. The R357 from Douglas and Kimberley also connects to Loots Boulevard, strengthening Loots Boulevard as the central business spine of Prieska. Andries Pretorius Street, which runs parallel and east of Loots Boulevards, also contains a number of retail facilities. Church Street, which terminates at the Dutch Reformed church locate east of Loots Boulevard, comprises all the banks located in Siyathemba. Smaller business nodes are located within the suburbs of Prieska. These are located in Lemnertsville (next to Skool Street) and Ethembeni (next to Polyane Street) and Prieska North (next to Omega Street). In total, Prieska has approximately 43100m² of retail space and approximately 1600m² of office space. The size of the retail floor area within the Prieska CBD or primary node make it the clearly dominant business node with Siyathemba and the service centre to the larger municipal region.

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Marydale has 3 business nodes. The first business node is located on the R383 (Connan Street), which is the primary access road to Marydale. The second business node is located south of the first node, behind the Dutch Reformed Church, located on the corner of Niekerk and Snyman Streets. The third node is located in Rama Rou, near the primary school. All the business nodes in Marydale comprise of a cluster of mini-supermarket located on a street corner. In total, Marydale has approximately 8640m² of retail space and approximately 480m² of office space. The retail space is evenly distributed between the secondary and tertiary business nodes.

Niekerkshoop also has 3 business nodes. The first business node is located at the entrance to Niekerkshoop from the R386. The second business node is located south of the existing Dutch Reformed Church. The third business node is located north of the police station, next to the primary school. As in the case of Marydale, all the business nodes in Niekerkshoop comprise of a cluster of mini-supermarket located on a street corner. In total, Niekerkshoop has approximately 4440m² of retail space and no office space. A total of 3480m² of the town's total retail space is located within the secondary node of the town.

2.8.5. INDUSTRIAL AND AGRO-INDUSTRIAL

According to the Siyathemba Local Economic Development Strategy (2012), manufacturing is a significant economic sector, contributing roughly 14% to the local GDP of Siyathemba. Agri-processing is the main manufacturing activity in Siyathemba, which consists of the production of various plant and meat products. Siyathemba has an existing industrial area, which is located in the southeastern periphery of Prieska, next to the road R357. This industrial area houses the GWK silos, which is the most prominent building structure in Prieska from a height and bulk perspective.

TABLE 16: EXISTING INDUSTRIAL AND AGRO-INDUSTRIAL LAND

Industrial area	Occupied Industrial (ha)	Occupied Commercial (ha)	Vacant (ha)	Total (ha)
Prieska	22,7	0,0	15,3	38,0
Marydale	3,8	0,0	1,6	5,3
Niekerkshoop	0,0	0,0	0,0	0,0
Total	26,4	0,0	16,8	39,5

Source: Urban Dynamics Gauteng, 2019

Table 16 provides the occupied and vacant land areas available within the existing industrial areas of Siyathemba. Prieska has the only significant industrial area within Siyathemba. The Prieska industrial is 38,8ha in size, of which approximately 22,7ha is

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occupied. Approximately 15,3ha of this industrial area is still vacant. However, much (if not all) of this land could be in private ownership and therefore not available for development. The only other industrial area located within Siyathemba in the industrial area located in Marydale. This industrial area is 5,3ha in size, of which approximately 3,8ha is occupied. Approximately 1,6ha of this industrial area is still vacant.

The Siyathemba Local Economic Development Strategy (2012) proposes a number of development opportunities for the manufacturing sector of the Siyathemba. These include establishing an agri-processing plant in Prieska, thereby benefiting produce from the agriculture sector, investment in a local recycling plant (paper, plastic and glass), the local production of solar panels that could supply the local renewable energy sector, and investment in a local leather tannery, cotton gin, game abattoir and a chicken broiler house will provide opportunities for beneficiation of agricultural produce. In addition to the above, the Siyathemba Local Economic Development Strategy (2012) proposed the implementation of training and skills development programmes in local communities, which is focused on the youth.

2.8.6. RENEWABLE ENERGY

Siyathemba is becoming the solar capital of the country. The reason for this is the fact that Siyathemba is located within the so-called 'Solar Corridor'. The Solar Corridor stretches from Upington located north of Prieska to Colesberg located south of Prieska. National Government chose to start the Solar Corridor in Siyathemba for a number of reasons, including the fact that it is located next to the Orange River, facilitating easy access to water, as well as an abundance of suitable, flat land. Other advantages that Siyathemba has include proximity to the power existing grid, which can fairly easily be extended to Siyathemba, thus enabling grid connectivity. Renewable energy projects are developed under the Renewable Energy Independent Power Producers Programme (REIPPP) of the National Department of Minerals and Energy.

TABLE 17: APPROVED AND IN PROCESS RENEWABLE ENERGY PROJECTS

	Project	Applicant	Technology	Power	Status
1	115 MW Camel Thorn Solar on the Remaining Extent of Portion 2 of the Farm Karabee 50 east of Prieska	Camel Thorn Solar Power Plant (RF) (Pty) Ltd	Solar PV	115	Approved
2	8 Infinite energy (PTY) LTR 140mw wind energy facility near Copperton	Copperton Wind Farm (Pty) Ltd	Onshore Wind	140	Approved
3	75MW PV4 Photovoltaic Energy Plant on Farm Hoekplass (remainder of farm no. 146) near Copperton	Hoekplaas Solar PV Four (Pty) Ltd	Solar PV	75	Approved

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Project	Applicant	Technology	Power	Status	
4	75MW Hermanus PV solar energy facility on the farm Hermansrus No 147	Humansrus Solar 3 (Pty) Ltd	Solar PV	75	In process
5	75MW IPMS Solar power plant in Prieska	IPMS Consulting (Pty) Ltd	Solar PV	75	Approved
6	Solar Power Generation Plant on Portion 2 and Portion 7 of the Farm Rietfontein 11	Kameelboom Solar Power Plant Pty Ltd	Solar CSP	125	Approved
7	2MW Mahoebe solar energy facility on portion 19 of the farm De Hoek 32	Mahoebe Eiendomme BPK	Solar PV	2	Approved
8	Expansion of the Prieska solar power plant	Maxwell Mosses and Associates (Pty) Ltd	Solar CPV	19	Approved
9	100MW Photovoltaic (PV) facility on portion 4 of the farm No 117, farm Klippgats Pan near Copperton	Mulilo Renewable Energy Pty Ltd	Solar PV	100	Approved
10	Bosjesmansberg solar energy facility near Copperton	Networx Renewables (Pty) Ltd	Solar PV	75	Approved
11	75mw Photovoltaic Power Plant on A Portion of The Remaining Extent of Erf 1 Prieska	Prieska International Solar 1 (Pty) Ltd	Solar PV	75	Approved
12	75MW Solar Photovoltaic Facility on the eastern portion of the Platsjambok Farm near Prieska	SA Mainstream Renewable Power Development	Solar PV	75	Approved
13	75MW Prieska Solar Energy facility on portion 3 of the Farm Holsloot 47	To review	Solar PV	75	In process
14	1GW Siyathemba solar park	To review	Solar PV	1000	In process
15	Badudex solar project	To review	Solar PV	74	In process
16	Garob Wind Energy fascility project near Copperton	To review	Onshore Wind/ Solar PV	140	Approved
17	Helena Solar 75mW Solar pV Energy Facility near Copperton	To review	Solar PV	75	Approved
18	Moiblox solar project	To review	Solar PV	75	In process
19	Renewable energy farm on portion 3 of farm Hedley Plains No. 64 near Prieska	To review	Solar PV		In process
20	Renewable energy farm on portion 5 of farm Doonies Pan No. 106 near Prieska	To review	Solar PV		In process
21	Prieska Solar Power Plant	To review	Solar PV	19	Approved
Total MegaWatt power planned				2409	

Source: National Department of Minerals and Energy, 2019

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As depicted on Figure 27 and set out on Table 17, a number of solar and on-shore winds projects are being proposed for the Siyathemba Municipal Area, which confirms the status of Siyathemba as the solar capital of the country. Despite the high number of projects proposed, only 2 of these projects have been implemented to date. These projects are as follows:

a. Vogelstruisbult (Copperton Mine) Solar Plant

The Vogelstruisbult (southeast of the Copperton Mine) Solar Plant is a 20MW photovoltaic (PV) power generation facility and ancillary infrastructure and buildings near Copperton. It is located on the Remainder of Portion 1 of the Farm 104 Vogelstruisbult. The area utilised on the farm for the solar facility is approximately 34ha in extent. The facility includes a number of buildings associated with the plant, including stores, offices, medical stations, fire stations, guard houses, substations accommodation and recreation facilities for staff of the facilities. The site is located west of the R357, which links the facility with Prieska (approximately 60km to the north of the site).

The proposed facility will comprise of two 10 MW phases, of which the first phase has been developed. The Solar PV facility was directly connected to the Eskom Cuprum Substation 11kV busbar. This connection required the construction of a 2.5km, 11kV line connecting the PV facility with the Eskom Cuprum substation. It also comprised the installation of a 22kV line between the PV power plant substation.

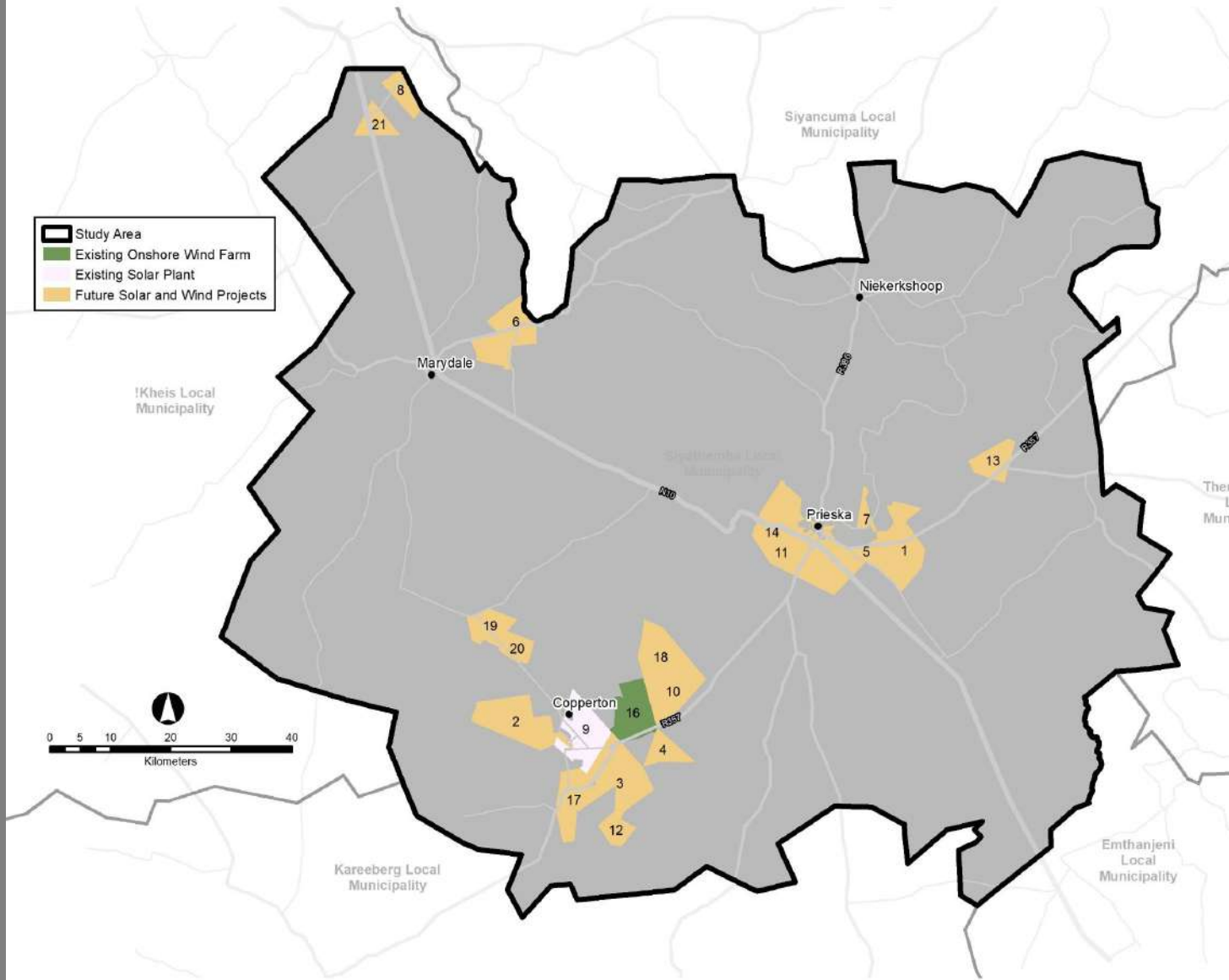
b. Garob Onshore Wind Farm

The Garob Project is a 135MW wind power generation facility located in Siyathemba. The construction of the wind farm is expected to start within the first half of 2019 and should be operational by the second half of 2021.

2.8.7. MINING

As depicted on Figure 28, Siyathemba has diamonds deposits scattered through the municipal area. Most of these are located in the vicinity of Prieska. These reserves have, however not been mined for unknown reasons. The only mineral that has been mined within the Siyathemba municipal area is asbestos, copper and zinc.

FIGURE 27 | RENEWABLE ENERGY



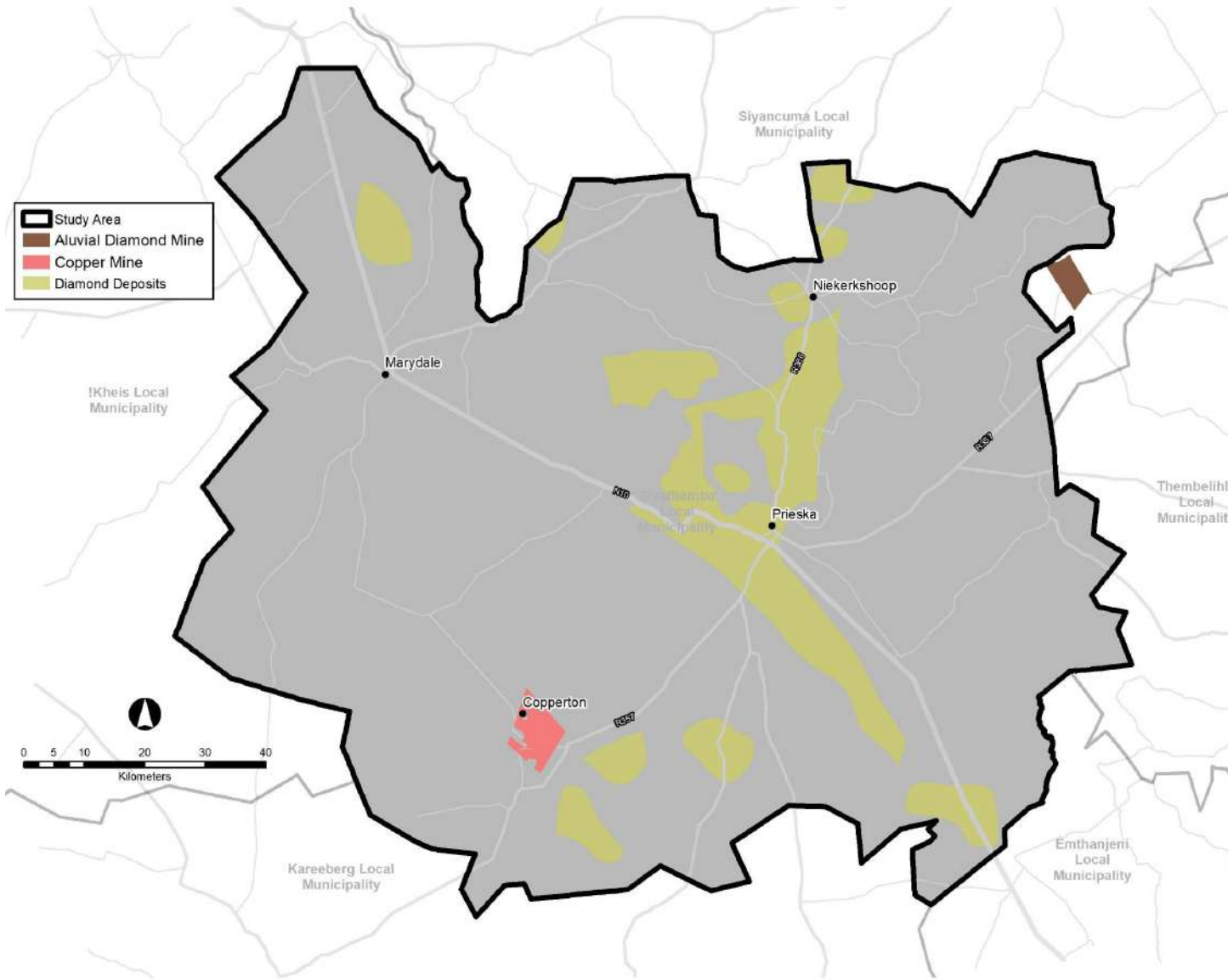
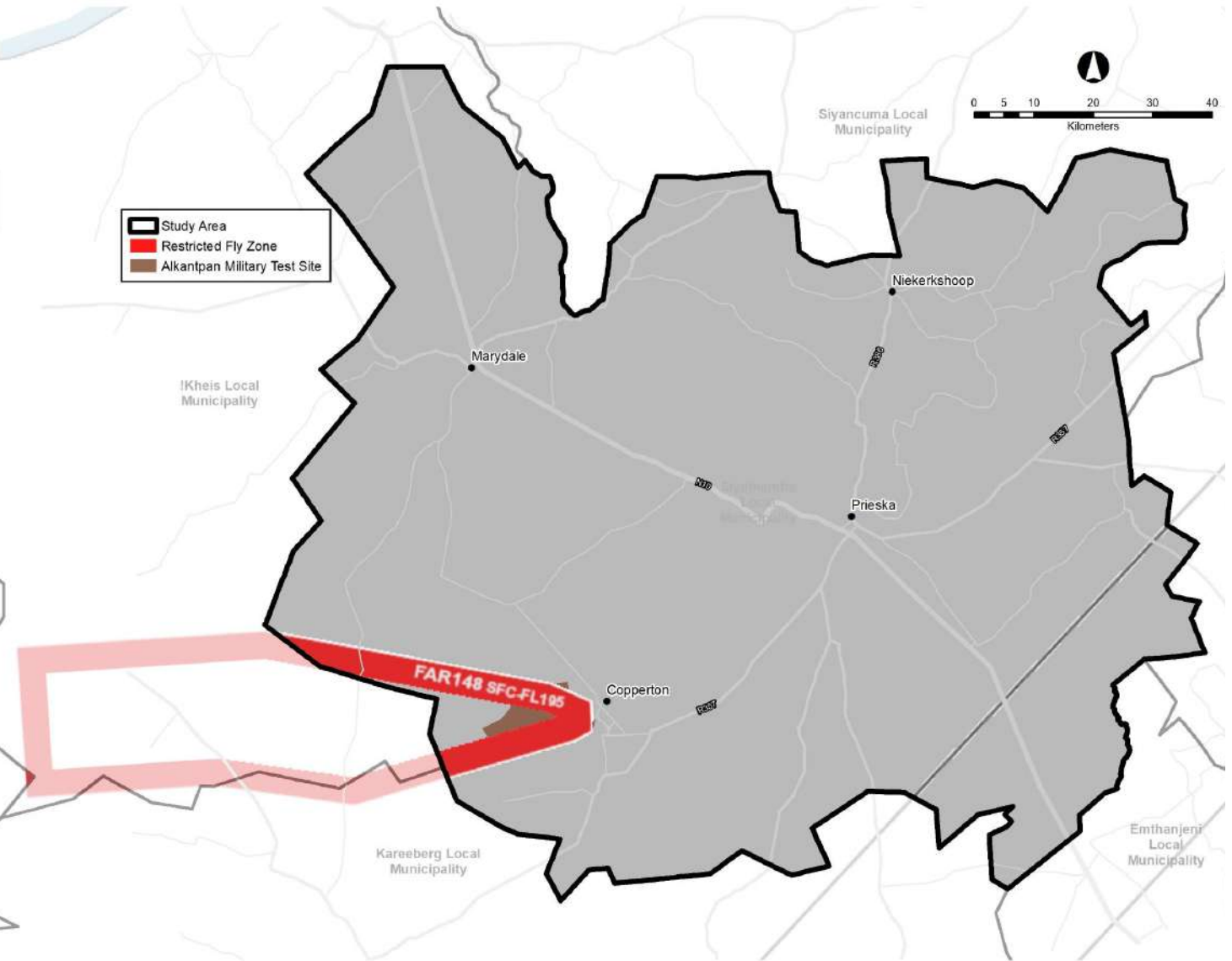


FIGURE 28 | MINING AND MINERALS

FIGURE 29 | MILITARY AREAS



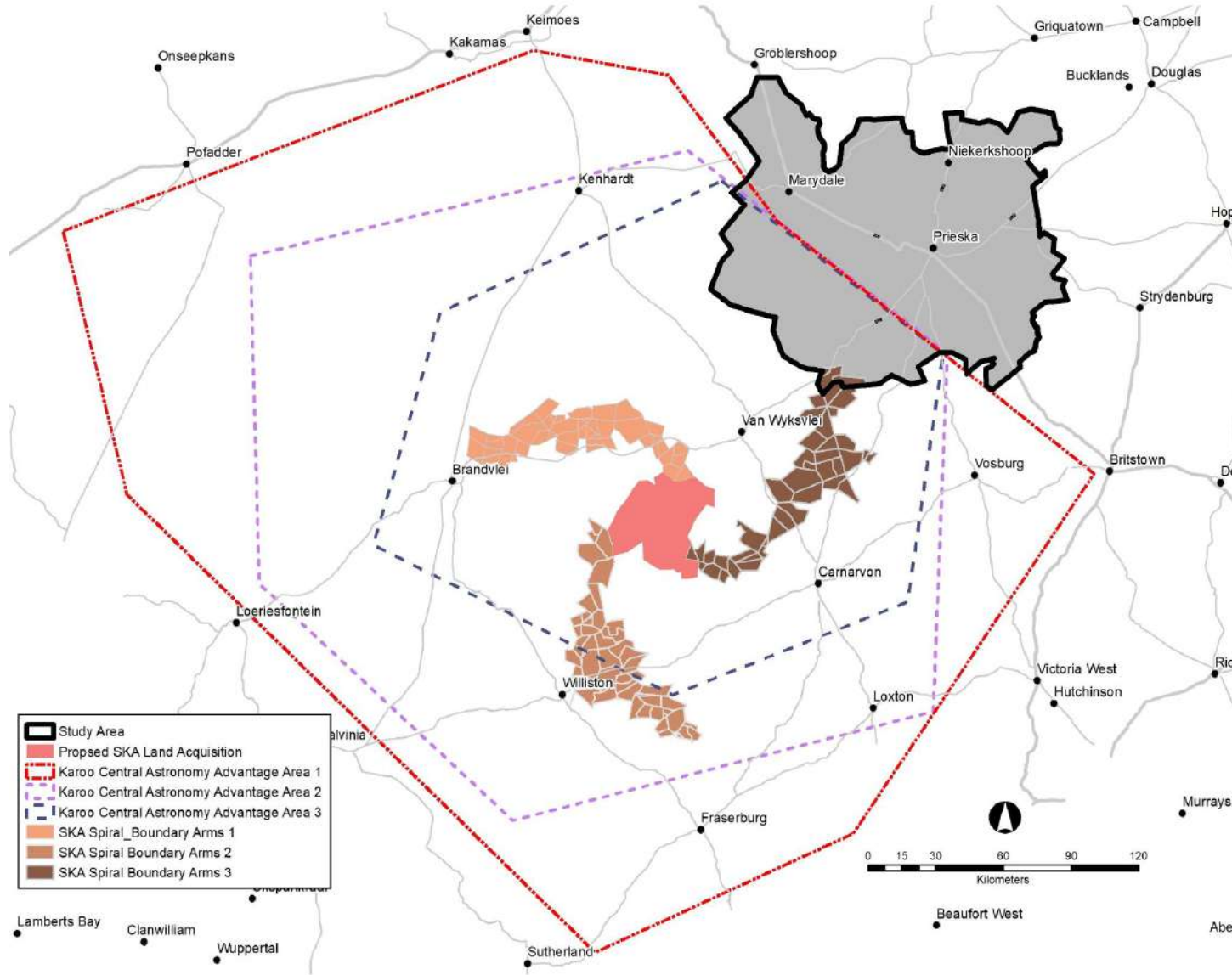
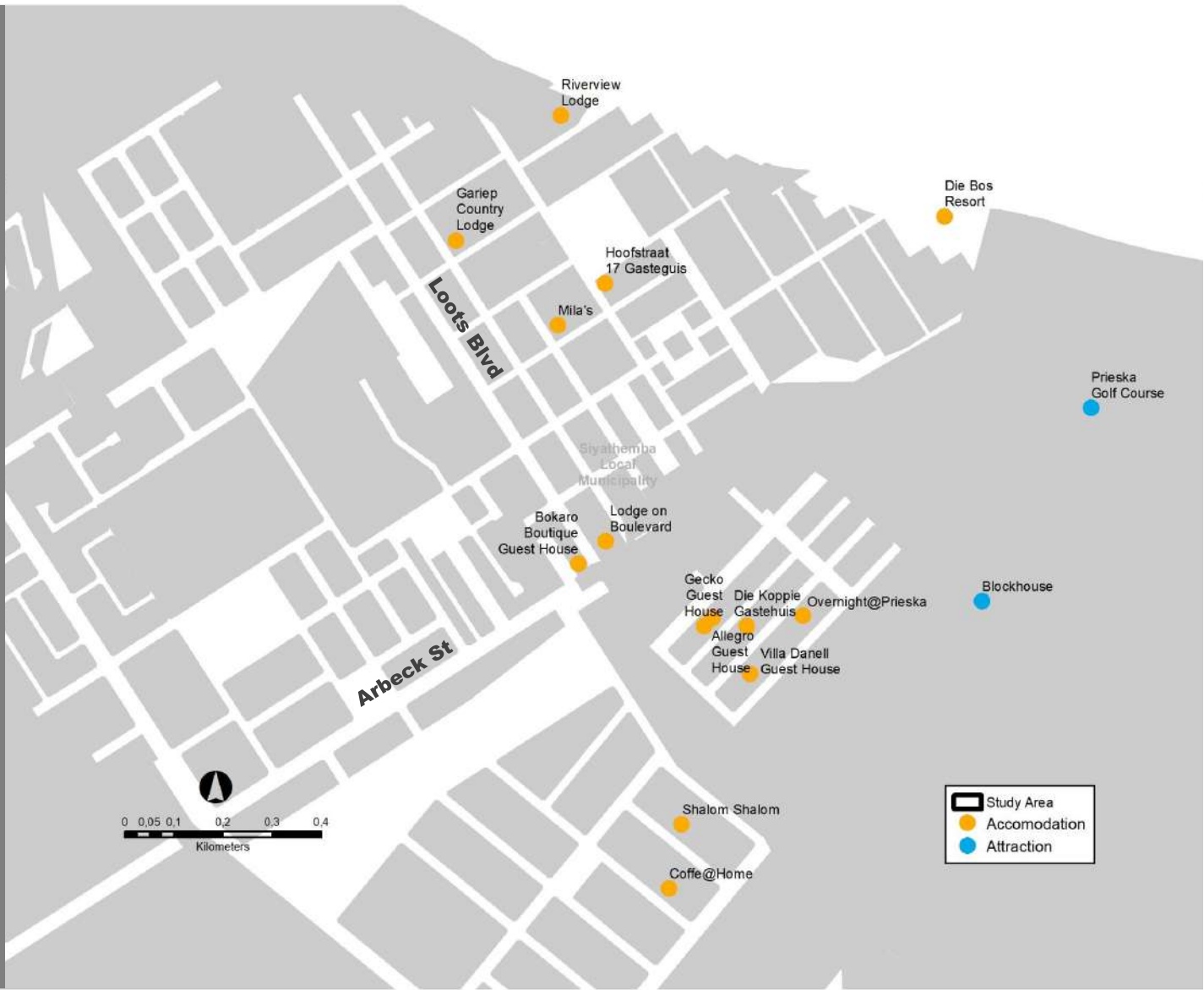


FIGURE 30 | ASTRONOMY SKA

FIGURE 31 | TOURISM FACILITIES

PRIESKA



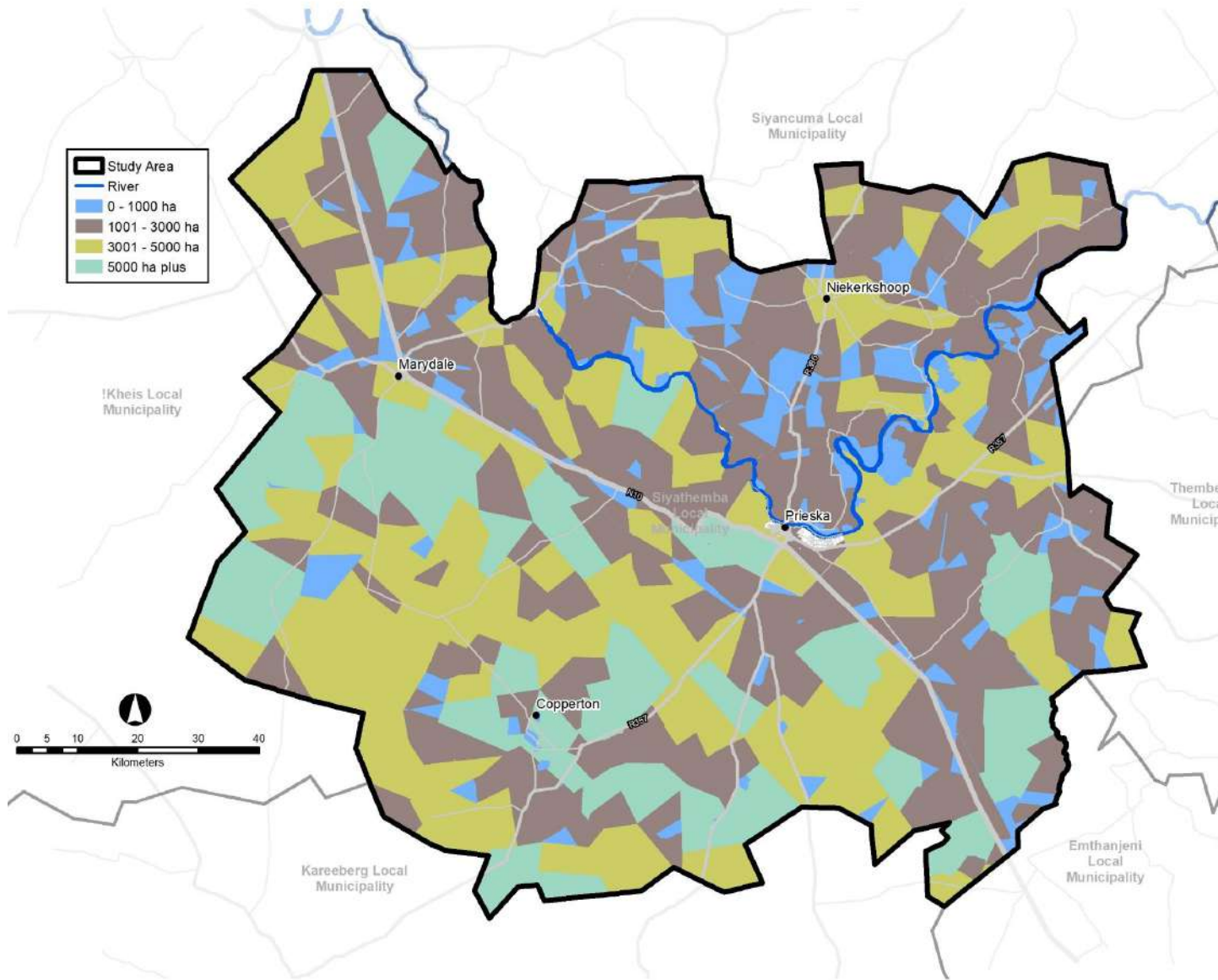
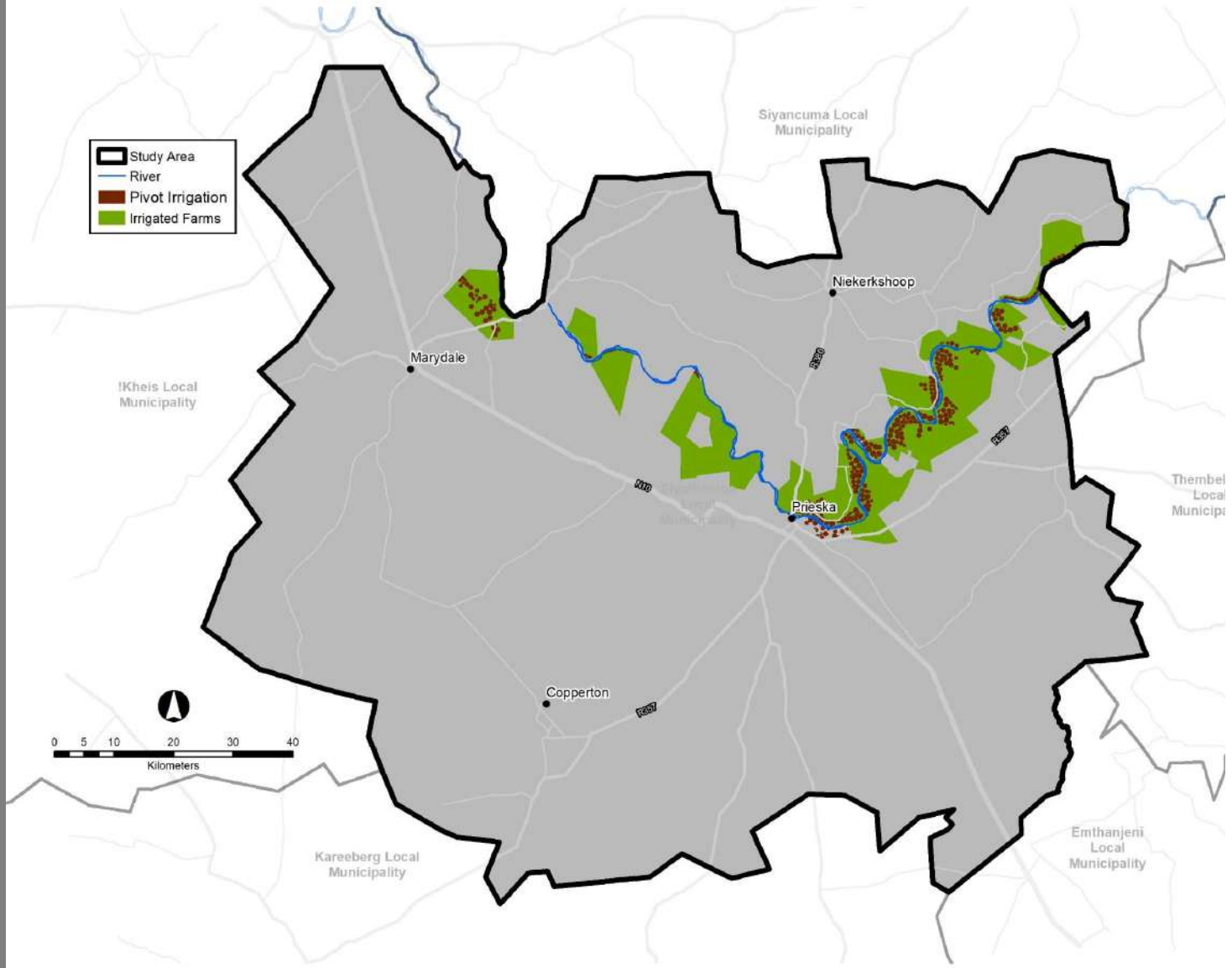


FIGURE 32 | FARM PORTION SIZES



FIGURE 33 | IRRIGATION FARMING



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TABLE 18: MINES AND MINERALS MINED

Mine	Location	Properties	Minerals	Area	Operational
Copperton	Copperton	Remainder of Portion 1 of the Farm 104, Vogelstruisbult	Copper and zinc	6,086ha	No, but planned
Saxendrift	Middle Orange River	Ptn of Rem of Saxendrift 20, Remainder of Saxendrift 21, and Ptn of Ptn 1 of Saxendrift 21	Alluvial diamonds	1,727ha	Yes

Source: Urban Dynamics Gauteng, 2019

The minerals that are mined within the Siyathemba region are described below. The mines locations, minerals mines and the property descriptions of the mines are presented by Table 18.

a. Asbestos mining

Asbestos has been mined in the Prieska area from as early as the 1890s. The Old Mill Site is located within the centre of Prieska and is an area in the town where asbestos was received for processing from the early 1970s until it was closed down in 1986. Due to the many years of asbestos mining, Siyathemba is now affected by asbestos contamination. Although the extraction of asbestos ceased a long time ago, the residents of Prieska continue to live and work in an asbestos-polluted environment. Consequently, there is a need to rehabilitate the contaminated areas of Prieska to address the health risk associated with asbestos contamination. A key aspect of the rehabilitation process was the rehabilitation of the Old Mill Site at Prieska. The rehabilitation of the site was successfully completed by 2011.

b. Copper mining

Copperton in Siyathemba has copper and zinc ore deposits that initially exceeded 25 million tons. These ore deposits were discovered in 1969 and mining of the ore deposit began the following year. Mining at Copperton lasted for two decades until it was stopped in 1991. A large, untouched ore resource remains underground that could not be extracted due to technology constraints at the time. The underground mine is accessed through an 8.8 m-diameter concrete-lined vertical shaft to a depth of 1 024 m.

The town Copperton was established during this period and housed approximately 3000 mine workers and their families. It provided a school and excellent recreation facilities, including a nine-hole golf course. Today, most of the buildings have been demolished and only a few houses are still used by Armscor, who operate the Alkantpan military test site located

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west of the town. Armscor also uses the 1,900m landing strip of the Copperton airfield to access its test site. In addition to the above, parts of the Copperton mining site have been utilised for the development of a large solar generation project.

Although mining at the Copperton mine has been abandoned for almost 2 decades, there is renewed interest in opening the mine again for copper and zinc extraction. Orion Minerals is currently investigating mining at Copperton by apply modern technology and engineering solutions that previous generation miners never had access to. Orion plans to extract large, untouched resource using highly mechanised and automated processes. Orion Mineral is in talks with Transnet to move ore concentrate via containerised train to one of South Africa's harbours, with the preference being Port Elizabeth or Cape Town.

c. Alluvial diamond mining

The only other mineral mined within this region of the Northern Cape Province is alluvial diamonds. Alluvial diamonds area mined on the south bank of the middle Orange River, located between Douglas and Prieska. The Orange River has been mined for alluvial diamonds for over 100 years since the 19th century. In particular, the middle Orange River, stretch between Douglas and Prieska are historically important diamond mining centres.

This large Saxendrift Alluvial Diamond Mine is located outside of the Siyathemba Municipal Area. However, because it is located on the northeastern boundary of the municipality justifies mentioning it because of its proximity-influence on the municipality. The Saxendrift mine area constitutes 1,700ha and comprises three mining areas: Brakfontein, Saxendrift Terrace A and Saxendrift Terrace B. The mine comprises mine offices and out-buildings, processing and final recovery facilities, fines disposal (tailings) ponds, transitory coarse dumps and more permanent water supply dams. Production on Saxendrift was achieved by open cast mining methods.

According to the Siyathemba Local Economic Development Strategy (2012), the challenge facing Siyathemba is how to broaden and encourage the opportunity spaces presented by the availability of mineral resources. Mineral-based activities, whether large- or small-scale, have the potential to stimulate economic diversification and industrial development in a region. These potentially include the development of local engineering companies, engineering suppliers, construction and manufacturing firms, and heavy equipment suppliers. While most of these activities are typically sourced from outside the area, the Economic Development Strategy believes there is nevertheless the potential for SMMEs to establish workshops and facilities in the immediate vicinity of such mining operations to serve these mines.

2.8.8. MILITARY

As depicted on Figure 29, Siyathemba houses the Alkantpan Military Test Range, located near Copperton in the southern parts of the municipal area. This strategic, all-purpose ballistic test range is used to test medium and large caliber guns, rockets and short-range ground to ground missiles. Alkantpan is orientated east to west with the five firing sites and administrative buildings situated on the eastern side of the range. The closest town to the test range is Copperton. The town's airfield is often used by the South African Air Force and chartered aircraft to bring in equipment for testing, as well as the associated people and instruments.

The sparse vegetation, low rainfall and firing distances up to 55,000 meters, make Alkantpan an ideal range for any type of conventional ammunition. In special cases, firing distances of up to 70,000 meters can be obtained. Alkantpan has five firing sites that can be used simultaneously. The firing sites are designed to protect personnel and equipment against any catastrophic failure of the weapon or ammunition. Secure stores and magazines allow for storage of weapons, spares, equipment and ammunition, while the people doing the testing are also catered for in a facility that can accommodate people about 10 km from the range.

In 1987, a decision was taken by Armscor to create an all-purpose test range at Alkantpan. Its primary purpose then was to test artillery, rockets, short range missiles, mortars and anti-aircraft weapons used by the then South African Defense Force. Currently, the Alkantpan Test Range is not only used by the South African National Defense Force (SANDF), but also hosts foreign militaries and foreign munitions manufacturers. Foreign clients that use the Alkantpan Test Range for ballistic testing include militaries and foreign munitions manufacturers from Germany, Italy, the Netherlands and Singapore.

With both Alkantpan and SKA (see below) using sophisticated instruments, there is a potential for a clash in operations. However, Armscor notes the effect of the co-existence is still not fully known and will probably only surface once SKA is fully functional. This will confirm whether tests at Alkantpan have any significant influence on SKA operations.

2.8.9. ASTRONOMY

The SKA is an international effort to construct the world's largest radio telescope with a one million square metre collecting area, hence the name 'Square Kilometer Array' (SKA). When completed, the SKA will deploy thousands of individual radio telescopes across the Karoo, Australia and the world (remote stations will be placed in Botswana, Ghana, Kenya, Madagascar, Mauritius,

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Mozambique, Namibia and Zambia). Environmental factors that impact on radio astronomy were taken into consideration when considering these locations, such as altitude, weather, geology and topography. The town Carnarvon, located south of Siyathemba, will be the focal point of the SKA. The SKA is already under construction, with some components already in use.

Figure 30 shows the farms potentially affected by SKA's land acquisition programme, as well as the SKA buffer zones surrounding the facility. The central area of the SKA will be where the majority of the antennae will be built, while the 3 spiral corridors will host fewer antennae. The current SKA site in the Karoo consists of two farms (Losberg and Meysdam) and covers 13,400ha. The SKA is currently negotiating and buying more land around the initial site to create a larger core area of about 130,000ha. Once SKA's land acquisition programme is complete and the buffer zones established, only radio frequencies below 100Mhz and above 25.5Ghz will be allowed in these areas. This potentially turns the SKA area into a silent reserve or radio protected area, having serious consequences on municipal areas such as Siyathemba.

The SKA will be largely funded by the SKA International Partner States. These are the United Kingdom, Canada, Sweden, Italy, The Netherlands, Australia, New Zealand, India and China. Further non-member states include France, Japan, Malta, Portugal, Spain and Switzerland.

2.8.10. TOURISM

The tourism sector fulfills a relatively significant role in the local Siyathemba economy. This economic sector has particularly high employment and income generating capacity. The sector is also more accessible to unskilled labour. It therefore makes sense to develop the local tourist industry in Siyathemba.

As depicted on Figure 31 and listed on Table 19, a wide range of tourist facilities are found within Prieska and its direct surroundings, making Prieska the heart and focus of the Siyathemba tourist industry. The facilities mostly include bed and breakfast accommodation and limited tourist facilities, such as eateries and historical sites. There appears to be a strong linkage between the bed and breakfast industry and the mining, renewable and military technology industry found within Siyathemba. Engineering, mining and military personnel fly into the area via Kimberley Airport or directly to the Copperton airfield. Many of them stay in the local bed and breakfast establishment. This distinguished Siyathemba as a 'business tourism' area, rather than an adventure tourism area. This is an importation distinction to make when development the local tourism industry.

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TABLE 19: ACCOMMODATION AND ROOMS

Facility	Location	Type of Facility	Rooms
Allegro Guest House	Prieska	Guest house	5
Avenue Guesthouse	Prieska	Guest house	5
Boesmiansberg Guest Farm	Farm near Copperton	Guest farm	7
BoKaro Boutique Guesthouse	Prieska	Guest house	6
Coffee@home	Prieska	Bed and Breakfast	3
Die Koppie Gastehuis	Prieska	Guest house	4
Excelsior River Cottage	Prieska	Tented camp	6
Fifty2 Self-Catering Accommodation	Prieska	Bed and Breakfast	8
Gariep Country Lodge	Prieska	Guest lodge	8
Gecko Cottage Guest House	Prieska	Guest house	12
Glen Allen - 'n Stukkie Hemel op Aarde	Prieska	Guest house	6
Hoofstraat 17 Gastehuis	Prieska	Guest house	5
Lodge on Boulevard	Prieska	Guest lodge	4
Mila's	Prieska	Self-catering	2
Nelsportjie Karoo Guest Farm	Farm near Copperton	Guest farm	27
Overnight@Prieska	Prieska	Guest house	3
Riverview Lodge	Prieska	Guest lodge	14
Shalom	Prieska	Guest house	2
Villa Danell Guest House	Prieska	Guest house	5
Total number of rooms			132

Source: Urban Dynamics Gauteng, 2019

Despite the above, Prieska does have a noteworthy history and tourist attractions. The town was originally named Prieschap. This Khoisan word means "place of the lost she-goat". The New Dutch Congregation of Prieska was founded in 1878 and the village won municipal status in 1892. The railway line from De Aar, which was eventually extended to Windhoek in Namibia, reached Prieska in 1905. For the next few years the town was the rail access for a large sheep farming district. Geographically, Prieska is located on the bank of the Orange River and located at the foot of the Doringberg. Khoisan rock art can be seen on several farms in the district.

A number of development opportunities have been identified for the tourism sector in the Siyathemba Local Economic Development Strategy (2012). These include developing a resort and adventure tourism along the Orange River to entice tourists to stay in the region for longer periods of time, and expanding the game and hunting industry to enhance eco-tourism in the region.

2.8.11. AGRICULTURE

Geographically, Siyathemba mostly comprises farmland. This farmland is divided into farms of varying sizes, all of which are large when compared to farms located near metropolitan areas. The farm sizes found within Siyathemba are depicted in Figure 32. Four basic farm sizes can be identified: farms up to 1000ha in size, farms between 1000ha and 3000ha in size, farms between 3000ha and 5000ha in size and farms larger than 5000ha in size. Within the Siyathemba context, farms smaller than 1000ha in size can be considered intensive farms that are used for intensive agricultural purposes, mostly intensive irrigation farming purposes. Farm portions larger than 1000ha can be considered extensive farms with extensive, most grazing farming use or potential. The subdivision of farms larger than 20ha in size is generally prohibited by the National Department of Agriculture to ensure the viable operation of the commercial farming practices and to adhere to the national objective to ensure national food security.

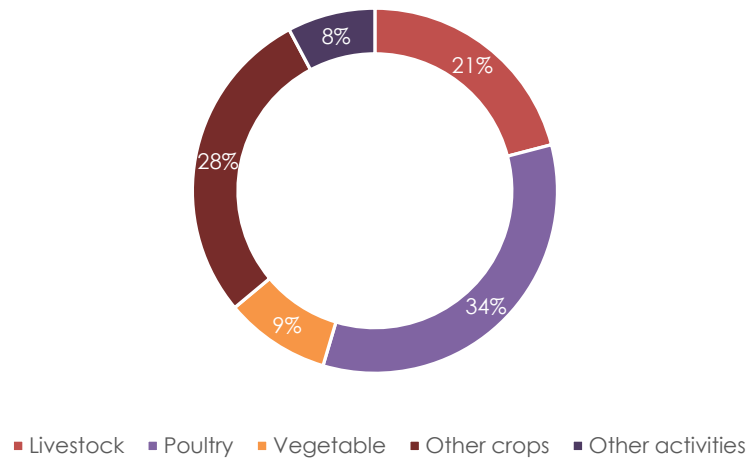


DIAGRAM 15: AGRICULTURAL PRODUCTION
Source: Stats SA Community Survey 2016

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When considering farms sizes within Siyathemba, it is evident that there is a separation between average farm sizes north and south of the N10 freeway. Most farms south of the N10 freeway are in extent of 3000ha in size, whereas farms north of the N10 freeway are mostly smaller than 3000ha in size. This situation can largely be explained by the Orange River, which flows through the northern part of the municipal area. As depicted on Figure 33, the Orange River allows the irrigation of farms bordering the river, which in turn allow the more intensive cultivation of these farms, which in turn allow smaller farm units to be economically viable.

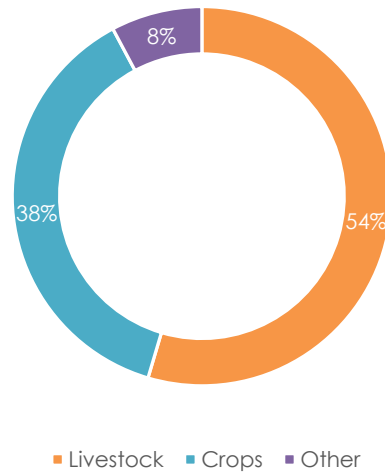


DIAGRAM 16: LIVESTOCK VS CROPS PRODUCTION
Source: Stats SA Community Survey 2016

The larger farms south of the N10 freeway are located in an area with no access to irrigation water and therefore need to be used for livestock grazing. Because Siyathemba has a low annual rainfall, with resulting sparse vegetation, these farms need to be large to sustain even a limited number of livestock (such as sheep). Incidentally, the large farms located south of the N10 freeway coincide with the SKA radio frequency protection zone, which is beneficial. The larger farms imply lower population densities, which in turn implies a lesser impact of the SKA on the local population.

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Diagram 15 provides an indication of the different agricultural production typologies that households within Siyathemba are engaged in. Most households (34%) are engaged in poultry production. Because Siyathemba is not a primary poultry production area, this statistic suggests that many of these households use poultry production as part of subsistence farming to supplement household food supplies. According to this Diagram, approximately 28% of households within Siyathemba are engaged in crop farming. Because Siyathemba has a large commercial irrigation farming component, it can be assumed that most of the households on these farms are involved in the commercial farming sector. A relatively low number (9%) of households are involved in vegetable farming. Many of these households most probably farm with vegetables at a subsistence level to supplement household food supplies. The low number of these households may be a reflection of the fact that very little subsistence households have access to irrigation water, thus rather opting for poultry farming. This is reflected by Diagram 16, when comparing the number of households involved in livestock production versus of households involved in crop production.

Siyathemba has a long agricultural history, as agriculture is the oldest economic industry operation in the region. Historically, agriculture in Siyathemba was largely focusses on sheet farming. When the railway line construction from De Aar (that was eventually extended to Windhoek in Namibia) reached Prieska in 1905, the town became the railhead for a large sheep farming district for many years. To this day, the main farming products of Siyathemba include karakul pelts, marino wool and mutton. Other livestock farming in the region include cattle and goat farming. Limited game farming also takes place in the region and aids in the development of tourism and hunting activities in the region.

Apart from livestock farming, irrigation farming is also a dominant agricultural land uses within Siyathemba. Both Prieska and Douglas are largely dependent of the irrigated agricultural activities along the banks of the Orange River. Agricultural activities along the stem of the Orange River make a variable crop production possible, including mielies, wheat, potatoes, cotton, fruit, sultana grapes and lucerne.

Some abstractions of irrigation water do take place in the greater Siyathemba region. Abstraction occurs mainly at the Douglas and Boegoeberg weirs. Irrigation canals feeding off from Boegoeberg Weir provide irrigation water for farmers downstream. Towns situated a distance from the main stem of the Orange River, rely primarily on groundwater resources and include Marydale and Niekerkshoop.

According to the Siyathemba Local Economic Development Strategy (2012), opportunities for expanding the agricultural industry in Siyathemba include sheep and goat farming in the areas surrounding Prieska and Niekerkshoop. In addition, much of the farmland in Siyathemba is regarded as wilderness and will therefore be suitable for the development of game farming activities. Hydroponic production could also be well-suited for Siyathemba, due to its warm climate and the low water use of this type of farming. Poultry and broiler farming can potentially be implemented as part of an emerging farmer support programme. In

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In addition, the development of an agricultural school or college in Siyathemba could foster skills development in the agricultural sector and retain these skills within the local economy.

2.9 HOUSING

Geographically, Siyathemba mostly comprises farms, with a number of small towns functioning as service centres for the farming areas. Consequently, housing within Siyathemba is largely aligned with the urban and rural characters of Siyathemba. Most of the urban housing units are located within Prieska, the largest town within Siyathemba. Smaller towns include Niekerkshoop, Marydale and Copperton, each comprising small numbers of housing units. These towns within Siyathemba mostly comprise bonded housing typologies, with Prieska also comprising a significant affordable housing component.

2.9.1. FORMAL HOUSING

Census 2011 provides information with regard to the state of housing within Siyathemba. This information is reflected by Table 20. According to this Table, Siyathemba had approximately 5,200 dwelling units in 2011. Of this number, roughly 1,900 were bonded, detached housing and roughly 2,200 were affordable, detached housing units. This total formal housing figure if Siyathemba was estimated to have increased to approximately 5,800 units by 2019.

TABLE 20: TOTAL FORMAL HOUSING STOCK 2011

Settlement	Bonded House	Affordable House	Flat	Walk-Up	Townhouse	Semi-Detached	Granny Flat	Total Dwelling Units
Urban dwellings								4026
Copperton	33							33
Marydale	138		12				6	156
Rainbow		135						135
Rama Rou		249	6					255
Rooidal		48						48
Niekerkshoop	97	200			24	84	9	414
Prieska	636		105			12	9	762
Ethembeni		525		3		216	3	747

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Settlement	Bonded House	Affordable House	Flat	Walk-Up	Townhouse	Semi-Detached	Granny Flat	Total Dwelling Units
Lemnertsville		1056		27		369	21	1473
Plakkerskamp	3							3
Rural dwellings								1125
Copperton Mine								0
Siyathemba NU	1008		27			42	30	1107
Westerberg	18							18
Total	1933	2213	150	30	24	723	78	5151
Estimated increase by 2019								5835

Source: Derived from Census 2011

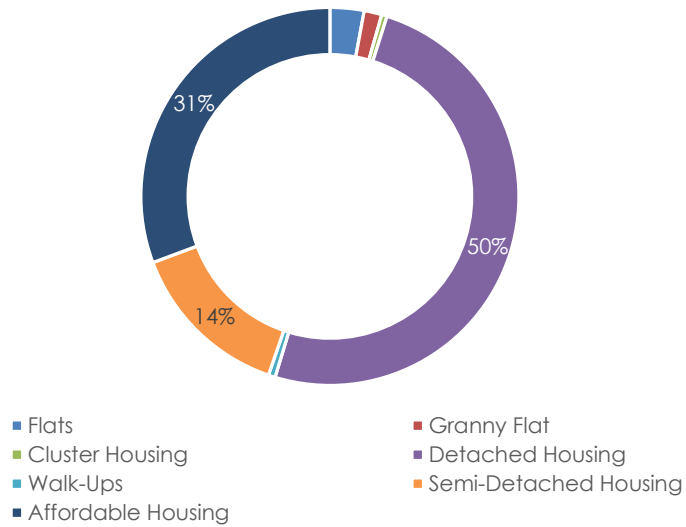


DIAGRAM 17: FORMAL HOUSING TYPOLOGIES SHARE
Source: Census 2011



FIGURE 34 | PRIESKA HOUSING

FIGURE 35 | MARYDALE HOUSING



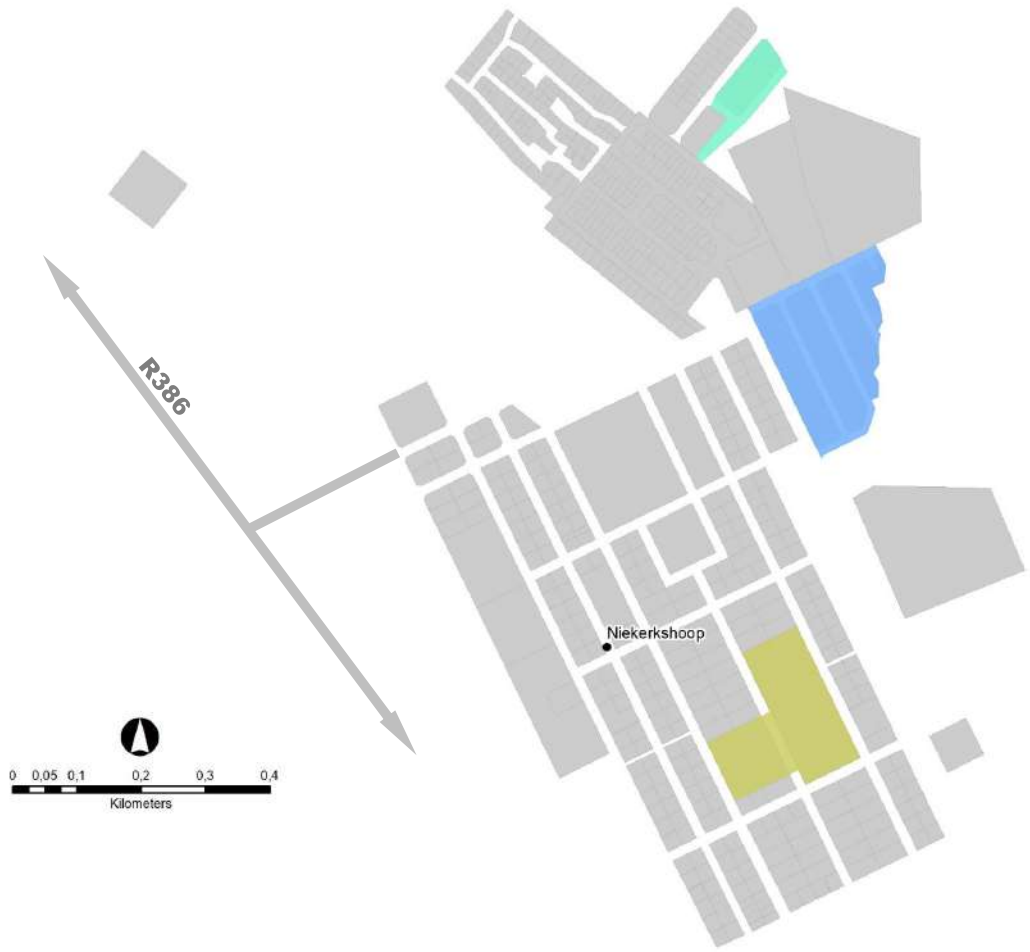


FIGURE 36 | NIEKERKSHOOP HOUSING

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The bonded, detached housing units is the dominant housing type (50%) within Siyathemba, as depicted graphically on Diagram 17. It is followed by affordable housing (31%) and semi-detached housing (14%) as the main housing typologies within Siyathemba. All these housing typologies are single-storey housing typologies, resulting in Siyathemba not having a significant higher-density component. This low building height is typical of rural towns and, in fact, contribute to the rural character evident within these towns. Approximately three-quarters (78%) of the housing units are located within towns and settlements within Siyathemba, while roughly a quarter (22%) of the formal housing stock is located in the rural areas of Siyathemba, as depicted by Diagram 18. Consequently, most people living within Siyathemba live in urban conditions, relying on urban services and employment opportunities.

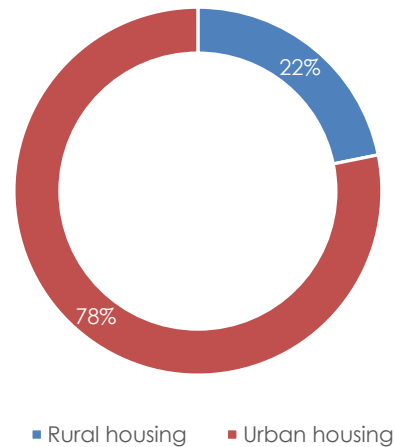


DIAGRAM 18: RURAL AND URBAN HOUSING SHARE

Source: Census 2011

As depicted by Diagram 19, most households (51%) within Siyathemba own their property, have a bond on their residential property, but have not yet fully paid their property. This is followed by households that occupy their property rent free (28%), but do not own their property. An additional 18% of households rent the properties they are residing on. Only a small portion (3%) of the population own their property and have fully paid their property.

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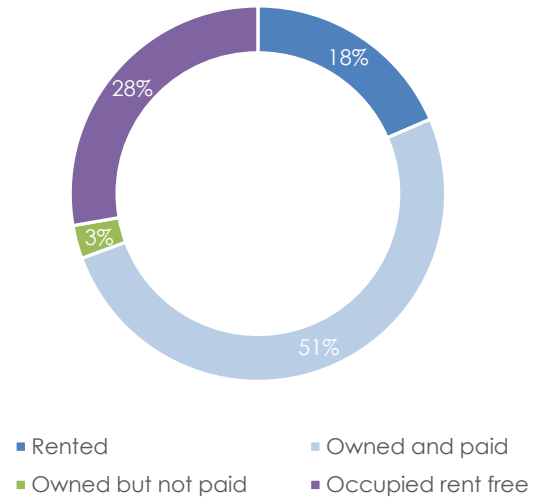


DIAGRAM 19: TENURE STATUS
Source: Census 2011

2.9.2. INFORMAL HOUSING

As depicted by Diagram 20, Siyathemba contains mostly formal dwelling structures (89%), with comparatively few informal structures utilised to house residents within the municipal area. Backyard shacks comprises approximately 4% of the total formal/informal housing stock. The informal dwelling units located within informal settlements in Siyathemba account for approximated 7% of the total formal/ informal housing stock.

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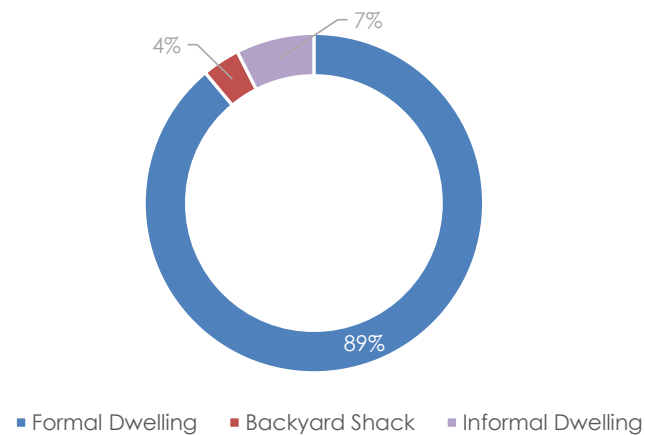


DIAGRAM 20: INFORMAL HOUSING SHARE
Source: Census 2011

TABLE 21: NUMBER AND TYPE OF INFORMAL DWELLINGS 2011 AND 2019

Settlement	Backyard Shack	Informal Dwelling	Total Dwelling Units
Urban dwellings			600
Copperton		0	0
Marydale		3	3
Rainbow	3	39	42
Rama Rou	3	42	45
Roodal		0	0
Niekerkshoop	6	30	36
Prieska		30	30
Ethembeni	72	18	90
Lemnertsville	126	18	144
Plakkerskamp	3	207	210

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Settlement	Backyard Shack	Informal Dwelling	Total Dwelling Units
Rural dwellings			63
Copperton Mine		0	0
Siyathemba NU	3	60	63
Westerberg		0	0
Total	216	447	663
Estimated increase by 2019			751

Source: Derived from Census 2011

Table 21 lists the number of informal dwelling units and its location within the various settlement located within Siyathemba. In total, Siyathemba had approximately 700 informal dwelling units located within towns and informal settlements in 2011. This informal housing number has been estimated to have increased to about 800 units by 2019. Most of these informal settlements are located within Ethembeni, Lemnertsville and Plakkerskamp. The location of the relatively large informal settlement (Plakkerskamp) situated in Prieska is illustrated on Figure 34.

2.9.3. AFFORDABLE HOUSING DEVELOPMENT

TABLE 22: AFFORDABLE HOUSING DEVELOPMENT

Location	Status	No. of Residential Stands
Prieska	Completed	223
Marydale	Completed	55
Niekerkshoop	Completed	54
Total Stands		253

Source: Siyathemba Local Municipality IDP, 2018

A number of small-scale affordable housing developments have been developed and completed in Siyathemba in recent years. The locations of these affordable housing developments within Prieska, Marydale and Niekerkshoop are illustrated on Figures 34-36 respectively. The development of these townships has been constructed using the National Housing Subsidy Scheme. According to the Siyathemba IDP (2018), the National Housing Subsidy allocations for Siyathemba Municipality are in general relatively small. With the housing allocation to date, Siyathemba managed to build 223 affordable housing units in Prieska and 55 affordable housing units in Marydale and 54 affordable housing units in Niekerkshoop. The affordable housing units that have

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recently been completed are depicted by Table 22. These include the ASLA development, located in the central parts of Prieska, directly south of Lemnertsville, and an extension of the existing Rainbow township, located in Marydale.

According to the Siyathemba IDP (2018), challenges that are faced in Siyathemba in terms of affordable housing delivery include the fact that the Municipality does not have proper and realistic information with regards to the housing need in the municipal area and the fact that the Municipality does not have a Spatial Development Plan/Framework to guide the development of affordable housing within the municipal area.

SECTION 3: DEVELOPMENT VISION

3.1. SWOT ANALYSIS

An analysis was conducted to determine the primary strength, weakness, opportunity and constraint affecting Siyathemba, as depicted by Table 23. This analysis concluded the following:

a. Strength

A primary strength of Siyathemba is the fact that it has an extensive and well-developed commercial irrigation agricultural industry situated along the banks of the Orange River. This makes the commercial agricultural sector the largest employer and economic mainstay of Siyathemba. This commercial agricultural sector is supported by Prieska, which is the agricultural service centre to the agricultural sector and therefore a strength of the municipal area. Prieska has a fairly large business centre comprising all the higher-order business establishments, it has a well-developed community infrastructure network, providing educational, health and other essential social services, and it has an established bed and breakfast accommodation industry. In addition, Siyathemba is located on the N10 freeway linking Port Elisabeth to Namibia, and it has the Doringberg mountain range and the Orange River, which are scenic natural features within the municipal area.

b. Weakness

The greatest weakness of Siyathemba is its lack of access to irrigation water from the Orange River. Much of Siyathemba has fairly high-potential agriculture soils, but most of these soils cannot be used for agriculture due to low rainfall and the lack of access to irrigation water from the Orange River. This severely diminished the high agricultural potential of Siyathemba and the ability of Siyathemba to expand its agricultural sector. Another weakness of Siyathemba is the fact that it has low levels of tertiary education and skills training, which hinders the working, young population from accessing skilled employment opportunities within the cities of Gauteng and the Western Cape.

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TABLE 23: SWOT ANALYSIS

Strengths

- Siyathemba has a strong formal sector that employs almost 90% of the population employed in Siyathemba.
- **The agricultural sector is the largest employer within the municipal area and it is clearly the economic mainstay of Siyathemba.**
- Siyathemba has a well-developed major road network covering most of the municipal area.
- **The N10 is a strong regional movement axis through Siyathemba that is supported and strengthened by a freight railway line.**
- Prieska, Marydale and Niekerkshoop are small, walkable settlements that do not require motorized transport to access employment opportunities and social amenities.
- Siyathemba has 2 light aircraft airfields located near Prieska and Copperton.
- Bulk water supply to Prieska is sustainable over the long term.
- **The Doringberg mountain range and the Orange River are natural features that attribute the municipal area's scenic quality.**
- Siyathemba does not comprise geotechnical conditions that are unsuitable for settlement development.
- Most of Siyathemba has a moderate soils depth, making it suitable of agriculture.
- Soils within Siyathemba are well-drained, making it suitable of agriculture.
- Siyathemba has very little soils erosion, especially in the area surrounding the Orange River.
- Soils in Siyathemba has a moderate to low clay content, making it suitable of agriculture.
- **Siyathemba has a well-developed community infrastructure network, providing educational, health and other essential social services.**
- Prieska houses the municipal area's primary community facilities, such as the regional hospital.
- All the suburbs in Prieska, Marydale and Niekerkshoop have the community facilities needed to support its residential population.
- Siyathemba has an established business node network, comprising 3 primary business nodes and residential area business nodes.
- **Prieska has a business centre (or CBD) comprise all the higher-order business establishments, such as all the major banks.**
- Siyathemba has proximity to the power existing grid, enabling grid connectivity for solar and wind projects.
- **Prieska has a well-established bed and breakfast accommodation industry and limited tourist facilities.**
- **Prieska has extensive and well-developed commercial irrigation agricultural activities along the banks of the Orange River.**
- Most households within Siyathemba own their residential properties.
- Siyathemba contains mostly formal dwelling structures, with comparatively few informal structures.
- **A number of small-scale affordable housing developments have been developed and completed in Siyathemba in recent years.**

Weaknesses

- **The low levels of tertiary education within Siyathemba hinders the working population from accessing skilled employment opportunities.**
- A significant portion of the households in Siyathemba are still using the bucket sanitation system.

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- The informal settlement in Prieska does not have access to proper sanitation facilities.
- Two areas in Prieska have an outdated electricity network, so power failures occur regularly in these areas.
- **Most of the high-potential agriculture soils within Siyathemba do not have agricultural value due to a low rainfall and lack of access to irrigation water.**
- Most of the poor agricultural soils are located next to the Orange River flows, which is the only source of irrigation water within Siyathemba.
- **Although Siyathemba has high agricultural potential, most these are not located near a water source for irrigation.**
- Siyathemba has a rainfall of less than 300mm per annum, which makes cultivating dryland crops impossible.
- Due to the arid nature of the Siyathemba climate, most of the open spaces within the towns are poorly landscaped and maintained.
- Rooiblok and Ethembeni in Prieska are affected by asbestos contamination cause by historic asbestos extraction
- Most of the houses and facilities in Copperton have been demolished.
- There are no fire brigade services within the municipal area.
- Eco-tourism sector fulfils a relatively small role in the local Siyathemba economy.

Opportunities

- **A strong movement of people and goods occurs along the N10 freeway, which passes through Siyathemba.**
- A strong movement of people and goods also occurs along the R357, connecting Prieska and Kimberley.
- The Copperton airfield is often used by the South African Air Force and chartered aircraft to bring in military personnel and equipment for testing at the Alkantpan Armour military testing facility.
- **Most people in Siyathemba walk to access employment opportunities and social amenities, which requires a good pedestrian environment.**
- Most of the soils in Siyathemba is considered high-potential agricultural soils.
- **Irrigation channels can be used to overcome this disjunction between the location of high-potential soils and the Orange River irrigation water source.**
- **The rehabilitation of the Old Mill Site has been successfully completed, which implies the land can be used for alternative (selected) uses.**
- Most farms within Siyathemba are large (in the order of 5000ha in size), making them suitable the extensive livestock farming within an arid region.
- The agri-industrial area located in Prieska has space for expansion and intensification, thereby benefiting produce from the agriculture sector.
- The implementation of training and skills development programmes that are focused on the youth.

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- **Siyathemba can strengthen its position as the solar capital of the country, because it is well-located along the 'Solar Corridor' and has access to the national grid.**
- There is renewed interest in reopening the Copperton mine, which could lead to increased employment opportunities and capital inflows into Siyathemba.
- The Alkantpan test site attracts local and foreign militaries and foreign munitions manufacturers, which bring capital flows into the municipal area.
- **There appears to be a strong linkage between the bed and breakfast industry and the mining, renewable and military technology industry, who fly engineering, mining and military personnel into the area, which creates an opportunity for business tourism.**
- The Orange River and its associated open space (such as the Die Bos resort, Prieska Golf Course and Koppies Nature Reserve) lend Siyathemba a measure of tourism potential. It includes developing resort and adventure tourism along the Orange River. Much of the farmland in Siyathemba is wilderness and will therefore be suitable for the development of game farming activities.
- Hydroponic production could also be well-suited for Siyathemba due to its warm climate and the low water use of this type of farming.
- **Goat farming can be established in the arid areas surrounding Prieska and Niekerkshoop as part of an emerging farmer support programme.**
- Poultry and broiler farming can potentially be implemented as part of an emerging farmer support programme.
- The development of an agricultural school or college in Siyathemba could foster skills development in the agricultural sector.
- **The older townships within Siyathemba still have a number of vacant stands that can be used for affordable housing development**

Threats

- The population has steadily increased over the past 30 years, which requires increased employment opportunities and social amenities.
- High level of urbanization within Siyathemba inevitably stresses the need to manage town and settlements development.
- The large component of the population is young and this requires investment in education and skills development to enter the workforce.
- **A large portion of the economically active population is unemployed or discourage to continue looking for work.**
- The N10 freeway fulfils a through-traffic function, thus potentially not serving Siyathemba specifically.
- **Siyathemba remains a predominantly agricultural area and Prieska an agricultural service centre, with little opportunity for economic diversification.**
- The bulk water supply to Marydale and Niekerkshoop could develop a supply problem within the next 15 to 18 years.
- The Niekerkshoop and Marydale disposal sites are not authorized.
- The environmental quality of the Orange River, Brak River and the Doringberg mountain range could potentially be threatened by inappropriate agricultural practices in not managed.

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- **Households that would benefit from subsistence agriculture do not have access to irrigation water.**
- **The asbestos contaminated areas of Prieska need to be address to eliminate the health risk associated with asbestos contamination.**
- The SKA area will be turned into a silent reserve or radio protected area, having serious consequences on affected areas, such as Siyathemba.

Source: Urban Dynamics Gauteng, 2019

c. Opportunity

A primary opportunity within Siyathemba is the fact the it is located on the N10 freeway, which links people and goods between Namibia and the Port Elisabeth export harbor. Linking to the N10 freeway can increase capital flows into the municipal area. In addition, Siyathemba can strengthen its position as the solar capital of the country, thus increasing external capital inflows into the municipal area. Another source of capital inflow can be obtained from the strong linkage between the bed and breakfast accommodation industry and the high-tech industry (renewable energy, mining and military).

Internally, a number of opportunities are located within Prieska. For example, Prieska is a walkable town, which provides opportunities to improve the pedestrian environment linking people to employment opportunities and social amenities. The rehabilitation of the Old Mill Site has been successfully completed, which implies the land can be used for alternative (selected) uses. Also, the older townships within Siyathemba still have a number of vacant stands that can be used for affordable housing development. Regarding the agricultural industry, there are opportunities the use irrigation channels to overcome the disjunction between the location of high-potential soils and the Orange River irrigation water source. Goat farming can be established in the arid areas surrounding Prieska and Niekerkshoop as part of an emerging farmer support programme.

d. Threats

The primary threat to Siyathemba is most likely the fact the it remains a predominantly agricultural area) and Prieska an agricultural service centre) with little opportunity for economic diversification. This limits the municipal area's ability to grow economically and sustain a growing number of households within the municipal area. Even the agricultural industry is curtailed by the lack of access to irrigation water. In particular, households that would typically benefit from subsistence agriculture do not have access to irrigation water. Linked to the above is the fact that a large portion of the economically active population is unemployed or discourage to continue looking for work.

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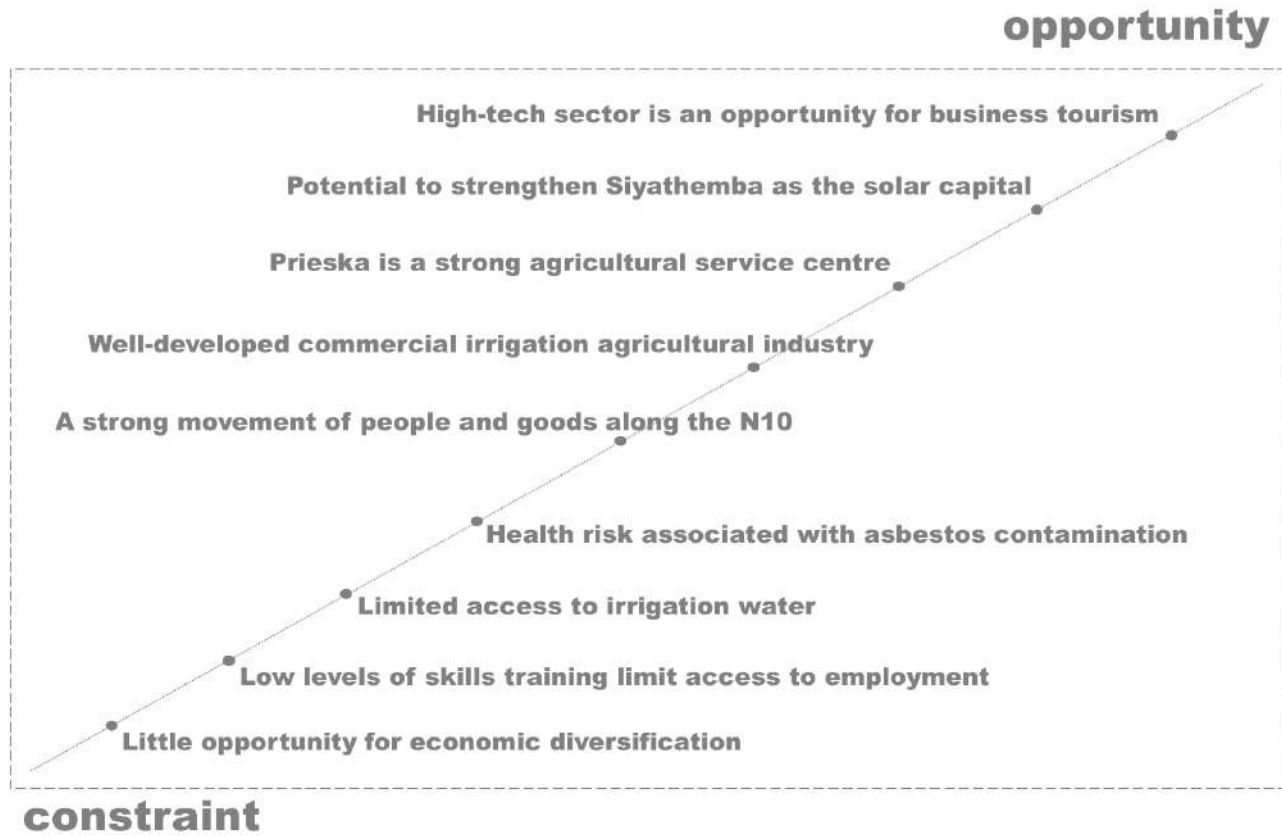


DIAGRAM 21: OPPORTUNITIES AND CONSTRAINTS

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

Diagram 21 illustrates the opportunities and constraints affecting Siyathemba. These opportunities and constraints have been selected from the SWOT analysis set out in Table 23. The opportunities and constraints have been depicted from the most severe constraint (situated on the bottom left-hand corner of the Diagram) to the most significant opportunity (situated on the top righthand corner of the Diagram).

3.2. DEVELOPMENT VISION

Siyathemba has a vision which is presented in the Siyathemba IDP. This vision needs to form the bases for the development of a spatial vision to ensure correlation between the municipal and spatial objectives of Siyathemba. The Siyathemba IDP vision is as follows:

'Siyathemba Municipality undertakes to improve the standard of living of its entire community by delivering visible and affordable services'.

Taking into account the above, it is clear that the IDP vision is people-centred, aiming to improve the lives of its population. Consequently, the spatial vision also needs to be people centred. Such an approach fits well with the objectives of the National, Provincial and District spatial policies. It also addresses the needs of Siyathemba, as identified in the SWOT analysis above. Based on the aforementioned, the vision of the Siyathemba SDF is to:

'Create a spatial structure that enhances the ability of the Siyathemba population to continually improve their standard of living; physically, socially and economically'.

3.3. DEVELOPMENT PRINCIPLES

The Siyathemba SDF proposals need to address the weaknesses and threats faced by Siyathemba and aim to harness the strengths and opportunities relating to Siyathemba. To ensure the aforementioned, it is necessary to develop a set of sound principles on which to base the Siyathemba SDF proposals. The following development principles have been identified and defined for Siyathemba, as depicted on Diagram 22:

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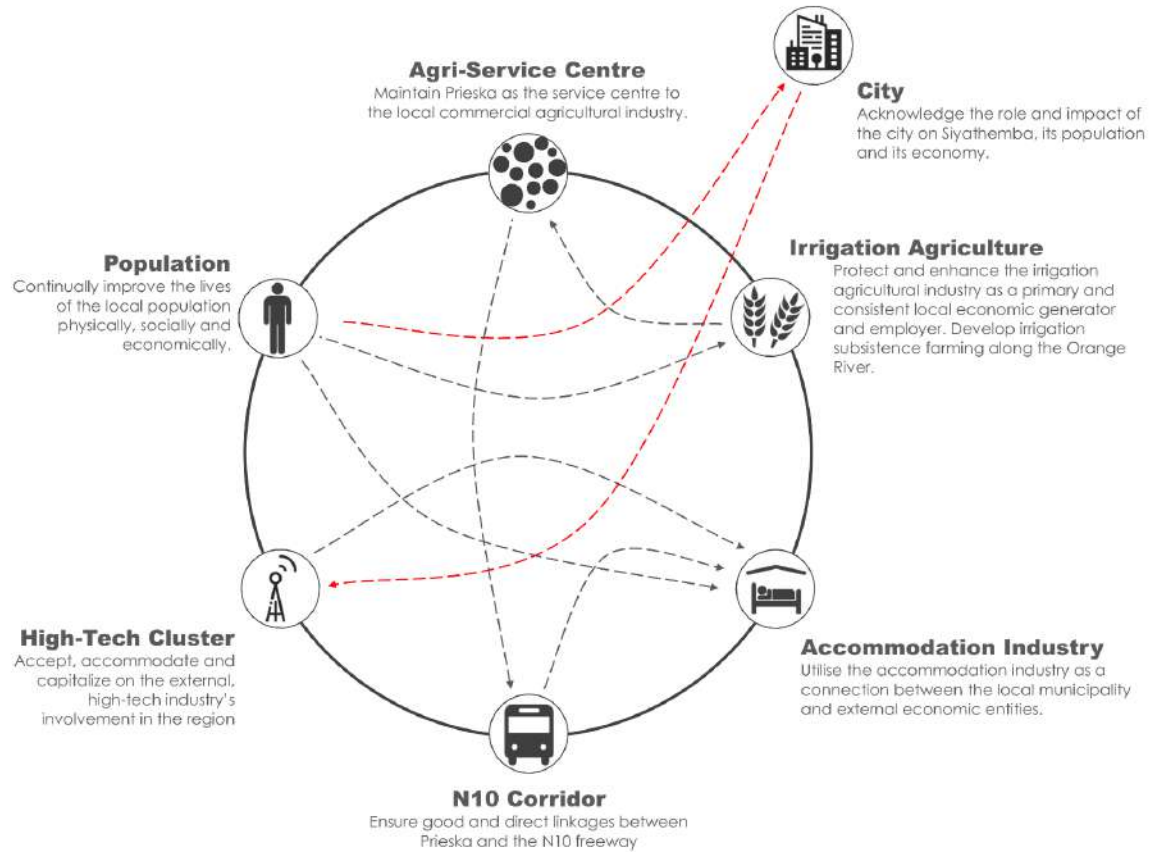


DIAGRAM 22: DEVELOPMENT PRINCIPLES

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

a. City

Siyathemba is not located within a vacuum. It is linked to regions and cities surrounding it, often over long distance. For example, there is a clear link between Prieska and Kimberley and there would surely also be links between Prieska, Cape Town, Johannesburg and the Eastern Cape Province. It is important to acknowledge the role and impact of the city (generically used) on Siyathemba, its population and its economy. For example, often engineers and other high-tech industry specialists (linked to the SKA, Alkantpan and Copperton) visit the area and spends money in the area on food and lodging.

b. N10 Corridor

The N10 Freeway Corridor is the primary road axis traversing Siyathemba. It links Upington and Namibia located northwest of Siyathemba, to Port Elisabeth and the Eastern Cape located southeast of Siyathemba. As such, this corridor transports commuters and freight between the aforementioned destinations. Prieska is located at the precise midpoint between Namibia and Port Elisabeth, making Prieska an ideal stop-over along the corridor. To capitalize on this strategic location, it will be necessary to ensure that there are good and direct linkages between Prieska and the N10 freeway, both physically and economically.

c. Agri-Service Centre

Apart from being strategically located along the N10, Prieska mainly functions as a rural service centre, serving the irrigation agriculture industry located along the Orange River and the sheet farming industry within the interior parts of Siyathemba. Because the local commercial agricultural industry is fully established and developed, implies that the agri-service centre function of Prieska is largely capped. This is important to recognize when considering economic and employment growth within the municipality. The development principle should therefore be to maintain Prieska as the service centre to the local commercial agricultural industry.

d. Irrigation Agriculture

As mentioned above, the irrigation agriculture industry located along the Orange River and the sheet farming industry within the interior parts of Siyathemba, is a fully established and highly-developed agricultural industry. It is important to recognize this and then protect and support this agricultural industry as a primary and consistent local economic generator and employer. In addition to the aforementioned, the Orange River and its agricultural benefits needs to be made

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accessible to more of Siyathemba's population. In this regard, consideration needs to be given to the development of irrigation subsistence farming along the Orange River.

e. High-Tech Cluster

A number of high-tech enterprises that have been established in the vicinity of Prieska in recent years. These enterprises include the SKA, renewable energy enterprises, international military equipment testing and possibly in future advanced copper mining. Although these enterprises are all largescale enterprises, which are heavily funded by government and other multi-national organization, most of the funding in these enterprises do not 'trickle down' to the local population of Siyathemba. These enterprises may periodically have employment benefits for the local population when constructed, but most of these jobs are lost when the projects are complete. This aspect of these industries needs to be acknowledged in order to draw as much benefit from these industries on a long-term, sustainable basis. It is therefore necessary to accept, accommodate and capitalize on the external, high-tech industry's involvement in the region in a rational manner.

f. Accommodation Industry

Siyathemba has a significant accommodation industry, mostly comprising bed and breakfast establishments. The emergence of this accommodate industry can most likely be linked to the high-tech enterprises that have been established in the vicinity of Prieska in recent years. These enterprises include the SKA, renewable energy enterprises, international military equipment testing and possibly in future advanced copper mining. This advantage linked to the accommodation industry needs to be utilised to the benefit of Siyathemba, by continually strengthening the connection between the accommodation/ hospitality industry in Siyathemba and the external, high-tech economic entities visiting Siyathemba.

g. Population

Ultimately, all of the above has to do with the question: how can the above be utilised for the betterment of the local population: physically, socially and economically? In this regard, two aspects are relevant. Firstly, it is important to acknowledge the forward and backward linkages between the Siyathemba population and the city. Forward linkages include, for example, people from Siyathemba finding employment in the city. This requires skills training of the youth in Siyathemba. Backward linked include those same people sending funds back to their families in Siyathemba. Works on basic sustainability of the poor in Siyathemba is also important. For example, households need to be able to supplement

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their basic food supplies by producing it themselves. Creating low-skilled employment in the accommodation/ hospitality industry in Siyathemba, as mentioned above, can also assist in this regard.

3.4. DEVELOPMENT CONCEPT

The development principles set out above provide a platform for envisioning a spatial development concept for Siyathemba. This development concept needs to achieve specific objectives, which can be related to the development principles set out above. The following development objectives have been identified for the spatial development of Siyathemba:

Objective 1: Protect, enhance and develop the agricultural industry

The existing agriculture industry, comprising commercial irrigation farming and sheet farming, is the historical economic base of Siyathemba, and remains so to this day. Consequently, it is important to protect and enhance the existing commercial agricultural industry (see Diagram 23). Partially this can be done by maintain and strengthen linkages between the agriculture industry and Prieska; the agri-service centre to the local commercial agricultural industry. At the same time, it is necessary to give a greater number of people within Siyathemba access to this industry. This can be done by developing irrigation subsistence farming along the Orange River near Prieska.

Objective 2: Maintain and utilise external linkages

Siyathemba is linked to the regions and cities surrounding it, such as Kimberley, Cape Town, Johannesburg and the Eastern Cape Province (see Diagram 24). This linkage is becoming increasingly stronger as large high-tech companies are developing projects within Siyathemba, such as renewable energy projects. Ways to capitalize on these linkages is by utilising the accommodation industry as the connection between Siyathemba and these external economic entities. It is also necessary to ensure good and direct linkages between Prieska and the N10 freeway. The later relates to physical linkages, but there are also non-physical linkages to take into account. For example, it is necessary to improve the forward and backward linkages between the local population and the city. Forward linkages can be established though skills training to improve the mobility of the youth to access employment opportunities within the city.



**Objective 1
Agricultural Industry**

- Protect and enhance the existing commercial irrigation agricultural industry
- Develop irrigation subsistence farming along the Orange River near Prieska
- Maintain and strengthen linkages with Prieska as the service centre to the local commercial agricultural industry

DIAGRAM 23: DEVELOPMENT OBJECTIVE 1

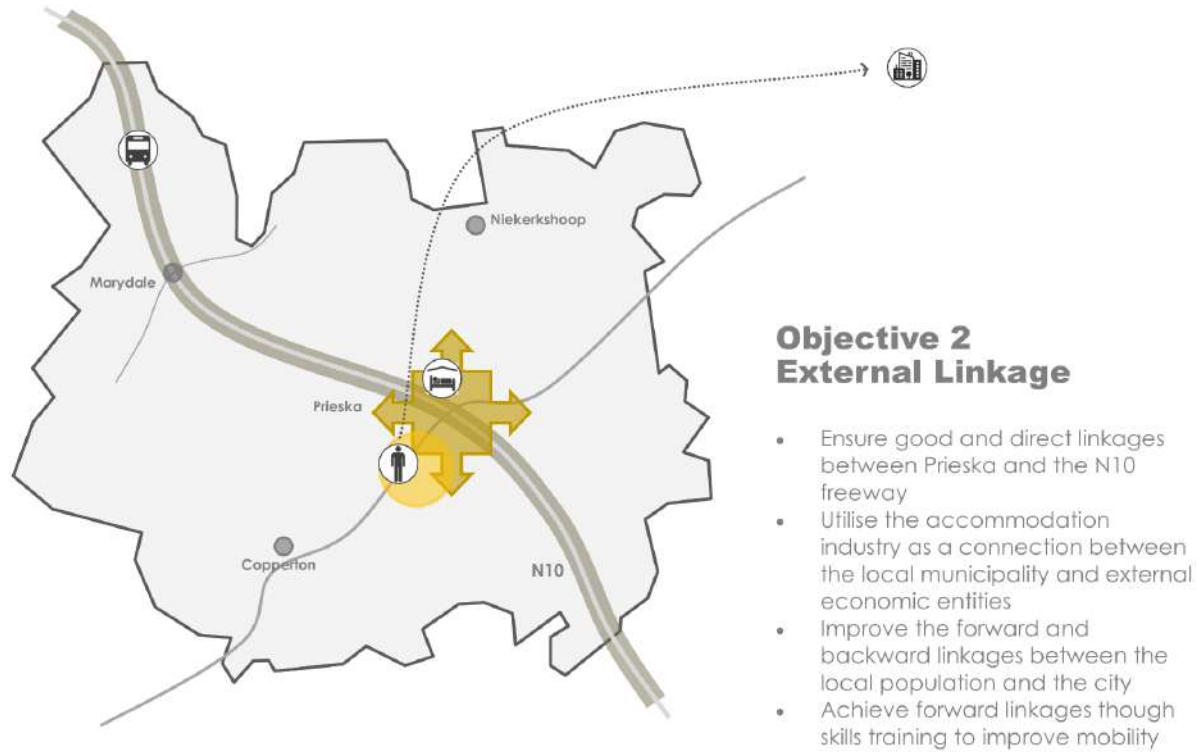


DIAGRAM 24: DEVELOPMENT OBJECTIVE 2

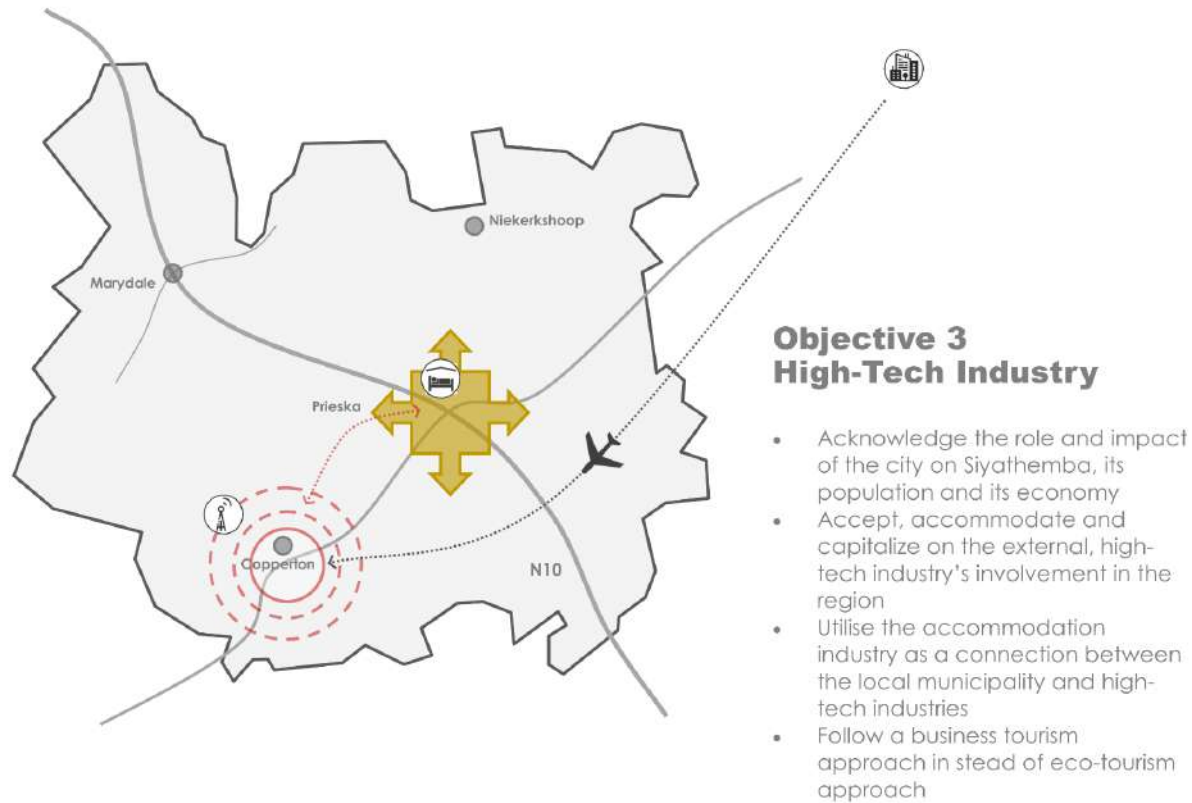
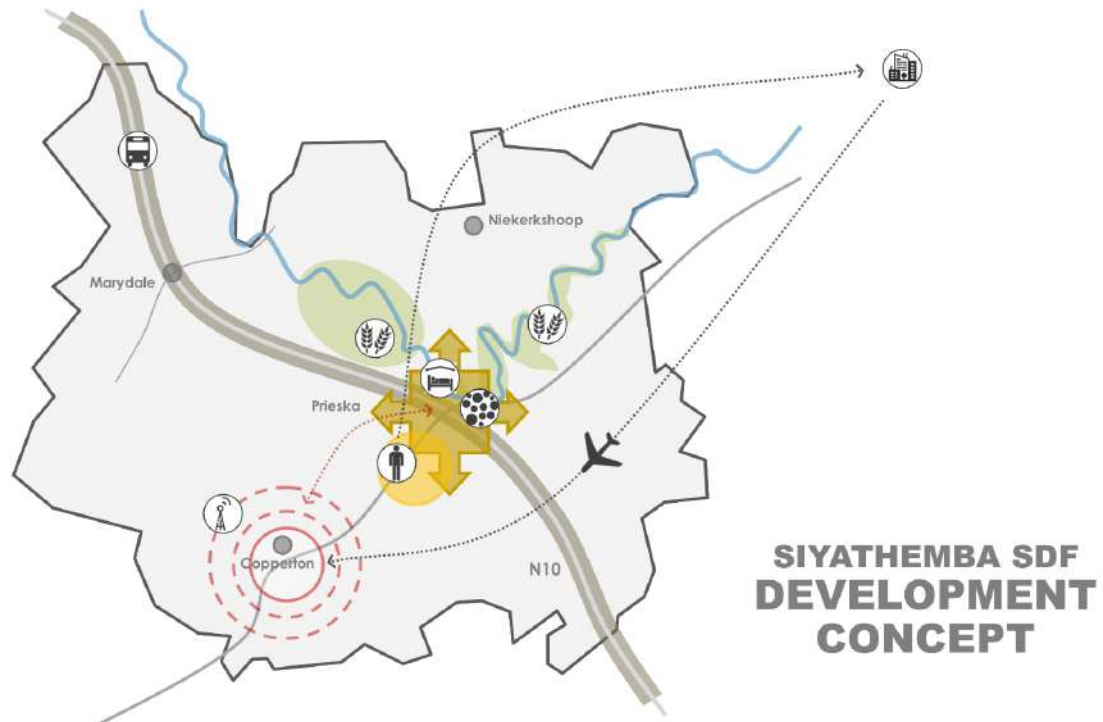


DIAGRAM 25: DEVELOPMENT OBJECTIVE 3

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SIYATHEMBA SDF DEVELOPMENT CONCEPT

DIAGRAM 26: DEVELOPMENT CONCEPT

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Objective 3: Accommodate and capitalize of the high-tech industry

The increasing presence of the high-tech industry in Siyathemba is a reality (see Diagram 25). The high-tech industry includes the SKA, renewable energy enterprises, international military equipment testing and possibly in future advanced copper mining. Consequently, it is important to acknowledge the role and impact of the high-tech industry on Siyathemba, its population and its economy. This is necessary to accept, accommodate and ultimately capitalize on the economic development potential the external, high-tech industries brings to Siyathemba. In particular, the accommodation/hospitality industry can be used as a means to capitalize on the presence of the high-tech industries. This requires Siyathemba to follow a business tourism approach instead of eco-tourism approach.

Based on the development objectives set out above, a development concept is proposed for Siyathemba. The Development Concept is illustrated by Diagrams 26. The development concept aims to maintain and support the existing agriculture industry, development subsistence irrigation farming, linking to the N10 corridor and neighbouring cities as best as possible, and accommodate and capitalize on the expanding high-tech sector involvement in the area. This development concept will be the platform on which the spatial development framework proposed for Siyathemba will be based.

SECTION 4: LAND USE ESTIMATES

4.1. POPULATION ESTIMATE

Population estimates need to be based on a base year. In other words, a specific year must be chosen of which the population number is known or can be calculated to a reasonably accurate degree. This base year population is used as a platform on which to calculate or project the population growth up to the current year (in this case 2019), as well as the population growth up to certain points in the future. The base year used for Siyathemba is the year 2011, which correlates with the Census 2011 year. Table 24 shows the estimated current (2019) urban and rural population of Siyathemba. The future population growth was calculated for 5 incremental periods up to the year 2030.

TABLE 24: SIYATHEMBA POPULATION 2011 TO 2019

Settlement	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)	%	Population Growth Rate (%)
Urban population	18747	20047	20673	87	
Rural population	2838	1538	3130	13	
Total	21585	21585	23802	100	1.03%

Source: Estimated from Census 2011 and Stats SA Community Survey 2016

To calculate the population growth of Siyathemba, a population growth rate of 1.03% per annum was used for the period 2011 to 2030. This population growth rate was calculated based on the historical growth trend experienced in Siyathemba since 1996 (as set out in the Status Quo section of this report) and therefore provides a realistic growth rate to benchmark future growth within Siyathemba upon.

According to Table 25, the population of Siyathemba in 2019 was estimated to be approximately 23,800 people or 6,600 households. Of the 6,600 households, approximately 5,900 households were estimated to be formal households. Siyathemba population will grow to an estimated total population of approximately 25,300 people and 7,000 households by the year 2025 and an estimated total population of approximately 26,600 people and 7,400 households by the year 2030. This is an additional 1,200 households by 2025 and an additional 700 households by 2030. These additional households include the informal households

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living within Siyathemba. Thus, the additional households equate to the approximate number of new housing units that will need to be constructed within Siyathemba by the year 2030 to accommodate the population growth, as well as eradicating the backlog within Siyathemba.

TABLE 25: SIYATHEMBA POPULATION GROWTH 2030

Item	Population Estimate (2011)	Population Estimate (2016)	Population Estimate (2019)	Population Estimate (2025)	Population Estimate (2030)
Total Population	21585	23082	23802	25312	26643
Formal population	19198	20504	21170	23996	26643
Informal population	1609	1721	1775	887	0
Backyard population	778	857	857	429	0
% growth		1,35	1,03	1,03	1,03
Households	5996	6412	6612	7031	7401
Formal households	5333	5695	5881	6666	7401
Informal households	447	478	493	246	0
Backyard households	216	238	238	119	0
Average household size	3,60	3,60	3,60	3,60	3,60
Household growth (incl. informal)		1079	1279	1150	735

Source: Estimated from Census 2011 and Stats SA Community Survey 2016

4.2. SETTLEMENT EXPANSION

The land areas required for settlement expansion within Siyathemba has been calculated based on the estimated population growth within Siyathemba, eradicating the existing housing backlog within Siyathemba, and creating opportunities for economic development within Siyathemba. The land area requirement was calculated for the periods 2019 to 2030, as depicted by Table 26. According to this Table, Prieska requires approximately 450ha of land for expansion, and Marydale requires approximately 40ha of land for expansion, and Niekerkshoop requires approximately 20ha of land for expansion up to the year 2030.

Most of the land required for settlement expansion in Siyathemba is land required for residential expansion or industrial expansion, as set out in Table 26. These residential and industrial land use areas are illustrated on Figure 38 to 40 and have been located as follows:

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a. Residential expansion

Most of the land allocated for residential expansion has been located within Prieska, the primary town and agricultural service centre of Siyathemba. Approximately 171ha of land was allocated for medium residential density expansion in Prieska. This land was located along Upington Way, situated south of Lemnertsville, and along Arbeck Street, situated north of the Prieska industrial area. In addition, 135ha of land was allocated for smallholdings, located north of Ethembeni. Approximately 35ha of land was allocated for medium residential density expansion in Marydale. Approximately 13ha of land was allocated for residential densification within Niekerkshoop on vacant low-density residential stands. This land is proposed for affordable housing.

TABLE 26: LAND ALLOCATED FOR SETTLEMENT EXPANSION 2030

Proposed SDF	Existing			Proposed		
	Prieska	Marydale	Niekerkshoop	Prieska	Marydale	Niekerkshoop
Low Density Residential	152	59	20			13
Medium Density Residential	188	44	21	171	25	3
Agricultural Holdings				135		
Primary Business Node	83					
Secondary Business Node		7	3			
Tertiary Business Node	13	4	4	2		
Commercial Area				30		
Industrial Area	52	5		95		
Active Open Space	120				10	
Passive Open Space	192	45	11			
Cemetery	10	8	1	19		
Railway Reserve	47					
Airfield	128					
Total	985	172	60	452	35	16

Source: Urban Dynamics Gauteng, 2019

b. Industrial and commercial expansion

The industrial and commercial expansion areas needed to support continued industrial growth within Siyathemba was calculated taking into account the existing industrial land available Siyathemba and the expressed need for additional industrial land within the municipality. All the land allocated for industrial and commercial expansion within Siyathemba

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has been located within Prieska, the primary town and agricultural service centre of Siyathemba. Approximately 100ha of land was allocated for industrial expansion and an additional 30ha of land was allocated for commercial expansion up to the year 2030. The land allocated for industrial and commercial expansion was located south of the existing industrial area in Prieska, thus essentially constituting the southward expansion of this industrial area.

Allocating the land for residential and industrial expansion within Siyathemba took into account a number of factors that were set out in the Status Quo section of the report. Environmental constraints were taken into account, such as the ridges, environmental sensitive areas, and hydrological corridors. Infrastructure development was also a guiding factor, such as the potential to access existing bulk municipal services networks. Access to existing collector roads and creating compact rural settlements were factors that were also taken into account.

4.3. LAND USE BUDGET

Whereas the above deals with the land areas needed for settlement expansion, the Land Use Budget deals with the composition of these land areas. In other words, the Land Use budget provides estimates with regards to the number of social facilities, business space and housing units that are needed within the towns rural area of Siyathemba by the year 2030. From the onset, it has to be emphasized that the following Land Use Budget is only a rough estimate of the number of community facilities, business space and housing units needed within each town and rural area by the year 2030. The estimates given only serve as guidelines for officials to make land use development decisions from day-to-day. It is not a tool to conclusively prove or disprove the viability of a specific land use proposal for a specific area, nor does it take into account the often-non-empirical views and needs of communities.

4.3.1. PRIESKA

A Land Use Budget has been calculated for Prieska, which calculated the need, amongst others, for social facilities, business space and housing for the period 2019 to 2025 and the period 2025 to 2030. This land use budget is depicted on Table 27. This land use budget can be used to assess applications for land use change, determine the number of social facilities to budget for in the IDP, and to plan for the municipal services infrastructure extensions needed to serve future settlement expansion.

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TABLE 27: PRIESKA LAND USE BUDGET 2025 AND 2030

Land Use	Existing 2019			Estimate 2025			Backlog 2019-2025			Estimate 2030			Backlog 2025-2030		
	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²
POPULATION															
Population	15707			16703						17581					
Households	4363			4640						4884					
Formal Households	3840			4378						4884					
Informal Households	523			261						0					
LAND USE															
Housing	3255	129		4378	172		1123	43		4884	192		505	20	
Detached Housing (Smallholdings)	0	0,0		175	17,5		175	17,5		195	19,5		20	2,0	
Detached Housing (Bonded)	705	70,5		744	74,4		40	4,0		830	83,0		86	8,6	
Detached Housing (Affordable)	1743	43,6		2452	61,3		709	17,7		2735	68,4		283	7,1	
Semi-Detached (Row) Housing	658	13,2		788	15,8		130	2,6		879	17,6		91	1,8	
Walk-Ups (Flats)	149	1,9		219	2,7		70	0,9		244	3,1		25	0,3	
Educational	7	23,6		4	16,5		1	12,0		4	14,2		0	0,2	
Primary School	5	14,0		3	8,2		0	0,0		2	6,8		0	0,0	
Secondary School	2	9,6		1	7,0		0	0,0		1	5,9		0	0,0	
Tertiary Institution	0	0,0		0	1,3		1	12,0		0	1,5		0	0,2	
Health	3	18,4		1	1,2		0	0,0		1	1,3		0	0,0	
Clinic	2	0,4		1	0,2		0	0,0		1	0,2		0	0,0	
Hospital	1	18,0		0	1,0		0	0,0		0	1,1		0	0,0	
NGO Centre	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Community	4	5,1		4	6,0		1	1,4		4	6,2		0	0,2	
Library	2	0,8		1	0,3		0	0,0		1	0,4		0	0,0	
Post Office	1	0,2		1	0,2		0	0,0		1	0,2		0	0,0	
Police Station	1	1,0		1	1,0		0	0,0		1	1,0		0	0,0	
Emergency Service Centre	0	0,0		1	1,2		1	1,2		1	1,2		0	0,0	
Cemetery		3,1			3,3			0,2			3,5			0,2	
Business	11,2	44740		11,8	47354		0,7	2614		12,5	49844		0,6	2489	
Retail	10,8	43120		11,3	45099		0,5	1979		11,9	47470		0,6	2371	
Private Office		0,4 1620			0,6 2255			0,2 635			0,6 2374			0,0 119	
Open Space	31,4			33,4			0,0			35,2			0,0		
Active		17,8			10,0			0,0			10,5			0,0	
Passive		41,0			23,4			0,0			24,6			0,0	
Industrial	28	22,7		117	96,9		89	74,2		124	102,0		6	5,1	
Industrial	28	22,7		103	82,3		75	59,7		108	86,7		5	4,3	
Commercial	0	0,0		15	14,5		15	14,5		15	15,3		1	0,8	
Streets	50,7			55,3			27,5			59,5			5,4		
TOTAL AREA	292,2			318,8			158,4			343,1			31,3		

Source: Urban Dynamics Gauteng, 2019

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a. Housing

Approximately 1,100 housing units will need to be developed within Prieska to accommodate the population growth within Prieska by 2025. An additional 500 housing units will need to be developed within Prieska to accommodate the population growth within Prieska up to the year 2030. These housing units will have to be developed to accommodate the population growth within Prieska, as well as to eradicate the existing housing backlog within Prieska by the year 2030.

b. Community Facilities

The Land Use Budget has calculated the number of community facilities needed to support the envisaged population growth within Prieska up to the year 2030. According to the Land Use Budget, Prieska will NOT require any primary schools, secondary schools, a clinics or police station by the year 2030. However, Prieska requires an emergency service centre by the year 2025. Prieska can also accommodate a tertiary educational facility, which would best be a satellite campus of an existing tertiary educational institution, such as Sol Plaatje University.

c. Business

The potential retail and office floor area to support the current population within Prieska was calculated based on the socio-economic position of people living within the area, as set out in the socio-economic section of this report. Taking the above into account, the additional retail and office space that could potentially be developed within Prieska up to the year 2025, based on the estimated population growth of the region, is approximately 2,600m², of which approximately 2,000m² can be allocated to retail. An additional 2,500m² of additional retail and office space can potentially be developed within Prieska by the year 2030, of which approximately 2,400m² can be allocated to retail.

d. Open Space

Open space can be classified as active and passive open space. The former involves recreation and sport facilities. The latter involves natural areas, such as ridges and river flood areas. According to the Land Use Budget, Prieska has an oversupply of passive and active open space up to the year 2030. This may require closing underutilized, underdeveloped active open spaces. Passive open space will need to be set aside as needed, despite the oversupply in passive open space provision. These spaces are needed to protect environmentally sensitive areas and secure flood line areas.

e. Industrial and commercial

The industrial and commercial land that is proposed for Prieska was based on typical per capita and industrial land ratio. Taking the above into account, approximately 80ha of industrial land and 16ha of commercial land can be allocated within Prieska by 2030.

4.3.2. MARYDALE

A Land Use Budget has been calculated for Marydale, which calculated the need, amongst others, for social facilities, business space and housing for the period 2019 to 2025 and the period 2025 to 2030. This land use budget is depicted on Table 28. This land use budget can be used to assess applications for land use change, determine the number of social facilities to budget for in the IDP, and to plan for the municipal services infrastructure extensions needed to serve future settlement expansion.

a. Housing

Approximately 160 housing units will need to be developed within Marydale to accommodate the population growth within Marydale by 2025. An additional 100 housing units will need to be developed within Marydale to accommodate the population growth within Marydale between 2025 and 2030. These housing units will have to be developed to accommodate the population growth within Marydale, as well as to eradicate the existing housing backlog within Marydale by the year 2030.

b. Community Facilities

The Land Use Budget has calculated the number of community facilities needed to support the envisaged population growth within Marydale up to the year 2030. According to the Land Use Budget, Marydale will only require an NGO centre to house located NGOs working in Marydale. Apart from the NGO centre, Marydale does NOT require any community facilities (such as primary schools, secondary schools, a clinics or police station) by the year 2030.

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TABLE 28: MARYDALE LAND USE BUDGET 2025 AND 2030

Land Use	Existing 2019			Estimate 2025			Backlog 2019-2025			Estimate 2030			Backlog 2025-2030		
	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²
POPULATION															
Population	2888			3071						3233					
Households	802			853						898					
Formal Households	703			803						898					
Informal Households	99			50						0					
LAND USE															
Housing	648	27		803	32		155	5		898	35		94	3	
Detached Housing (Smallholdings)	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Detached Housing (Bonded)	152	15,2		161	16,1		9	0,9		171	17,1		10	1,0	
Detached Housing (Affordable)	476	11,9		623	15,6		146	3,7		708	17,7		85	2,1	
Semi-Detached (Row) Housing	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Walk-Ups (Flats)	20	0,2		20	0,3		0	0,0		20	0,2		0	0,0	
Educational	2	7,6		1	3,0		0	0,2		1	4,1		0	0,0	
Primary School	1	2,8		1	1,5		0	0,0		1	2,8		0	0,0	
Secondary School	1	4,8		0	1,3		0	0,0		0	1,1		0	0,0	
Tertiary Institution	0	0,0		0	0,2		0	0,2		0	0,3		0	0,0	
Health	1	0,2		1	0,4		1	0,4		1	0,4		0	0,0	
Clinic	1	0,2		0	0,0		0	0,0		0	0,0		0	0,0	
Hospital	0	0,0		0	0,2		0	0,2		0	0,2		0	0,0	
NGO Centre	0	0,0		1	0,2		1	0,2		1	0,2		0	0,0	
Community	2	2,0		1	1,7		0	0,1		1	1,7		0	0,0	
Library	1	0,4		0	0,1		0	0,0		0	0,1		0	0,0	
Post Office	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Police Station	1	1,0		1	1,0		0	0,0		1	1,0		0	0,0	
Emergency Service Centre	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Cemetery		0,6			0,6			0,0			0,6			0,0	
Business	2,3	9120		2,2	8707		0,0	0		2,3	9165		0,1	458	
Retail	2,2	8640		2,1	8292		0,0	0		2,2	8728		0,1	436	
Private Office		0,1	480		0,1	415		0,0	0		0,1	436		0,0	22
Open Space	5,8			6,1			0,0			6,5			0,0		
Active		2,7			1,8			0,0			1,9			0,0	
Passive		45,0			4,3			0,0			4,5			0,0	
Industrial	5	3,8		22	17,8		17	14,1		23	18,7		1	0,9	
Industrial	5	3,8		19	15,1		14	11,4		20	15,9		1	0,8	
Commercial	0	0,0		3	2,7		3	2,7		3	2,8		0	0,1	
Streets	10,3			10,3			4,0			11,3			0,9		
TOTAL AREA	59,2			59,4			23,3			65,1			5,1		

Source: Urban Dynamics Gauteng, 2019

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c. Business

The potential retail and office floor area to support the current population within Marydale was calculated based on the socio-economic position of people living within the area, as set out in the socio-economic section of this report. Taking the above into account, there is sufficient retail and office space available in Marydale up to the year 2025. Approximately 500m² of additional retail and office space can potentially be developed within Marydale by the year 2030, of which approximately 400m² can be allocated to retail.

d. Open Space

Open space can be classified as active and passive open space. The former involves recreation and sport facilities. The latter involves natural areas, such as ridges and river flood areas. According to the Land Use Budget, Marydale requires approximately 2ha of active open space by the year 2030, which would involve providing a sports facility within this timeframe to serve the town. According to the Land Use Budget, Marydale has an oversupply of passive open space up to the year 2030. However, passive open space will need to be set aside as needed, despite the oversupply in passive open space provision. These spaces are needed to protect environmentally sensitive areas and secure flood line areas.

e. Industrial and commercial

The industrial and commercial land that is proposed for Marydale was based on typical per capita and industrial land ratio. Taking the above into account, approximately 18ha of industrial and commercial land can be allocated within Marydale by 2030.

4.3.3. NIEKERKSHOOP

A Land Use Budget has been calculated for Niekerkshoop, which calculated the need, amongst others, for social facilities, business space and housing for the period 2019 to 2025 and the period 2025 to 2030. This land use budget is depicted on Table 29. This land use budget can be used to assess applications for land use change, determine the number of social facilities to budget for in the IDP, and to plan for the municipal services infrastructure extensions needed to serve future settlement expansion.

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TABLE 29: NIEKERKSHOOP LAND USE BUDGET 2025 AND 2030

Land Use	Existing 2019			Estimate 2025			Backlog 2019-2025			Estimate 2030			Backlog 2025-2030		
	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²
POPULATION															
Population	2018			2146						2259					
Households	561			596						627					
Formal Households	521			576						627					
Informal Households	40			20						0					
LAND USE															
Housing	447	19		576	22		130	4		627	24		51	2	
Detached Housing (Smallholdings)	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Detached Housing (Bonded)	107	10,7		115	11,5		8	0,8		125	12,5		10	1,0	
Detached Housing (Affordable)	221	5,5		317	7,9		96	2,4		345	8,6		28	0,7	
Semi-Detached (Row) Housing	119	2,4		144	2,9		25	0,5		157	3,1		13	0,3	
Walk-Ups (Flats)	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Educational	1	2,8		1	3,9		0	0,2		1	3,7		0	0,0	
Primary School	1	2,8		1	2,8		0	0,0		1	2,8		0	0,0	
Secondary School	0	0,0		0	0,9		0	0,0		0	0,8		0	0,0	
Tertiary Institution	0	0,0		0	0,2		0	0,2		0	0,2		0	0,0	
Health	1	0,2		1	0,4		1	0,3		1	0,4		0	0,0	
Clinic	1	0,2		0	0,0		0	0,0		0	0,0		0	0,0	
Hospital	0	0,0		0	0,1		0	0,1		0	0,1		0	0,0	
NGO Centre	0	0,0		1	0,2		1	0,2		1	0,2		0	0,0	
Community	2	1,8		1	1,5		0	0,0		1	1,5		0	0,0	
Library	1	0,4		0	0,0		0	0,0		0	0,0		0	0,0	
Post Office	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Police Station	1	1,0		1	1,0		0	0,0		1	1,0		0	0,0	
Emergency Service Centre	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Cemetery		0,4			0,4			0,0			0,5			0,0	
Business	1,1	4440		1,5	6084		0,4	1644		1,6	6404		0,1	320	
Retail	1,1	4440		1,4	5794		0,3	1354		1,5	6099		0,1	305	
Private Office		0		0,1	290		0,1	290		0,1	305		0,0	15	
Open Space	4,0			4,3			2,8			4,5			0,2		
Active		3,6			1,3			0,0			1,4			0,0	
Passive		0,2			3,0			2,8			3,2			0,2	
Industrial	0	0,0		15	12,4		15	12,4		16	13,1		1	0,7	
Industrial	0	0,0		13	10,6		13	10,6		14	11,1		1	0,6	
Commercial	0	0,0		2	1,9		2	1,9		2	2,0		0	0,1	
Streets	6,0			7,1			4,2			7,6			0,6		
TOTAL AREA	34,5			41,0			24,1			43,6			3,5		

Source: Urban Dynamics Gauteng, 2019

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a. Housing

Approximately 130 housing units will need to be developed within Niekerkshoop to accommodate the population growth within Niekerkshoop by 2025. An additional 50 housing units will need to be developed within Niekerkshoop to accommodate the population growth within Niekerkshoop up to the year 2030. These housing units will have to be developed to accommodate the population growth within Niekerkshoop, as well as to eradicate the existing housing backlog within Niekerkshoop by the year 2030.

b. Community Facilities

The Land Use Budget has calculated the number of community facilities needed to support the envisaged population growth within Niekerkshoop up to the year 2030. According to the Land Use Budget, Niekerkshoop will only require an NGO centre to house located NGOs working in Niekerkshoop. Apart from the NGO centre, Niekerkshoop does NOT require any community facilities (such as primary schools, secondary schools, a clinics or police station) by the year 2030.

c. Business

The potential retail and office floor area to support the current population within Niekerkshoop was calculated based on the socio-economic position of people living within the area, as set out in the socio-economic section of this report. Taking the above into account, the additional retail and office space that could potentially be developed within Niekerkshoop up to the year 2025, based on the estimated population growth of the region, is approximately 1,600m², of which approximately 1,300m² can be allocated to retail. An additional 300m² of retail space can potentially be develop within Niekerkshoop by the year 2030.

d. Open Space

Open space can be classified as active and passive open space. The former involves recreation and sport facilities. The latter involves natural areas, such as ridges and river flood areas. According to the Land Use Budget, Niekerkshoop has an oversupply of active open space up to the year 2030. Niekerkshoop requires approximately 3ha of passive open space by the year 2030 to protect environmentally sensitive areas and secure flood line areas.

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e. Industrial and commercial

The industrial and commercial land that is proposed for Niekerkshoop was based on typical per capita and industrial land ratio. Taking the above into account, approximately 13ha of industrial and commercial land can be allocated within Niekerkshoop by 2030.

4.3.4. RURAL

A Land Use Budget has been calculated for rural area of Siyathemba, which calculated the need housing and for social facilities for the period 2019 to 2025 and the period 2025 to 2030. This land use budget is depicted on Table 30. This land use budget can be used to assess applications for land use change and determine the number of social facilities to budget for in the IDP.

a. Housing

The rural areas of Siyathemba has an oversupply of housing units and will not develop a backlog in housing units by the year 2030.

b. Community Facilities

The Land Use Budget has calculated the number of community facilities needed to support the envisaged population growth within the rural areas of Siyathemba up to the year 2030. According to the Land Use Budget, the rural areas of Siyathemba will NOT require any community facilities (such as primary schools, secondary schools, a clinics or police station) by the year 2030.

c. Business

The potential retail and office floor area to support the current population within the rural areas of Siyathemba was calculated based on the socio-economic position of people living within the area, as set out in the socio-economic section of this report. Taking the above into account, the additional retail and office space that could potentially be developed within the rural areas of Siyathemba up to the year 2025, based on the estimated population growth of the region, is approximately 9,600m², of which approximately 9,100m² can be allocated to retail.

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TABLE 30: SIYATHEMBA RURAL LAND USE BUDGET 2025 AND 2030

Land Use	Existing 2019			Estimate 2025			Backlog 2019-2025			Estimate 2030			Backlog 2025-2030		
	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²	no.	ha	m ²
POPULATION															
Population	3189			3391						3570					
Households	886			942						992					
Formal Households	816			907						992					
Informal Households	69			35						0					
LAND USE															
Housing	1244	118		907	84		0	0		992	93		0	0	
Detached Housing (Smallholdings)	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Detached Housing (Bonded)	1168	116,8		831	83,1		0	0,0		915	91,5		0	0,0	
Detached Housing (Affordable)	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Semi-Detached (Row) Housing	46	0,9		46	0,9		0	0,0		47	0,9		0	0,0	
Walk-Ups (Flats)	30	0,4		30	0,4		0	0,0		30	0,4		0	0,0	
Educational	3	10,4		1	3,4		0	0,3		1	4,3		0	0,0	
Primary School	2	5,6		1	1,7		0	0,0		1	2,8		0	0,0	
Secondary School	1	4,8		0	1,5		0	0,0		0	1,2		0	0,0	
Tertiary Institution	0	0,0		0	0,3		0	0,3		0	0,3		0	0,0	
Health	0	0,0		0	0,2		0	0,2		0	0,3		0	0,0	
Clinic	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Hospital	0	0,0		0	0,2		0	0,2		0	0,2		0	0,0	
Community	0	0,6		0	0,8		0	0,1		0	0,8		0	0,0	
Library	0	0,0		0	0,1		0	0,1		0	0,1		0	0,0	
Post Office	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Police Station	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Emergency Service Centre	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Cemetery		0,6			0,7			0,0			0,7			0,0	
Business (see Note 1)		0,0	0		2,4	9614		2,4	9614		2,5	10120		0,1	505
Retail		0,0	0		2,3	9157		2,3	9157		2,4	9638		0,1	481
Private Office		0,0	0		0,1	458		0,1	458		0,1	482		0,0	24
Open Space		0,0			0,0			0,0			0,0			0,0	
Active		0,0			0,0			0,0			0,0			0,0	
Passive		0,0			0,0			0,0			0,0			0,0	
Industrial	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Industrial	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Commercial	0	0,0		0	0,0		0	0,0		0	0,0		0	0,0	
Streets		27,1			19,2			0,6			21,2			0,0	
TOTAL AREA		156,2			110,4			3,7			121,9			0,2	

Note 1: The retail and office space potential of rural Siyathemba can be located within Prieska, the agricultural service centre of Siyathemba.
Source: Urban Dynamics Gauteng, 2019

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An additional 500m² of additional retail and office space can potentially be develop within the rural areas of Siyathemba by the year 2030. It is important to note that in the case of rural Siyathemba, the retail and office space potential allocated to rural Siyathemba can be reallocated to Prieska, because Prieska functions as the agricultural service centre of Siyathemba.

d. Open Space

Active open space involves recreation and sport facilities. Passive open space involves natural areas, such as ridges and river flood areas. No active or passive open space has been allocated in the Land Use Budget to the rural areas of Siyathemba. However, active open space can be provided within the rural areas of Siyathemba, based on the guidelines for such facilities provided in a following section of this report. Passive open space will need to be set aside as needed, to protect environmentally sensitive areas and secure flood line areas.

e. Industrial and commercial

No industrial or commercial land was proposed for the rural areas of Siyathemba in the Land Use Budget. Such land is best provided within the appropriately designated industrial and commercial areas in Prieska.

SECTION 5: DEVELOPMENT FRAMEWORK

5.1. SPATIAL STRUCTURE

Land use development proposals for Siyathemba are presented in this section of the Siyathemba SDF. These land use proposals were made, taking into account a number of factors, such as the creation of walkable and sustainable settlement environments and the protection of natural resource. The development potential of Siyathemba was determined using the Land Use Budget, presented in a previous section of this report, and should be read in conjunction with the land proposals made in this section of the report.

5.1.1. MUNICIPAL STRUCTURE

The Municipal Spatial Development Framework is presented by Figure 37. The municipal structure of Siyathemba is broadly divided spatially by the N10 freeway. To the south of the N10 freeway the land use character is largely flat, sparse and rural. To the north of the N10 freeway the land use character is largely mountainous, residential and intensive farming. This broad land use pattern found within Siyathemba will remain, but a number of projects are proposed and indicated by number 1 to 10.

5.1.1.1. Towns and Corridors

Siyathemba has 4 towns that house the majority of the municipal area's population. These towns include Prieska, Marydale, Niekerkshoop and Copperton. Prieska is the main town and functions of the primary rural service centre to the local commercial agricultural industry. Marydale and Niekerkshoop also function as rural service centres, but albeit smaller than that of Prieska. These are therefore classified and secondary rural service centres (see Figure 37) in terms of their hierarchy. Copperton is an old mining town that is in private ownership and is therefore not classified. The development of the towns in Siyathemba is closely related to the road linking these towns to each other and to areas located beyond the municipal boundary. The following two road corridors are of specific importance to the development of Siyathemba:

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a. N10 public transport corridor

Prieska is located on the N10 freeway, which is a strong freight and public transport corridor that connects Namibia and Upington in the northwest to De Aar and Port Elisabeth in the southeast. Movement along this axis is supported and strengthened by an existing freight railway line. Linking Prieska to this movement axis is of vital importance to the continued economic viability of Prieska. To create this linkage, it is proposed that a transport hub (1 on Figure 37) be developed next to the N10 freeway at Prieska. This transport hub can contain a public transport and truck stop, accommodation facilities, a small retail outlet, and warehousing.

b. R357 high-tech corridor

A minor road link (R357) connects Prieska to Copperton, which is located southwest of Prieska. As mentioned in the Development Concept, the Copperton area is experiencing an increasing presence of the high-tech industries, that includes the SKA, renewable energy enterprises, international military equipment testing and possibly advanced copper mining in future. Further developing the link (both the physical linkage and non-physical linkages) is critical if Prieska and Siyathemba is to ultimately capitalize on the economic development potential created by the high-tech industries.

5.1.1.2. High-Tech Industry

The Copperton mine, its renewal energy plant, and the Alkantpan military test site are the only non-agricultural land uses within Siyathemba that are significant on a municipal scale. Although mining at Copperton has ceased in 1991, there are current plans to reopen the mine (2 on Figure 37). A portion of the Copperton mine is used for a large solar plant. The Alkantpan military test site is still active and uses the Copperton airfield to transport military personnel and equipment to the site. In particular, two specific proposals can be made for the high-tech industry in the Copperton region, which are as follows:

a. Airport link

It is proposed (and will be elaborated upon in a following section of this report) that an airport shuttle link (3 on Figure 37) be instated between the Copperton airfield and Prieska. The Copperton airfield provides logistical support for miners establishing mines within the municipality, and military personnel visiting the Alkantpan military test site. Potentially, this

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airfield can also provide logistical support for scientists visiting the SKA, engineers involved in the construction and maintenance of renewable energy facilities within the municipality, and lecturers from the Sol Plaatje University involved in skills training in Prieska. Establishing a shuttle link between the Copperton airfield and Prieska will ensure the personnel visiting the Copperton region uses the business tourist facilities located in Prieska, to the benefit of the Prieska economy.

b. Renewable energy expansion

As mentioned in the Status Quo section of this report, Siyathemba is becoming the solar capital of the country. The reason for this is that Siyathemba is located in the middle of the 'Solar Corridor', which stretches from Upington to Colesberg. A small number of renewable energy projects have already been established and additional projects are in the pipeline. Most of these projects are located in the Copperton vicinity. The reasons for this include an abundance of suitable flat land and proximity to the existing power grid. The development of the Copperton region for renewable energy (4 on Figure 37) needs to be supported to intensify the high-tech industry clustering in the Copperton region.

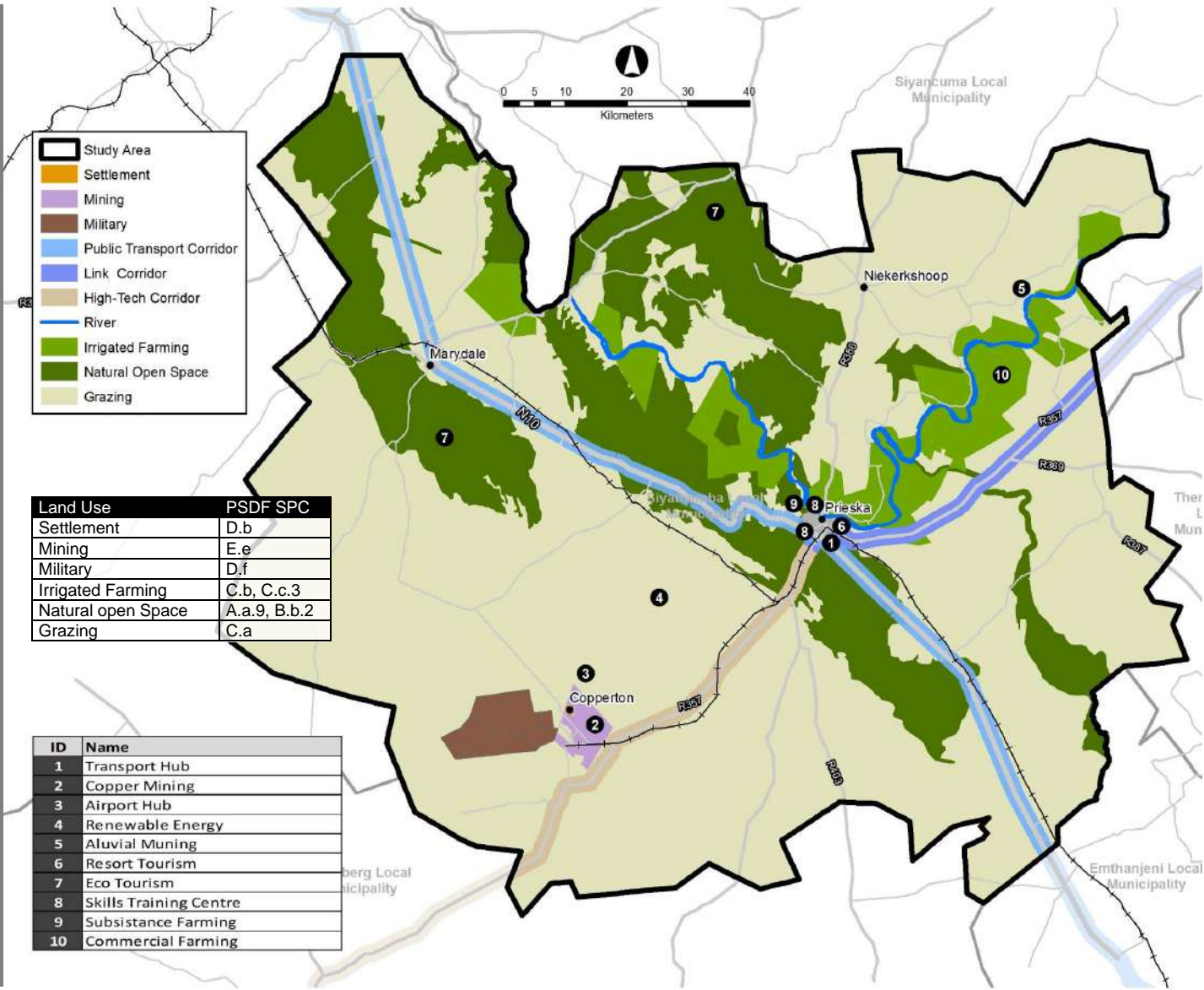
c. Alluvial mining

Although not located within the Copperton region, alluvial diamond mining (5 on Figure 37) along the Orange River is a high-tech sector that can be considered. Apart from copper, the only other mineral mined within the region is alluvial diamonds. Alluvial diamonds are currently mined on the south bank of the Orange River, between Douglas and Prieska. The potential for the development of alluvial mines within Siyathemba can therefore be investigated.

5.1.1.3. Tourism

Prieska and its direct surroundings is the focus of the Siyathemba tourist industry. The tourist facilities in and around Prieska include bed and breakfast accommodation, eateries, historical sites and access to the Orange River. The Status Quo section of this report found a strong linkage between the Prieska tourism industry and the high-tech industry located near Copperton. This linkage distinguished Siyathemba as a largely 'business tourism' area, rather than an eco-tourism area. Exploiting this 'business tourism' linkage requires focusing on the high-tech corridor mentioned above. Despite the focus on business tourism, eco-tourism opportunities can be identified within the municipal area. These are as follows:

**FIGURE 37 | SIYATHEMBA
MUNICIPAL SPATIAL DEVELOPMENT FRAMEWORK**



a. Resort tourism

Apart from its irrigation function, the Orange River has tourist potential that can be exploited, such as developing a resort and adventure tourism along the Orange River. Up to now, only a small number of smaller accommodation establishments have been developed along the Orange River, without much regard for the potential of the river as a larger tourist destination. To fully utilize the potential of the Orange River, it is proposed that Die Bos be redeveloped into a more contemporary tourist facility (6 on Figure 37), containing riverfront uses, such as hotels, restaurants and waterparks. This site also has access to the existing Prieska golf course and the blockhouse historical site.

d. Eco-tourism

Although it was mentioned above that the focus of tourism in Siyathemba should be on business tourism, there are limited opportunities for game farming. For example, much of the farmland in Siyathemba is regarded as wilderness and will therefore be suitable for the development of game farms (7 on Figure 37) and associated safari lodges. In turn, these eco-tourist facilities can link to the business tourism industry in Prieska by providing, for example game-drives to visiting business tourists.

5.1.1.4. Agriculture

Most of the land surface of Siyathemba is used for intensive and extensive agricultural purposes. Intensive, irrigation farming occurs north of the N10 freeway along the Orange River. The Orange River is used for the extraction of irrigation water. A number of projects are proposed for Siyathemba that are related to the agricultural sector, which are as follows:

a. Skills training centre

It is proposed that the old mill site, located on a disused park situated between the Bill Pickard Hospital and Loots Boulevard, be developed as an agri-industry and renewable energy skills training centre (8 on Figure 37) to serve the Pixley Ka Seme District. Such a facility will build upon the agricultural history of the municipal area and its current function as an agricultural hub along the banks of the Orange River. Important external linkages can be established through this skills training centre by linking it to the Sol Plaatje University (or other tertiary educational institution), who can provide the training courses at the skills training centre. A following section of this report will elaborate on the proposed skills training centre.

b. Subsistence farming

The irrigation agriculture industry located along the Orange River is a fully established and highly-developed agricultural sector. To enable greater farming equity, the Orange River and its agricultural benefits also needs to be made accessible to small and subsistence farmers within the region. It is therefore proposed that small-scale, subsistence farms on smallholdings (8 on Figure 37) be developed along the Orange River, north of Prieska. The aim of these smallholdings will be to give the local residents of Prieska and opportunity to establish irrigated farmland, small-scale commercial farming enterprises, and subsistence farming to supplement local food supplies. A following section of this report will elaborate on this proposal.

c. Commercial farming

The existing commercial irrigation farming industry is the historical economic base of Siyathemba, and remains so to this day. Consequently, it is important to protect and enhance the existing commercial agricultural industry (9 on Figure 37). Partially, this can be done by maintaining and strengthen linkages between this agriculture industry and Prieska, which is the agri-service centre to the local commercial agricultural industry.

5.1.1.5. Open Space Conservation

An open space system fulfils a number of functions. These functions include hazard avoidance, resource conservation, ensuring community well-being and educational (see Table 31). Open space and recreation within Siyathemba can be divided into 2 categories: passive and active open space. Passive open space consists of land that is unsuitable or undesirable for settlement development due to topographical factors, ecological constraints or for flood protection. Active open space involves the recreational component of the open space system and is dealt with at a later stage in this report.

The open space network proposed for Siyathemba is depicted on Figure 37. This open space network consists mountainous areas, as well as perennial rivers. The Doringberg is a mountain range that traverses the centre of the municipal areas, stretching from the southeastern corner of the municipal area to the northwestern corner of the municipal area. Apart from its ecological value, this mountain range is a significant landform defining the municipal area by giving it a specific character. It is therefore important to protect the Doringberg from settlement development, intensive farming and in particular mining activities. This does not imply

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that no activities or land uses can occur on this mountain range, but that all activity and land use should be done in a manner that will retain the ecological integrity and visual beauty of the mountain range.

TABLE 31: FUNCTIONS OF AN OPEN SPACE SYSTEM

Hazard avoidance	Resource conservation	Recreational and psychological	Educational
Open spaces must reserve flood prone areas.	Open spaces must protect water sources.	Developed and maintained open space must be provided for recreational purposes.	Open spaces must be protected for environmental education purposes.
Open spaces must reserve steep slopes and geologically unstable ground.	Open spaces must protect linked areas of conservable indigenous vegetation.	Open space must be provided for community interaction and as symbols of community identity.	Well-equipped and designed open spaces must be provided for sport education.
Open spaces should protect drinking water sources from being contaminated.		Open spaces must be protected for psychological relief from day-today stresses.	

Source: Urban Dynamics Gauteng, 2019

Apart from the Doringberg, the Orange River is another significant ecological feature traversing Siyathemba. The Orange River is arguably the most ecologically valuable natural area within Siyathemba, especially when considering it is the heart of the agricultural industry of Siyathemba. The conservation of this natural open space is therefore of the utmost importance. To do this, it is necessary to protect the banks of the river, as well as the water quality of the river. Because most of the banks of the Orange River are used for intensive agricultural purposes, conservation of the Orange River will require employing responsible farming practices along the banks of the Orange River to avoid polluting the river.

According to the Pixley Ka Seme District SDF, the Orange River Corridor is a unique and important landscape and has been identified as one of three bio-regions that should be considered in future spatial planning of municipalities located in the district. The Pixley Ka Seme District SDF proposes the following strategies for the protection and enhancement of the Orange River Corridor:

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- Protect the Orange River as an important river corridor that not only supports regional sustainable development in rural and settlement areas, but also forms an important provincial and national resource.
- Promote tourism along the river, with due consideration to the irrigation farming and mining along the river corridor.
- Implement an effective water management plan for the river corridor to ensure the optimal use and conservation of water as a scarce resource in this arid region.
- Effectively manage the river across the different municipalities to provide a combined approach with regards to infrastructure development, tourism and agriculture.

Apart from the Orange River, the Brak River is the only other perennial river flowing through Siyathemba. The Brak River, which in turn flows into the Orange River, as well as a number of non-perennial rivers that flow into the Orange River, needs to be protected by placing buffers zones along the banks of these rivers and protecting these buffer zones from settlement development, intensive farming and in particular mining activities. A number of non-perennial streams also flow southwestwards towards Verneukpan and should also be protected using buffer zones. Typically, buffer zones of 30m on either side of the rivers should suffice.

The conservation of the Siyathemba river system is also necessary for hazard avoidance. To this end, it is imperative that the natural drainage channels and banks of all the rivers within Siyathemba, as well as their non-perennial tributaries, be protected up to the 100-year flood line. This will protect Siyathemba communities from flooding; while at the same time ensure the protection of the ecological status of the river embankments, which is necessary for flood management.

5.1.2. TOWN STRUCTURE

The Local Spatial Development Frameworks are presented by Figures 38 to 40 and are applicable to the towns within Siyathemba, namely Prieska, Marydale and Niekerkshoop. Copperton is in private ownership and is therefore not applicable. Prieska is the primary town and agricultural service centre of the region. It contains most of the municipal area's population and contains most of the municipal area's community facilities. The Prieska population resides in a number of suburbs, including Lemnertsville and Ethembeni. Marydale and Niekerkshoop also function as local rural service centres, but albeit smaller rural areas than that of Prieska. Niekerkshoop comprises the suburbs Rainbow, Rooidal and Rama Rou.

5.1.2.1. Typical Town Structure

The towns within Siyathemba, as represented by Prieska, Marydale and Niekerkshoop, have a typical rural town structure. There is general agreement regarding the physical composition of the rural town model. First and foremost, the rural town is limited in area and structured around a defined center. While the population density of the rural town may vary, depending on its context, a rural town offers a balanced mix of residential typologies, workplaces, shops, public buildings and parks. The following are the principles of a rural town design:

a. Town centre and edge

A rural town has a center and an edge. The combination of a focus and a limit help define a community identity. The center is a necessity, but the edge not always so. The center always acts as public space, which may comprise a public space, a park, or an important street intersection. The centre is always located near the middle of the rural town, unless compelled by some geographic circumstance to be elsewhere. The centre is the focus of the town's public buildings, such as a church, post office, a community hall and a library. Shops and workplaces are usually associated with the centre.

Town edges may vary in character: it can be natural, such as a river, or man-made, such as a freight rail line. The former, if generously lined with trees, can reinforce the legibility of the edge. The edge may be assigned to low-density residential uses, it can be designated for rural purposes, such as agricultural holdings, or it can be set aside for the conservation of natural open space. These low-intensity areas can form part of a larger network of open space corridors, connecting open spaces in towns with the rural surroundings.

b. Optimal town size

The optimal size of a rural town is determined by the walking distance from the centre to the edge of the rural town. In this regard, the following two critical distances apply (see Diagram 27):

- 8-minute walk: The 8-minute walk basically delineates the centre of the rural town. Within this centre, pedestrians walk between the various public facilities, shops and workplaces located within the centre. These place a large number of households within walking distance of their daily needs, such as a convenience store, post office, police station, automatic teller, school, day-care centre and commuter railway station.

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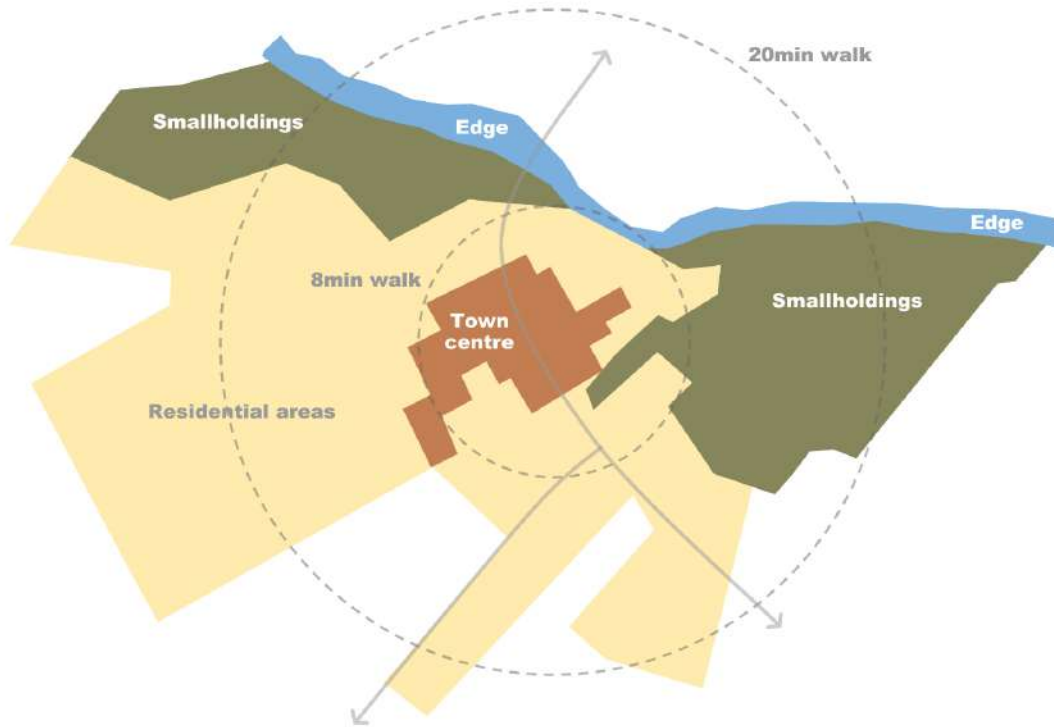


DIAGRAM 27: TYPICAL RURAL TOWN DESIGN APPLIED TO PRIESKA

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- 20-minute walk: Whereas the 8-minute walk is a predominantly a pedestrian environment, the 20-minute walk delineates an area that require transport to access the town centre. Although this outer ring is still within walking distance of the town centre, non-motorised vehicles (such as bicycles) are more frequently used to access the town centre. This outer ring usually contains small convenience store of centre for daily needs, such as groceries.

The location the town centre of a rural town places business and community facility within walking distance of residential areas. The scale of rural towns makes walking and non-motorised transport (e.g. bicycles) a viable form of transportation within such towns.

c. Mix of activities

A rural town has a balanced mix of activities: residential, shopping, working, schooling, worshipping and recreation. This mix thus places all the activities needed in daily life within walking distance of the rural town residents. For instance, children are able to walk or bicycle to school and other activities. In addition, the proximity and convenience of the town size reduces the need for private vehicles, making non-motorised vehicles sufficient to access social amenities, shopping facilities and employment opportunities. The land use mix of a rural town usually includes a range of housing typologies catering for a variety of households and income categories. Such a range and variety of housing choices caters of typical families comprising parents with 2 children, but also for extended families with grandparent being part of the family, and families that are young with no children.

d. Rural town street network

Whereas the typical, modern residential area in cities utilizes loops and cul-de-sacs, older rural towns, typically use a grid network of interconnecting streets. Rural town streets are configured to create street blocks and to shorten pedestrian routes. They are designed to calm local traffic, because an interconnected street pattern provides multiple routes and options that tends to diffuse traffic. Rural town streets are detailed and layered to provide both for pedestrian comfort and for vehicle movement. Slowing and diffusing the vehicle movement and increasing pedestrian activity encourages the casual meeting of residents, which forms the bonds that creates a community within a rural town.

e. Public space

A rural town gives priority to public space and to the appropriate location of public buildings. Public spaces and buildings represent community identity and tend to foster community pride. A rural town structures its streets and street blocks to

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create a hierarchy of public spaces and provide visual locations for public buildings. In other words, squares and streets are arranged in terms of size and layout with the intention of creating special places. The importance of these public and community buildings is enhanced by suitable and prominent locations, for example, placing a public building on a site that overlooks a park or public space.

Prieska, Marydale and Niekerkshoop all contain most of these rural town characteristics. Over time, this structure has been proven to be a sustainable and desired spatial pattern. In recent years, more modern spatial patterns have been applied to the outlying residential areas of Prieska. These residential patterns are not typical of rural towns and they do not support the walkability of rural town and should therefore be avoided. It is therefore proposed that future layouts in Prieska be design in the more rural town grid-network design. In addition to the above, it is important that the expansion of Prieska be limited to the 20min walk radius to ensure the town remains walkable.

5.1.2.2. Residential Development

Figures 38 to 40 indicate the land parcels within Prieska, Marydale and Niekerkshoop that are proposed for residential development. These land parcels were identified, taking a number of factors into account, such as the potential to access collector roads and creating compact rural settlements. Land categorized as environmentally important, mostly comprising ridges and rivers, were deemed unsuitable for residential development.

TABLE 32: RESIDENTIAL LAND ALLOCATION 2030

Proposed SDF	Land Use Budget Estimated Need (ha)			Land Allocated (ha)		
	Prieska	Marydale	Niekerkshoop	Prieska	Marydale	Niekerkshoop
Low Density Residential						13
Medium Density Residential				171	25	3
Agricultural Holdings				135		
Total	63	8	6	306	25	16

Source: Urban Dynamics Gauteng, 2019

As depicted by Table 32, approximately 300ha of land was allocated for residential expansion in Prieska, of which approximately 140ha was allocated for smallholding development. Approximately 25ha of land was allocated for residential expansion in Marydale and approximately 16ha of land was allocated for residential expansion in Niekerkshoop. A measured oversupply of land is made available for residential expansion within Prieska, Marydale and Niekerkshoop, when compared to the land needed

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for residential expansion, as set out in Table 32. This measured oversupply of land was made available to allow for environmental constraints, such as river tributaries, but also to counter high land values, which is often associated with the severe restriction of land available for residential expansion.

Despite the fact that Prieska, Marydale and Niekerkshoop has large tracts of land available that are suitable for residential expansion, the thoughtless use of land for residential expansion is unacceptable. Residential expansion within Prieska, Marydale and Niekerkshoop needs to occur in a controlled and consolidated manner to prevent settlement sprawl and the negative impacts associated with settlement sprawl. Some negative impacts of sprawl include high bulk services development cost due to long infrastructure runs and long walking distances to access social facilities and economic opportunities. It is therefore imperative that the land that is made available for residential purposes within Prieska, Marydale and Niekerkshoop be optimally used. This is primarily achieved by compacting towns by using infill parcels of land located near the town centres of each respective town.

Prieska, Marydale and Niekerkshoop has large tracts of land that are potentially available for residential expansion, as well as a number of infill sites that can be utilized for residential purposes. The primary residential expansion areas that have been identified within Prieska, Marydale and Niekerkshoop are depicted on Figures 38 to 40 and are as follows:

a. Prieska medium-density residential development

Most of the land allocated for residential expansion has been located within Prieska, the primary town and agricultural service centre of Siyathemba. Land for medium-density residential expansion in Prieska was located along Upington Way, situated south of Lemnertsville, and along Arbeck Street, situated north of the Prieska industrial area. Both these land parcels have been set aside for residential township establishment in recent years and draft township layouts have been prepared for these sites.

b. Mine over-flow area

Figure 38 illustrates an area marked as 'mine overflow area'. This area is earmarked for the development of a residential township for mine workers, should the proposed mine township along Arbeck Street prove not to be sufficient to cater for the needs of the Copperton mine. It is important to note that the Land Use Budget does not indicate a need for this additional land for residential expansion up to the year 2030, and that the estimated residential need of the Copperton mine does not show a need for this land either. However, should the Copperton mine be reopened, it could result in an unpredictable influx of workers seeking work at the mine, and that the area labelled 'mine overflow area' will then be

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required to absorb this unpredicted population growth. **Thus, this land can only be used if the influx of workers exceeds the current estimates of the mine and can only be developed as a last resort and if all other development areas proposed for residential develop is fully developed.** If and when it becomes evident that the influx of mine workers exceeds current estimates, a Precinct Plan will need to be drafted for the area labelled 'mine overflow area' to determine the layout and residential capacity of the land, and determined the social facilities, road infrastructure and the bulk municipal services infrastructure upgrades that will be required to develop the land.

c. Prieska smallholding development

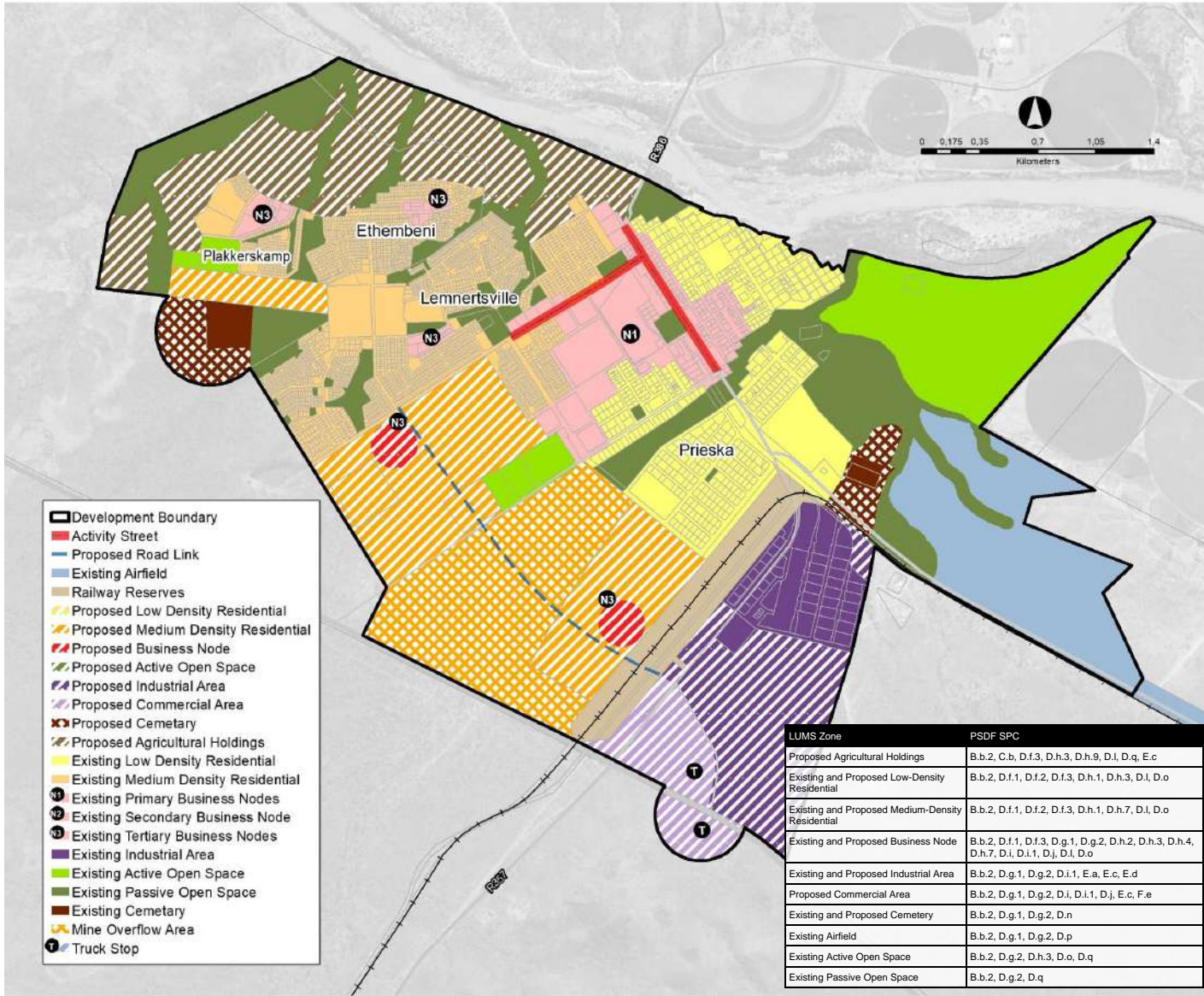
In addition to the medium residential density expansion areas set out above, land was allocated for smallholdings, located north of Ethembeni. The aim of these smallholdings is to enable greater farming equity by making the Orange River and its agricultural benefits accessible to small and subsistence farmers the Prieska region. Although many of these smallholdings will be farmed on a communal bases by local communities from neighbouring residential areas (such as Ethembeni), a limited number of these smallholdings will be allocated to individual households to farm on these smallholdings. These smallholdings will therefore also have a residential function.

d. Marydale medium-density residential development

Relatively small parcels of land have been allocated for medium residential density expansion in Marydale. One such residential expansion area involves the developed of a vacant extension of Rooidal, and another involves the northward expansion of Rama Rou up to the N10 freeway.

e. Niekerkshoop residential infill development

Niekerkshoop contains a number of residential townships that have large numbers of vacant stands. It is proposed that these stands be developed before any new residential townships are created within Niekerkshoop. Developing these stands have many benefits, one of which is the fact that they already have a municipal infrastructure network installed. It is proposed that the existing vacant stands within Niekerkshoop be utilised for affordable housing, but that the stands NOT be subdivided into smaller stands. This will ensure that the historic character of these established parts of the Niekerkshoop are maintained.

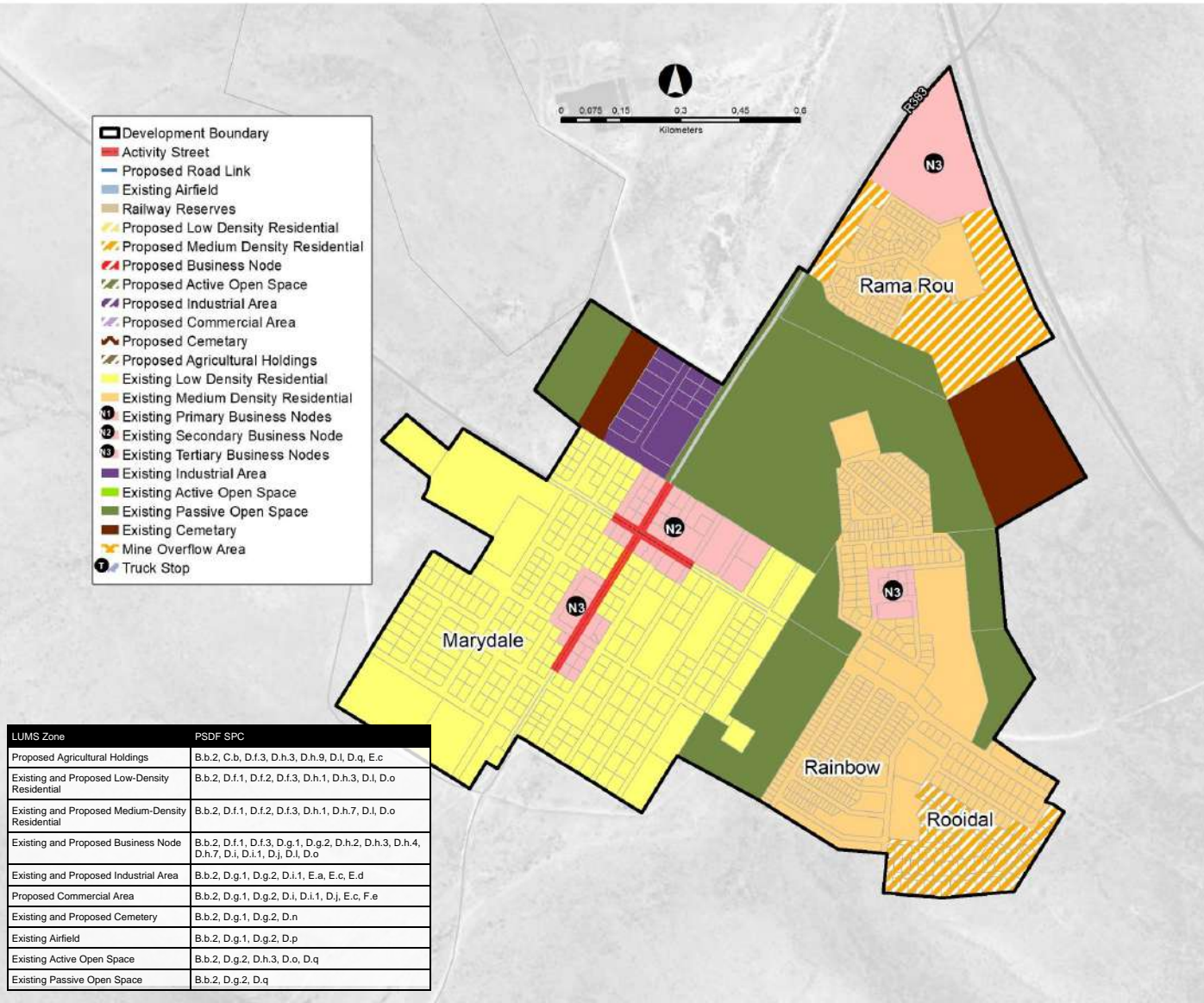


- Development Boundary
- Activity Street
- Proposed Road Link
- Existing Airfield
- Railway Reserves
- Proposed Low Density Residential
- Proposed Medium Density Residential
- Proposed Business Node
- Proposed Active Open Space
- Proposed Industrial Area
- Proposed Commercial Area
- Proposed Cemetary
- Proposed Agricultural Holdings
- Existing Low Density Residential
- Existing Medium Density Residential
- Existing Primary Business Nodes
- Existing Secondary Business Node
- Existing Tertiary Business Nodes
- Existing Industrial Area
- Existing Active Open Space
- Existing Passive Open Space
- Existing Cemetary
- Mine Overflow Area
- Truck Stop

LUMS Zone	FSDF SPC
Proposed Agricultural Holdings	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.i, D.q, E.c
Existing and Proposed Low-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.i, D.o
Existing and Proposed Medium-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.i, D.o
Existing and Proposed Business Node	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.i, D.o
Existing and Proposed Industrial Area	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Proposed Commercial Area	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Existing and Proposed Cemetary	B.b.2, D.g.1, D.g.2, D.n
Existing Airfield	B.b.2, D.g.1, D.g.2, D.p
Existing Active Open Space	B.b.2, D.g.2, D.h.3, D.o, D.q
Existing Passive Open Space	B.b.2, D.g.2, D.q

FIGURE 38 | PRIESKA
LOCAL SPATIAL DEVELOPMENT FRAMEWORK

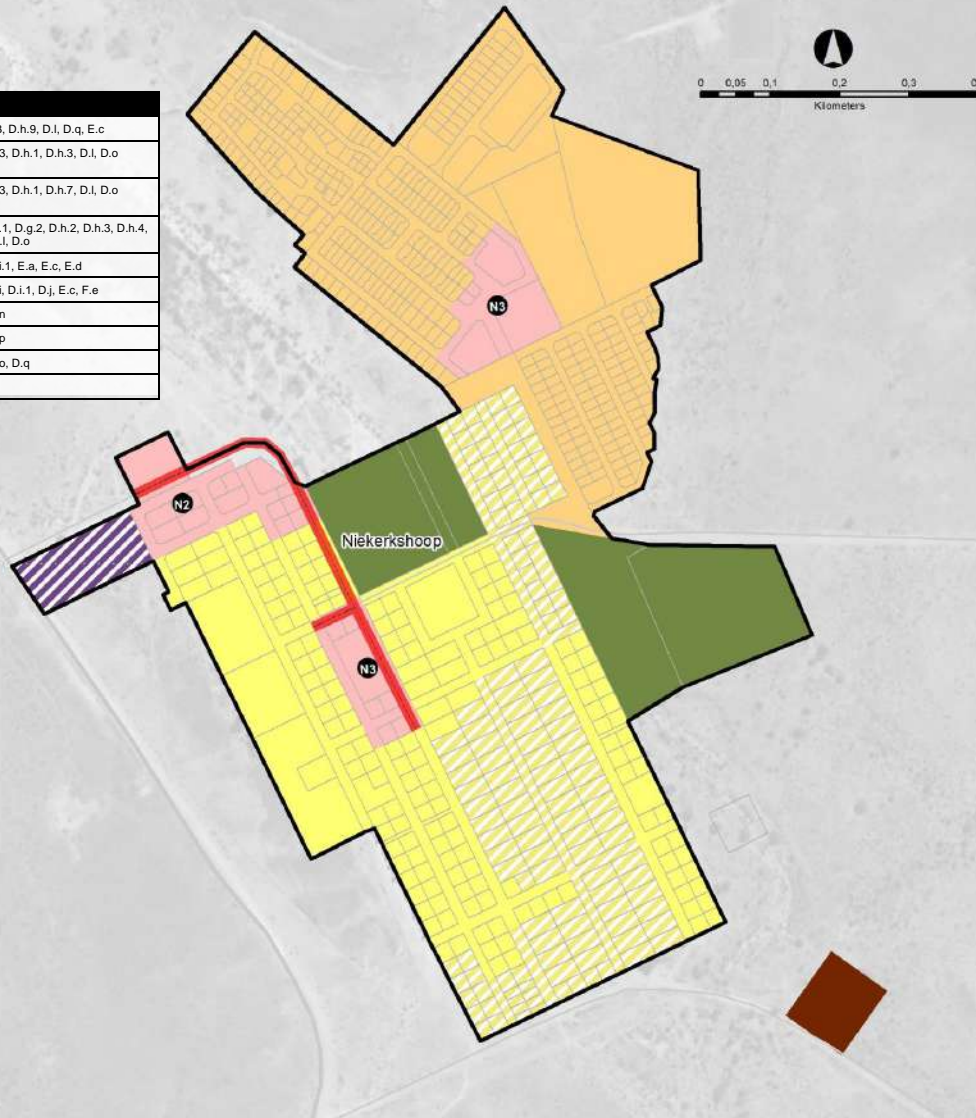
FIGURE 39 | MARYDALE LOCAL SPATIAL DEVELOPMENT FRAMEWORK





LUMS Zone	PSDF SPC
Proposed Agricultural Holdings	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.i, D.q, E.c
Existing and Proposed Low-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.i, D.o
Existing and Proposed Medium-Density Residential	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.i, D.o
Existing and Proposed Business Node	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.l, D.o
Existing and Proposed Industrial Area	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Proposed Commercial Area	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Existing and Proposed Cemetery	B.b.2, D.g.1, D.g.2, D.n
Existing Airfield	B.b.2, D.g.1, D.g.2, D.p
Existing Active Open Space	B.b.2, D.g.2, D.h.3, D.o, D.q
Existing Passive Open Space	B.b.2, D.g.2, D.q

- Development Boundary
- Activity Street
- Proposed Road Link
- Airfield
- Railway Reserves
- Proposed Low Density Residential Infill
- Proposed Medium Density Residential
- Proposed Tertiary Business Nodes
- Proposed Active Open Space
- Proposed Industrial Area
- Proposed Commercial Area
- Proposed Cemetery
- Proposed Agricultural Holdings
- Existing Low Density Residential
- Existing Medium Density Residential
- Existing Primary Business Nodes
- Existing Secondary Business Node
- Existing Tertiary Business Nodes
- Existing Industrial Area
- Existing Active Open Space
- Existing Passive Open Space
- Existing Cemetery
- Mine Overflow Area
- Truck Stop



**FIGURE 40 | NIEKERKSHOOP
LOCAL SPATIAL DEVELOPMENT FRAMEWORK**

5.1.2.3. Business Development

Siyathemba has 1 primary business node or Central Business Districts (CBD) and 2 secondary business nodes serving the municipal area. The primary business node is the established Prieska CBD, and the 2 secondary nodes are located at the entrances to Marydale and Niekerkshoop respectively. The Prieska CBD contains a significant concentration of retail and office space. For example, it contains medium-size retail outlets (e.g. OK, Jet, etc.), branches of all the major banks, and a number of motor and agri-trade businesses along Loots Boulevard. The decentralization of retail and office space to residential areas have not occurred within Prieska. As a result, the Prieska CBD remains a vibrant business node in Siyathemba. The Marydale and Niekerkshoop secondary nodes largely contain a cluster of mini-supermarket.

The Prieska CBD needs to be retained as the primary business node of Siyathemba. This node has a distinct rural town centre character, contributing significantly to the image of Siyathemba as a whole. It is especially important to protect the Prieska CBD from the retail and office decentralization to residential areas. If a shopping mall is proposed for Prieska in future, such a shopping mall must be located within the bounds of the CBD and the integrated through design into the spatial fabric of the CBD. This needs to be done to ensure the economic viability of the Prieska CBD is not endangered.

In addition to the above, the Prieska CBD needs to expand to further establish it as the agricultural service centre of Siyathemba. The Prieska CBD can expand south-westwards, unto the vacant land surrounding the Bill Pickard Hospital. This area can be developed through the development of additional retail and office space, as well as the development of higher-density housing (such as row housing and walk-ups) to increase the land use mix within the CBD.

The site located between the Bill Pickard Hospital and Loots Boulevard is proposed for an agri-industry and renewable energy skills training centre in a following section of this report. Such a Facility will significant strengthen and diversify the role of the Prieska CBD. It is important that when this expansion area is developed, that it is fully integrated and attached to the existing Prieska CBD to ensure that it is developed as a single node. This in turn will enhance the viability and attractiveness of this CBD.

In addition to the Prieska CBD mentioned above, a lower-order nodal structure needs to be strengthened and new nodes established. This includes strengthening the secondary business nodes in Marydale and Niekerkshoop as the town centres of these towns. The land use composition of these existing secondary business nodes can be diversified by adding uses such as office space, community facilities and higher-density housing (such as row housing) to its land use mix. However, such land uses should only be added to each of these nodes in accordance with the needs of the town communities.

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In addition to the above, two new tertiary business nodes can be developed within Prieska to serve new residential expansion areas within Prieska. Land for residential expansion in Prieska was located along Upington Way, situated south of Lemnertsville, and along Arbeck Street, situated north of the Prieska industrial area. Both these land parcels can potentially comprise a small tertiary business node, as depicted on Figure 38. It is important that these nodes not be developed in competition to the Prieska CBD, but that they focus on providing day-to-day goods and services to the surrounding residential area. For example, a cluster of convenience stores and a doctor's consulting rooms would be suitable for such nodes.

5.1.2.4. Industrial and Commercial Development

As depicted by Table 33, it was estimated that Siyathemba requires approximately 130ha of land for industrial and commercial development during up to the year 2030. To address this need, 125ha of industrial and commercial land was made available in Prieska. The additional industrial land in Prieska should help strengthen Prieska as the agri-industrial centre and renewable energy hub within the region. No additional industrial land was made available in Marydale, because the existing industrial area within Marydale has enough vacant industrial stand left for industrial development up to the year 2030. Approximately 13ha of industrial land was made available in Niekerkshoop. Figure 38 and 40 illustrates the land parcels within Prieska and Niekerkshoop that are proposed for industrial and commercial development. These industrial and commercial expansion areas are as follows:

a. Prieska industrial area expansion

The land allocated for industrial expansion was located south of the existing industrial area in Prieska, thus essentially constituting the southward expansion of this industrial area. It is proposed that the industrial area be expand southwards towards the N10 freeway. The primary reason for extending the industrial area towards the N10 freeway is that the rail sidings, which serve the existing Prieska industrial area, can be extended into the new the industrial area. The industrial area will also have direct access to the N10 freeway, which is the primary freight route traversing Siyathemba.

TABLE 33: INDUSTRIAL LAND ALLOCATION

Proposed SDF	Land Use Budget Estimated Need (ha)			Land Allocated (ha)		
	Prieska	Marydale	Niekerkshoop	Prieska	Marydale	Niekerkshoop
Commercial Area	16	3	2	30		2
Industrial Area	80	15	11	95		11
Total	96	18	13	125	0	13

Source: Urban Dynamics Gauteng, 2019

b. N10 commercial hub

The land located on the intersection of the N10 and the R387 is proposed for commercial uses, as depicted on Figure 38. This land is proposed for a public transport stop on the N10 freeway. The site is situated at the half-way mark between Hannover and Upington and is therefore ideally suited for a public transport stop. This public transport stop can be combined with a truck stop and can include a bus and taxi rank, a large filling station, accommodation facilities (e.g. a motel), restaurant facilities, and a small retail outlet. Other related commercial land uses, such as warehousing and vehicle and truck repair workshops, can also be included in this transport node.

c. Niekerkshoop industrial area

Approximately 13ha of industrial land was made available in Niekerkshoop. Niekerkshoop does not have an industrial area at present and local residents have expressed a need for industrial land. This industrial land can be utilised for uses such as vehicle panel beating.

The industrial and commercial areas proposed above are intended to help generate employment opportunities in Siyathemba and thereby reducing the need for Siyathemba residents to travel large distances to access such employment opportunities in other areas of the country, such as Gauteng. Providing industrial and commercial land within Siyathemba will strengthen Prieska as the regions agri-industrial service centre, as well as the country's renewable energy hub. The location of the industrial area expansion will also enable the industrial area to utilize the exposure provided by the N10 freeway. In addition, the industrial area will link Prieska to the freeway, whereas currently, Prieska is bypassed by the N10 freeway. Linking Prieska to the freeway will allow Prieska to tap into the freight transport and public transport opportunities presented by the freeway.

5.1.2.5. Local SDF and SPC Alignment

The Northern Cape PSDF uses Spatial Planning Categories (SPC's) to provide a framework in terms of which land-use decisions can be standardised throughout the province. The PSDF proposes that all municipalities within the Northern Cape should use the SPC's as the foundation of spatial planning. Consequently, the SPC's need to be applied to the Local Spatial Development Frameworks of the Siyathemba SDF. Table 34 applies the SPC's to the Local Spatial Development Frameworks categories.

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TABLE 34: LOCAL SDF AND SPC ALIGNMENT

Existing LSDF Land Use Category	Proposed LSDF Land Use Category	PSDF SPC Alignment
	Proposed agricultural holdings	B.b.2 – Rivers and riverbeds C.b – Intensive agricultural areas D.f.3 - Institution D.h.3 – Guest house D.h.9 - Smallholdings D.l – SMME incubators D.q – Resort and Tourism Related areas E.c – Light industry
Existing low-density residential	Proposed low-density residential	B.b.2 – Rivers and riverbeds D.f.1 – Place of instruction D.f.2 – Place of worship D.f.3 - Institution D.h.1 – Single residential house D.h.3 – Guest house D.l – SMME incubators D.o – Sports field and infrastructure
Existing medium-density residential	Proposed medium-density residential	B.b.2 – Rivers and riverbeds D.f.1 – Place of instruction D.f.2 – Place of worship D.f.3 - Institution D.h.1 – Single residential house D.h.7 - Subsidised housing D.l – SMME incubators D.o – Sports field and infrastructure
Existing business node	Proposed business node	B.b.2 – Rivers and riverbeds D.f.1 – Place of instruction D.f.3 - Institution D.g.1 – Government uses D.g.2 – Municipal uses D.h.2 – Group housing

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Existing LSDF Land Use Category	Proposed LSDF Land Use Category	PSDF SPC Alignment
		D.h.3 – Guest house D.h.4 – Flats/ residential buildings D.h.7 - Subsidised housing D.i – Business area D.i.1 – Business premises D.j – Service-related business D.l – SMME incubators D.o – Sports field and infrastructure
Existing industrial area	Proposed industrial area	B.b.2 – Rivers and riverbeds D.g.1 – Government uses D.g.2 – Municipal uses D.i.1 – Business premises E.a - Agricultural industry E.c – Light industry E.d – Heavy industry
	Proposed commercial area	B.b.2 – Rivers and riverbeds D.g.1 – Government uses D.g.2 – Municipal uses D.i – Business area D.i.1 – Business premises D.j – Service-related business E.c – Light industry F.e – Heavy vehicle overnight facilities
Existing cemetery	Proposed cemetery	B.b.2 – Rivers and riverbeds D.n - Cemeteries
Existing airfield		B.b.2 – Rivers and riverbeds D.p – Airport and infrastructure
Existing active open space	Proposed active open space	B.b.2 – Rivers and riverbeds D.g.2 – Municipal uses D.h.3 – Guest house

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Existing LSDF Land Use Category	Proposed LSDF Land Use Category	PSDF SPC Alignment
		D.o – Sports field and infrastructure D.q – Resort and Tourism Related areas
Existing passive open space		B.b.2 – Rivers and riverbeds D.o – Sports field and infrastructure D.q – Resort and Tourism Related areas

Source: Urban Dynamics Gauteng, 2019

5.1.3. SDF LIMITATIONS

Although an attempt was made to point out the constraints affecting Siyathemba, it has to be stressed that localized constraints could emerge once a site that is earmarked for development is investigated in more detail. Also, it may be that the constraints are more prohibitive than assumed in this report. Such issues may surface during the EIA process, during the township establishment application process, or during the construction phase, when building foundations are investigated. The following development constraints could emerge during these phases:

- **Geotechnical conditions:** Good geotechnical conditions underlie most of Siyathemba that is proposed for settlement development, thus not prohibiting settlement development. However, it may be that localized areas within Siyathemba may have geotechnical conditions that are not suitable for building construction, or would require specialized building foundations that may increase building cost.
- **Municipal services:** Besides the bulk municipal services network capacity (which was not been determined in this study) there may be localized areas within Siyathemba that cannot be directly linked to the bulk network due to topographical constraints or other factors. To address this may require, for example the installation of sewerage pump stations, which could possibly become a condition for development in such areas.
- **Flooding:** Although the protection of floor areas within Siyathemba have been taken into account in the open space network proposed in the Siyathemba SDF, it may be that certain properties within Siyathemba, which are located outside of this open space network, are subject to flood conditions.
- **Environmental constraints:** Although the open space network has taken environmental constraints into account; localized environmental constraints could affect properties or portions of properties that are not located within these

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open spaces. Such environmental constraints could surface during site visits associated with applications for land use change.

- High-potential agricultural soils: High-potential agricultural soils to be protected have been pointed out in the Siyathemba SDF. However, localized pockets of high-potential agricultural soils in other areas may also require protection, which could affect the manner and extent to which a property can be developed.

5.1.4. STRATEGIC ENVIRONMENTAL ASSESSMENT

The Strategic Environmental Assessment or SEA aims to evaluate the Siyathemba SDF proposals and its impact on the natural, social and infrastructural environment. This is done in order to determine the sustainability of the proposals and to propose mitigating measures to limit the negative impacts of the proposal on the natural, social and infrastructural environment of Siyathemba. Table 35 sets out the potential environmental impacts and mitigation measures proposed for each of the town regions within Siyathemba.

TABLE 35: POTENTIAL ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

Element	Impact/ Mitigation	Prieska Region	Marydale Region	Niekerkshoop Region	Copperton Region
Natural environment	Impact:	<ul style="list-style-type: none"> • Potential destruction of Orange River and Brak River riparian vegetation • Potential destruction of ridge vegetation from excessive farming practices. 	<ul style="list-style-type: none"> • Potential destruction of Orange River riparian vegetation • Potential destruction of ridge vegetation from excessive farming practices. 	<ul style="list-style-type: none"> • Potential destruction of ridge vegetation from excessive farming practices. 	<ul style="list-style-type: none"> • Potential destruction of natural vegetation
	Mitigation:	<ul style="list-style-type: none"> • Protection of natural open space in township layouts • Protection of river and tributary riparian environment in township layouts up to the 100-year flood line • Develop Environmental Management Plan 	<ul style="list-style-type: none"> • Protection of natural open space in township layouts • Protection of river and tributary riparian environment in township layouts up to the 100-year flood line • Protection of ridge vegetation through 	<ul style="list-style-type: none"> • Protection of natural open space in township layouts. • Protection of ridge vegetation through responsible farming practices. 	<ul style="list-style-type: none"> • Protection of native vegetation through responsible mining, renewable energy development, and farming practices.

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Element	Impact/ Mitigation	Prieska Region	Marydale Region	Niekerkshoop Region	Copperton Region
Hydrological system	Impact:	<p>(EMP) for river environment</p> <ul style="list-style-type: none"> • Protection of ridge vegetation through responsible farming practices. • Moderate increase of runoff from new tar and gravel roads into Orange River tributaries • Potential industrial pollutant runoff into Orange River 	<p>responsible farming practices.</p> <ul style="list-style-type: none"> • Tarring of gravel roads will increase runoff volumes 	<ul style="list-style-type: none"> • Tarring of gravel roads will increase runoff volumes 	<ul style="list-style-type: none"> • Tarring of gravel roads will increase runoff volumes
	Mitigation:	<ul style="list-style-type: none"> • Implementation of storm water management plan linked to road network • Take into consideration the cumulative impact of runoff on larger hydrological system • Take into consideration the increased runoff intensity caused by climate change impacts • Implementation of stringent industrial pollution control measures 	<ul style="list-style-type: none"> • Implementation of storm water management plan linked to road network • Take into consideration the cumulative impact of runoff on larger hydrological system • Take into consideration the increased runoff intensity caused by climate change impacts 	<ul style="list-style-type: none"> • Implementation of storm water management plan linked to road network • Take into consideration the cumulative impact of runoff on larger hydrological system • Take into consideration the increased runoff intensity caused by climate change impacts 	<ul style="list-style-type: none"> • Implementation of storm water management plan linked to road network • Take into consideration the cumulative impact of runoff on larger hydrological system • Take into consideration the increased runoff intensity caused by climate change impacts
Agricultural potential	Impact:	<ul style="list-style-type: none"> • Possible development on high-potential agricultural soils with irrigation potential. • Possible indiscriminate use of land with high-potential agricultural soils 	<ul style="list-style-type: none"> • Possible indiscriminate use of land with high-potential agricultural soils 	<ul style="list-style-type: none"> • Possible indiscriminate use of land with high-potential agricultural soils 	<ul style="list-style-type: none"> • Possible indiscriminate use of land with high-potential agricultural soils

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Element	Impact/ Mitigation	Prieska Region	Marydale Region	Niekerkshoop Region	Copperton Region
	Mitigation:	<ul style="list-style-type: none"> Consider smallholding layouts on high-potential agricultural soils to enable urban agricultural practices 	<ul style="list-style-type: none"> Consider and enforce the appropriate use of high-potential agricultural soils 	<ul style="list-style-type: none"> Consider and enforce the appropriate use of high-potential agricultural soils 	<ul style="list-style-type: none"> Consider and enforce the appropriate use of high-potential agricultural soils
Geotechnical	Impact: Mitigation:	<ul style="list-style-type: none"> No anticipated impact Subject to detailed geotechnical investigation during township establishment 	<ul style="list-style-type: none"> No anticipated impact Subject to detailed geotechnical investigation during township establishment 	<ul style="list-style-type: none"> No anticipated impact Subject to detailed geotechnical investigation during township establishment 	<ul style="list-style-type: none"> No anticipated impact Not applicable
Municipal Services Infrastructure (water, sewer and electrical)	Impact: Mitigation:	<ul style="list-style-type: none"> Increased strain on wastewater treatment works capacity Increased strain on water reservoir capacity Increased strain on electrical substation capacity Plan for sufficient wastewater treatment works capacity to cater for settlement expansion Prevent sewer effluent spillage into the hydrological system Plan for sufficient water reservoir capacity to enable settlement expansion Plan for sufficient electrical substation capacity to enable settlement expansion 	<ul style="list-style-type: none"> Increased strain on wastewater treatment works capacity Increased strain on water reservoir capacity Increased strain on electrical substation capacity Plan for sufficient wastewater treatment works capacity to cater for settlement densification Prevent sewer effluent spillage into the hydrological system Plan for sufficient water reservoir capacity to enable settlement densification Plan for sufficient electrical substation capacity to enable settlement densification 	<ul style="list-style-type: none"> Increased strain on wastewater treatment works capacity Increased strain on water reservoir capacity Increased strain on electrical substation capacity Plan for sufficient wastewater treatment works capacity to cater for settlement densification Prevent sewer effluent spillage into the hydrological system Plan for sufficient water reservoir capacity to enable settlement densification Plan for sufficient electrical substation capacity to enable settlement densification 	<ul style="list-style-type: none"> No anticipated impact Not applicable
Solid waste	Impact:	<ul style="list-style-type: none"> Increased solid waste due to settlement expansion 	<ul style="list-style-type: none"> Increased solid waste due to settlement densification of established areas 	<ul style="list-style-type: none"> Increased solid waste due to settlement densification of established areas 	<ul style="list-style-type: none"> No anticipated impact

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Element	Impact/ Mitigation	Prieska Region	Marydale Region	Niekerkshoop Region	Copperton Region
	Mitigation:	<ul style="list-style-type: none"> Increased solid waste due to new industrial development Provision of sufficient airspace on existing and planned landfill sites Encourage recycling of waste streams at source to reduce solid waste volumes Provide a landfill site and airspace at the site for possible hazardous waste streams from industrial areas 	<ul style="list-style-type: none"> Provision of sufficient airspace on existing and planned landfill sites Encourage recycling of waste streams at source to reduce solid waste volumes 	<ul style="list-style-type: none"> Provision of sufficient airspace on existing and planned landfill sites Encourage recycling of waste streams at source to reduce solid waste volumes 	<ul style="list-style-type: none"> Not applicable
Roads and storm water	Impact:	<ul style="list-style-type: none"> Significant expansion of township street network and associated increase in storm water runoff Tarring of gravel roads in township areas will increase runoff volumes 	<ul style="list-style-type: none"> Tarring of gravel roads in township areas will increase runoff volumes 	<ul style="list-style-type: none"> Tarring of gravel roads in township areas will increase runoff volumes 	<ul style="list-style-type: none"> No anticipated impact
	Mitigation:	<ul style="list-style-type: none"> Construction of storm water infrastructure linked to the street network expansion Improvement of existing storm water network where necessary Tarring gravel roads to improve storm water management 	<ul style="list-style-type: none"> Tarring gravel roads to improve storm water management 	<ul style="list-style-type: none"> Tarring gravel roads to improve storm water management 	<ul style="list-style-type: none"> Not applicable
Social facilities	Impact:	<ul style="list-style-type: none"> Enough schools, but needs other types of social facilities, such as an emergency service centre 	<ul style="list-style-type: none"> No anticipated impact 	<ul style="list-style-type: none"> No anticipated impact 	<ul style="list-style-type: none"> No anticipated impact

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Element	Impact/ Mitigation	Prieska Region	Marydale Region	Niekerkshoop Region	Copperton Region
	Mitigation:	<ul style="list-style-type: none"> Facilitate the development of lacking social facilities through consultation with relevant provincial government bodies 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable
Movement	Impact:	<ul style="list-style-type: none"> Reduction of walkability due to the expansion of the town periphery 	<ul style="list-style-type: none"> No anticipated impact 	<ul style="list-style-type: none"> No anticipated impact 	<ul style="list-style-type: none"> No anticipated impact
	Mitigation:	<ul style="list-style-type: none"> Encourage the design and development of a walkable town to maintain walking as the primary form of movement 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable 	<ul style="list-style-type: none"> Not applicable

Source: Urban Dynamics Gauteng, 2019

As can be derived from Table 35, the proposed expansion of Prieska should have an impact on the hydrological system by increasing surface water runoff. The municipal services network (sewer, water and electrical) will also require upgrading and/or expansion to cater for the expected growth of Prieska. This is in view of the fact that the existing municipal services infrastructure network can easily be overburdened. The proper management of solid waste and the use of recycling will also be a requirement for sustainable development in Prieska, as to a lesser extent in Marydale and Niekerkshoop.

The geotechnical conditions are not considered to have a significant impact on development or settlement expansion within Siyathemba. Of greater concern is the continued expansion of Prieska on its periphery to the point that it is no longer a walkable town. Being walkable is one of the primary characteristics of a rural town and must be maintained at all cost. Converting to a private vehicle-oriented settlement structure has significant impacts on the environment, especially the emission of greenhouse gasses.

All-in-all, mitigating the impacts of development and settlement expansion in Siyathemba, and in particular in a town such as Prieska, largely depends on the proper and efficient management of development and settlement expansion. This can be done by adhering to the guidelines of the Siyathemba SDF and through the proactive development of municipal services infrastructure to serve the future development needs of settlements in Siyathemba.

5.2. INFRASTRUCTURE

Infrastructure development forms of backbone of spatial development, simply because infrastructure development provides the necessary access, capacity and opportunities for spatial development. It is therefore essential that infrastructure development be addressed in relation to the spatial development proposals made for Siyathemba.

5.2.1. TRANSPORTATION

Developing and maintaining Siyathemba's transportation infrastructure is dealt with in terms of the road network, regional public transportation, non-motorised transport, the freight rail network, and airport infrastructure.

5.2.1.1. Road Network Classification

The South African Road Classification and Access Management Manual is an official requirement for National, Provincial and Municipal Authorities to implement. The South African Road Classification and Access Management Manual deals with 2 related issues: functional classification and access management:

a. Functional Classification

According to the South African Road Classification and Access Management Manual, it is not possible for a road to efficiently perform more than one function at a time. It must either function as a mobility road or as an access street. Mobility roads give priority to long distance, high-speed private vehicle, bus and truck movements. They typically consist of strategic through routes and arterials. Access streets give priority to vehicular access, pedestrians and parking. They are the short distance, low speed collector streets.

b. Access Management

According to the South African Road Classification and Access Management Manual, access management on mobility roads is totally different from access management on access streets. On mobility roads, access management requires

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limiting access and physically separating pedestrian and vehicle flows. On access streets, access is permitted and even encouraged, allowing parking, loading and providing for regular pedestrian crossings.

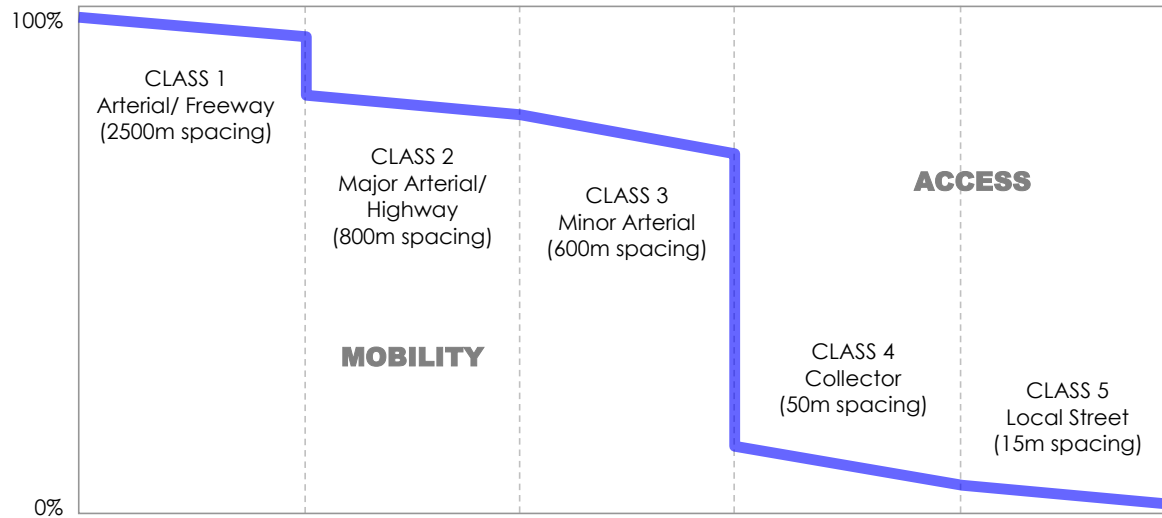


DIAGRAM 28: ROAD CLASSIFICATION AND ACCESS MANAGEMENT

Diagram 28 illustrates the relationship between the functional classification of the road network and access management. The functional classification of the road network classifies roads according to the road's level of mobility or accessibility. It does so by classifying each road within one of five road classes (Class 1 to Class 5 roads). For example, freeways are considered Class 1 roads and collector roads are considered class 4 roads. The spacing of intersections along each of the roads within these road classes are allowed according to the classification of the road. The spacing of intersections have a direct bearing on land use development, because many land uses require access to an intersection to function.

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5.2.1.2. Road Network Development

Because Siyathemba is a rural area, it does not have an intricate existing or planned freeway and distributor road network as one would find in metropolitan areas. However, it does have a number of existing roads that provide the necessary access the municipal area requires. On the whole, this existing road network is considered to be sufficient to serve its existing and future access needs of Siyathemba. The primary roads of this road network links and provide access to all the prominent land uses within the Municipal area. For example, the R387 provides direct access to the Copperton airfield, the Copperton mine and solar plant, and the Alkantpan military testing range. The existing road network also links the remote rural towns in Siyathemba to Prieska, the primary settlement in Siyathemba. The R386 that links Niekerkshoop to Prieska and the N10 that links Marydale to Prieska.

TABLE 36: ROAD HIERARCHY AND DESIGN

Road Type	Road Classification	Purpose	Design	Intersection Spacing	Responsibility
Freeway	Class 1	Links cities and provinces	Single to dual carriageway with level intersections and grade separating interchanges	2500m	National Government
Arterial	Class 2-3	Links towns	Single to dual carriageway with level intersections	800m outside metropolitan areas	Provincial Government
Collector	Class 4	Links suburbs within towns with town centre	Single carriageway with level intersections	50m	Local Municipality
Local street	Class 5	Links land uses	Single carriageway with level intersections	Determined by site layout	Local Municipality

Source: Urban Dynamics Gauteng, 2019

The proposed hierarchy and design of the Siyathemba road network is set out in Table 36. Siyathemba is not responsible for the design and maintenance of the Class 1 to 3 road network, which includes the N10 freeway the R387, and the R386. These roads are the responsibility of national and provincial government. These governmental bodies have basic design plans for the freeways and arterials traversing Siyathemba. Access to these roads from towns and farms in Siyathemba is enforced by the national and provincial government, depending who is responsible for the particular road.

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The Siyathemba Local Municipality proposed the development of a Class 2 road linking Prieska to Niekerkshoop to Griekwastad to Postmasburg to Kathu. This will allow a more direct road-freight route for mining-related freight to be transported between Kathu and Port Elisabeth. Currently, freight is transported via Kimberly, which is a significant detour. The proposed Kathu to Prieska road will connect to the N10 freeway, which in turn links to Port Elisabeth. Developing this route will create a significant intersection at Prieska, which will support the development of a truck stop (or transportation hub) at Prieska. In addition to the above, the Kathu to Prieska road will result in replacing the existing gravel road between Prieska and Niekerkshoop with a tar road, to the benefit of Niekerkshoop. The Siyathemba SDF supports the municipal initiative to develop a Class 2 road between Prieska and Kathu.

Locally, the Siyathemba Local Municipality proposes the development of a link road between Lemnertsville and the proposed mine township located north of the Prieska industrial area. This link road will in essence create an outer road connection, linking the various peripheral residential townships of Prieska to each other. It will also link these residential townships to the proposed Prieska industrial area, thus giving the residents of these townships access to the employment opportunities provided at the industrial area. This link road can be jointly developed by the mine township developer and public sector, because this road would be to the benefit of both the mine township and Prieska as a whole. Table 37 provides an estimate of the link road length.

TABLE 37: ESTIMATED TRANSPORTATION INFRASTRUCTURE REQUIREMENTS

Project	Town	Project Detail	No.
Transportation infrastructure	Prieska	Construct a link road between Lemnertsville and mine township	2,6 km
	Prieska	Construct collector road in Lemnertsville South	4,4 km
	Prieska	Construct collector road in Mine Township	2,1 km
	Prieska	Construct collector road in Agricultural Holdings	3,5 km
	Prieska	Construct collector road in Rama Rou	0,2 km
	Prieska	Construct street network in Industrial Area Expansion	3,2 km
Total			16,0 km

Source: Urban Dynamics Gauteng, 2019

The collector roads (Class 4) and internal roads (Class 5) are the responsibility of the Siyathemba Municipality. As such, the Municipality is responsible for preparing basic design plans for the development of the collector road (Class 4) network, ensure that the road reserves of these roads are protected in the layout plans of new townships, and that the maintenance of these roads are planned for and implemented. Table 37 provides an estimate of the collector roads and street required for township development within Prieska up to the year 2030. No collector roads or street are required for township development within Marydale and Niekerkshoop. It is important to note that these estimates were based on conceptual layouts of the planned and

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proposed township. Therefore, the ultimate road and street infrastructure need can differ significantly once the final, proclaimed township layouts have been drafted.

In addition to the above, an extensive rural road network (mostly dirt roads) provides adequate access to the farms within the municipal area, thus serving the agricultural industry sufficiently. The maintenance of this rural road network is of critical importance, because it is needed to maintain and to stimulate the agricultural sector, as well as tourism development on farms within the municipal area.

5.2.1.3. Public Transport and Stop Development

The Siyathemba municipal area is a dominantly rural area and therefore does not have a dedicated public transport system serving the towns of the municipality. However, the towns within the municipal (Prieska and Marydale) are linked to the N10 public transportation corridor that links a number of towns within the province to each other. The N10 public transportation corridor links Hanover, Britstown, Prieska, Marydale and Upington to each other, thus constituting an important public transportation route traversing Siyathemba.

The N10 public transportation corridor is used by mini-bus taxis and busses. The mini-bus taxis link dispersed settlements along the N10 corridor and pick up commuters travelling long distances to access services economic opportunities along the public transportation corridor. The bus services within the province also uses the N10 public transportation corridor linking Hannover, Prieska and Upington. As such, the bus services run parallel to the taxi routes.

The efficient functioning of the public transport system on the N10 public transportation corridor does not only require a well-developed public transport system, but also requires well-developed public transport stops that are strategically located along the public transport routes. Prieska is situated at the half-way mark between Hannover and Upington and is therefore ideally suited for a public transport stop. It is therefore proposed that a public transport stop be developed at Prieska, on the intersection of the N10 and the R387. This is the site earmarked for commercial uses on Figure 38. This public transport stop can be combined with a truck stop and can include a bus and taxi rank, a large filling station, accommodation facilities (e.g. a motel), restaurant facilities, and a small retail outlet. Other, indirectly related land uses, such as warehousing and vehicle and truck repair workshops, can also be included in this transport node.

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To ensure the proposed public transport stop serves the Prieska commuters, the public transport stop must be integrated through competent design with the rest of the town. Unfortunately, the proposed public transport stop is not located near the town centre, but it is more important to establish a direct link between the public transport stop and the N10 freeway, than between the public transport stop and the Prieska town centre. To overcome the distance between the proposed location of the public transport stop and the Prieska town centre, the design of the public transport stop will need to focus on pedestrian movement between the public transport stop and the Prieska town centre. This will require providing pedestrian walkway, pedestrian crossings at intersections, and tree for shade along the pedestrian route linking the proposed public transport stop to the Prieska town centre.

5.2.1.4. Non-Motorised Transport

In the recent past, there has been an over-concentration on providing infrastructure facilities for motorized transport within rural areas, thus neglecting non-motorised transport within these areas. This is despite the fact that rural areas and rural towns have historically been designed and developed as non-motorised areas. For example, rural towns have essentially been developed as small, compact, walkable settlements. Due to the lack of attention given to non-motorised transportation in rural area, a situation has arisen where the benefits of non-motorised transport, especially for the poor in rural settlements, have not been capitalized upon. In rural towns, non-motorised transport, such as bicycles can be used by the poor to access employment opportunities and social amenities. Bicycles become of specific value if users reside on the peripheral areas of larger rural towns, such as Prieska, thus requiring some form of non-motorised transport to ease the effort to access the town centre.

Advancing non-motorised modes of transport requires creating an environment that supports such modes of transport. In terms of bicycles, it requires identifying, planning and constructing bicycle lane on prominent access routes between the peripheral areas of Prieska and its town centre. Pedestrians are also very reliant on a good pedestrian environment to access employment opportunities and social amenities. Such an environment requires, for example, creating wide and direct pedestrian sidewalks within rural towns, as well as pedestrian facilities, such as seating, lighting, trees lanes and rubbish bins. Creating a safe pedestrian environment is also important to ensure their safe access of employment opportunities and social amenities.

5.2.1.5. Rail Network Development

As mentioned in the Status Quo section of this report, a freight rail line traverses the Siyathemba municipal area. This rail line links Uppington in the north to the harbours of Port Elisabeth and Ngqura in the south. The railway line passes through De Aar, which

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forms the focal point in the Northern Cape rail network. This freight rail line has an existing station at the industrial area of Prieska. This includes siding that serve the individual industrial stands located within the industrial area. Transnet Freight Rail is responsible for the freight rail network and therefore determines the expansion of the network, the operation of services on the network, and the maintenance of the network.

The Transnet freight rail network and services play a vital part in the transport of agricultural products and bulk liquids nationally. It is therefore important that the agricultural and agri-business sector within Siyathemba utilizes and increases its utilization of this freight transportation facility. In this regard, it is proposed that the rail sidings serving the Prieska industrial area be extended, to allow the industrial area to expand southwards towards the N10 freeway. This potential to extend the rail siding was the reason way it was proposed that the industrial area be extended southwards, instead to northwards onto the existing Prieska airfield site.

5.2.1.6. Copperton Airport Shuttle Link

Siyathemba currently has two airports. The first is a light aircraft airfield located near Prieska, which is accessed via the R357 that links Prieska to Kimberley. The second airfield is located at Copperton, which is accessed via the R357 that links Prieska to Copperton. The Copperton airfield is mostly used by the South African Air Force and chartered aircraft to bring in military personnel and equipment for testing to the Alkantpan Armscor military testing facility.

Good linkage between the Copperton airfield and Prieska is of utmost importance. This is to ensure that the Prieska economy, but also the economy of Siyathemba as a whole, benefits from the economic potential generated by the passengers passing through this airport. The Copperton airfield provides logistical support for miners establishing mines within the municipality, and military personnel visiting the Alkantpan military test site. Potentially, the Copperton airfield can also be used by scientists visiting the SKA, engineers involved in the construction and maintenance of renewable energy facilities within the municipality, and lecturers from the Sol Plaatje University or other universities involved in skills training in Siyathemba.

As mentioned in the status quo section of this report, most tourism facilities (accommodation, restaurants, etc.) are located within Prieska. These facilities largely cater for business tourists visiting the municipal area for business reasons or opportunities, many of which arrive via the Copperton airfield. To improve this linkage between business tourism emanating from the Copperton region and the tourism facilities found in Prieska, it will be necessary to establish a better linkage between the proposed Copperton airfield and Prieska (see Diagram 29).

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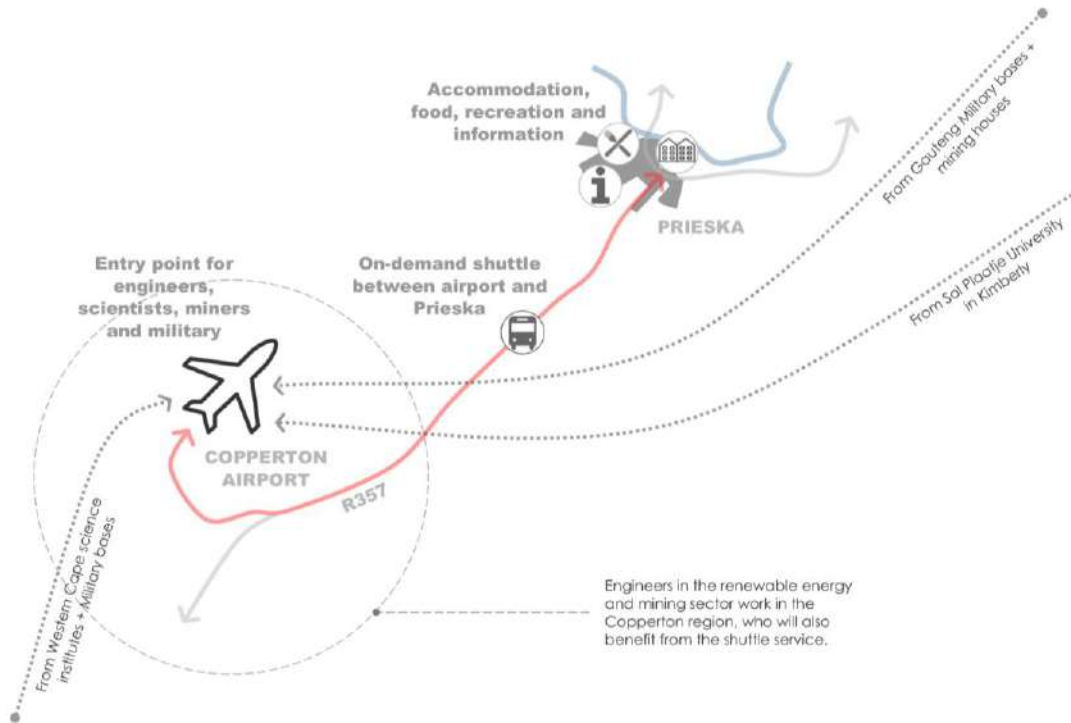


DIAGRAM 29: PROPOSED AIRPORT SHUTTLE LINK

In this regard, it is proposed that an on-demand shuttle service be established by the municipality to shuttle business tourists between the Copperton airfield and Prieska. Such a shuttle service can be operated by private companies under contract of the Municipality. Such a shuttle service will link the Copperton airfield and high-tech enterprises near Copperton (include the SKA, renewable energy enterprises, Alkantpan military testing site and possibly in future re-established copper mine) to Prieska and so

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ensure the viability of the tourism industry in Prieska. Tourist facilities, such as restaurants and guesthouse accommodation, should not be encourage at Copperton or the Copperton airfield to ensure the viability of the tourism industry in Prieska.

5.2.2. MUNICIPAL SERVICES

This study addresses the primary municipal services (water, electricity and sanitation), but it does not assess the capacity of the bulk municipal services network to accommodate the expansion and densification of rural towns. Determining capacity is therefore deemed falling outside the brief of this study. The way this study addresses the issue of bulk municipal services is to (a) promote compact settlement development to limit the length and cost of bulk infrastructure runs, (b) ensure that short-term expansion areas can connect to the existing bulk network and (c) provide an indication which areas would require bulk network infrastructure in the longer-term future to enable bulk infrastructure planning.

Although significant progress has been made in recent years regarding the provision of water, sanitation and electrical infrastructure within the municipal area, it is imperative that the existing network be upgraded and expanded to cope with the expansion and densification of rural towns within Siyathemba. Expansion of the bulk municipal service network to service the expansion of Prieska will be of particular importance. The bulk municipal service network requirements to accommodate the expansion and densification of rural towns in Siyathemba is as follows:

a. Prieska

A number of expansion areas are proposed for Prieska. The first expansion area will comprise a residential township, intended for affordable housing and supporting land uses, to be located west of the Bill Pickard Hospital. This township is already in its planning phase, including the basic planning of its water infrastructure.

The second expansion area comprises a proposed smallholding area, to be located north of Prieska and stretches up to the Orange River. This smallholdings area is intended for subsistence farming and agri-industrial purposes. Many of these smallholdings will be used communally by residents of neighbouring residential area and will therefore not be inhabited. Other smallholdings will house single households who practice subsistence farming on these smallholdings. Despite the spare population on this proposed smallholding area, a rudimentary municipal services network will need to be installed for households and agri-industrial use. The street frontage of the smallholdings will be limited to 40m in width to limit infrastructure runs.

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TABLE 38: ESTIMATED BULK INFRASTRUCTURE REQUIREMENTS

Project	Town	Project Detail	No.
Bulk water infrastructure	Prieska	Extend bulk water pipeline network into Lemnertsville South	2,1 km
	Prieska	Construct water reservoir at Lemnertsville South	1 unit
	Prieska	Extend bulk water pipeline network into Mine Township	1,4 km
	Prieska	Construct water reservoir at Mine Township	1 unit
	Prieska	Extend bulk water pipeline network into Agricultural Holdings	3,3 km
	Prieska	Construct water reservoir at Agricultural Holdings	1 unit
	Prieska	Extend bulk water pipeline network into Industrial Area Expansion	1,4 km
	Prieska	Construct water reservoir at Industrial Area Expansion	1 unit
	Marydale	Extend bulk water pipeline network into Rooidal and Rama Rou	0,6 km
Bulk sewer infrastructure	Prieska	Extend bulk sewer pipeline network into Lemnertsville South	1,4 km
	Prieska	Extension of waste water treatment plant for Lemnertsville South	1 unit
	Prieska	Extend bulk sewer pipeline network into Mine Township	1,2 km
	Prieska	Extension of waste water treatment plant for Mine Township	1 unit
	Prieska	Extend bulk sewer pipeline network into Agricultural Holdings	4,3 km
	Prieska	Extend bulk sewer pipeline network into Industrial Area Expansion	1,4 km
Bulk electricity infrastructure	Marydale	Extend bulk sewer pipeline network into Rooidal and Rama Rou	0,6 km
	Prieska	Extend bulk electrical network into Lemnertsville South	1,4 km
	Prieska	Construct substations to serve Lemnertsville South	1 unit
	Prieska	Extend bulk electrical network into Mine Township	1,2 km
	Prieska	Construct substations to serve Mine Township	1 unit
	Prieska	Extend bulk electrical network into Agricultural Holdings	4 km
	Prieska	Construct substations to serve Agricultural Holdings	1 unit
	Prieska	Extend bulk electrical network into Industrial Area Expansion	1,2 km
Prieska	Construct substations to serve Industrial Area Expansion	1 unit	
Internal water infrastructure	Marydale	Extend bulk electrical network into Rooidal and Rama Rou	0,6 km
	Prieska	Construct internal water network in Lemnertsville South	1255 stands
	Prieska	Construct internal water network in Mine Township	600 stands
	Prieska	Construct internal water network in Agricultural Holdings	40 stands
	Prieska	Construct internal water network in Industrial Area Expansion	72 stands
Internal sewer infrastructure	Marydale	Construct internal water network in Rooidal and Rama Rou	156 stands
	Prieska	Construct internal sewer network in Lemnertsville South	1255 stands
	Prieska	Construct internal sewer network in Mine Township	600 stands
	Prieska	Construct internal sewer network in Agricultural Holdings	40 stands
	Prieska	Construct internal sewer network in Industrial Area Expansion	72 stands

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Project	Town	Project Detail	No.
Internal electricity infrastructure	Marydale	Construct internal sewer network in Rooidal and Rama Rou	156 stands
	Prieska	Construct internal electrical network in Lemnertsville South	1255 stands
	Prieska	Construct internal electrical network in Mine Township	600 stands
	Prieska	Construct internal electrical network in Agricultural Holdings	40 stands
	Prieska	Construct internal electrical network in Industrial Area Expansion	72 stands
Irrigation infrastructure	Marydale	Construct internal electrical network in Rooidal and Rama Rou	156 stands
	Prieska	Construct irrigation network in Agricultural Holdings	40 ha
	Prieska	Construct irrigation pump station for Agricultural Holdings	1 unit

Source: Urban Dynamics Gauteng, 2019

A third expansion area involves the expansion of the existing Prieska industrial area. It is proposed that the industrial area be expand southwards towards the N10 freeway. This proposal includes the development of a transport hub (including a bus and taxi rank, truck stop and warehousing) on the intersection of the N10 and the R387.

b. Marydale and Niekerkshoop

Marydale and Niekerkshoop have a number of proclaimed stands that are vacant. It is proposed that these stands be developed before any new residential townships are created within these towns. Developing these stands have many benefits, one of which is the fact that they already have a municipal infrastructure network installed. It is proposed that the existing vacant stands within these towns be utilised for affordable housing, but that the stands NOT be subdivided into smaller stands. As a result, the proposed development of the existing vacant stands within Marydale and Niekerkshoop should not place a greater burden on the existing municipal infrastructure networks of these towns than it was initially designed for. Amongst other, this should alleviate the envisaged pressure on the bulk water supply to Marydale and Niekerkshoop, which is expected to become a problem within the next 15 to 18 years.

c. Copperton

The Municipality supplies bulk water to Copperton, but Alkantpan (Armscor) is responsible for the delivery of water, sanitation, and electricity services to the town and associated facilities. No settlement development or expansion is envisaged at Copperton, thus no bulk infrastructure requirements related to settlement development or expansion is envisaged in Copperton.

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Although it is necessary to plan for the future expansion of rural towns within Siyathemba, it is important that the planning of bulk municipal services infrastructure be done timely and not well in advance of planned developments. The reason for this is that many of the proposals made in this report may not materialize, which could result in wasted infrastructure planning and construction if these are done before a development initiative is secured.

Table 38 provides an estimate of the bulk water infrastructure, bulk sewer infrastructure, bulk electricity infrastructure, internal water infrastructure, internal sewer infrastructure, and internal electricity infrastructure required for township development within Prieska, Marydale and Niekerkshoop up to the year 2030. In addition, it provides an estimate of the irrigation infrastructure required to service the proposed small holdings, to be located north of Prieska. It is important to note that these estimates were based on conceptual layouts of the planned and proposed township, and no bulk infrastructure modelling was done to determine the capacities needed. Therefore, the ultimate infrastructure need can differ significantly once the final, proclaimed township layouts have been drafted.

5.3. PUBLIC REALM

Creating a sustainable town environment involves creating balanced communities in terms of employment opportunities, social amenities and recreation facilities. In other words, it involves supporting residential development with other land use types, such as schools, clinics, retail facilities, office development and public parks.

5.3.1. BUSINESS ACTIVITY

It is important that land use strategies are developed that recognize the need to stimulate economic growth and job creation within Siyathemba. These land use strategies must focus institutional support and private sector spending to achieve the aforementioned. In turn, this will create economic potential and provide opportunities for local economic development.

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5.3.1.1. Business Centre Hierarchy

Business activities should be clustered, rather than dispersed, in order to (a) stimulate the viability of these activities, (b) create strong focal points with which the surrounding communities can identify and (c) create a more ordered spatial structure. To achieve this concentration of facilities, a hierarchy of business nodes should be created within the towns of Siyathemba.

TABLE 39: PROPOSED BUSINESS NODE SIZE AND COMPOSITION

Node hierarchy	Total retail area	Total office area	Minimum trade area	Minimum access requirements	Composition
Primary business node (CBD)	30,000m ² to 50,000m ²	1,000m ² to 5,000m ²	4km	Access to a freeway and main road	A retail component of up to 50,000m ² , equaling the retail floor area of a small regional shopping centre in a metropolitan area Entertainment venues of regional significance. A number of office buildings catering for medium-scale businesses and banks
Secondary business node	5,000m ² to 10,000m ²	>1,000m ²	2km	Access to main road	A retail floor area of up to 10,000m ² , equaling the retail floor area of a neighbourhood shopping centre in a metropolitan area. Entertainment venues of local significance One or more buildings catering for small-scale businesses
Tertiary business node	1,000m ² to 5,000m ²	n/a	1km	Access to minor road or residential collector road	A retail floor area of up to 5,000m ² , equaling the retail floor area of a local shopping centre in a metropolitan area. Entertainment venues of local significance
Rural node	>1,000m ²	n/a	n/a	Access to main or minor road	A retail floor area of up to 1,000m ² , equaling the retail floor area of a local retail store in a metropolitan area.

Source: Urban Dynamics Gauteng, 2019

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The composition of each business node within the nodal hierarchy must take into account certain key variable, such as its intended function of the node; the size of the population its serves and its geographical location. Table 39 provides the proposed composition of each business node within the business node hierarchy proposed for the towns in Siyathemba.

a. Primary business node (CBD)

A primary business node is a node of municipality-wide significance and can therefore develop a strong retail, entertainment and office component. The retail component can accommodate a retail floor area of up to 50,000m², equaling the retail floor area of a small regional shopping centre in a metropolitan area. The entertainment component of regional significance, such as restaurants. This node can accommodate a fairly large office component, providing for example office space for all the major banks.

b. Secondary business node

A secondary business node can accommodate a retail floor area of up to 10,000m², equaling the retail floor area of a neighbourhood shopping centre in a metropolitan area. In addition, a secondary business node can accommodate local entertainment venues and one or more buildings catering for small-scale businesses.

c. Tertiary business node

A tertiary business node can accommodate a retail floor area of up to 5,000m², equaling the retail floor area of a local shopping centre in a metropolitan area. In addition, a tertiary business node can accommodate entertainment venues of local significance.

d. Rural business node

A rural business node is a node that is found within rural areas and is aimed at selling agricultural products to farm workers and tourists. These rural business nodes are usually found on the intersections of rural and main roads and typically comprise farms stalls and convenient stores. A rural business node can accommodate a retail floor area of up to 1,000m², equaling the retail floor area of a local retail store in a metropolitan area.

5.3.1.2. Business Node Development

To ensure the viability of proposed business activities within Siyathemba, it is important to (a) link the business floor areas proposed for Siyathemba to the Land Use Budget, and (b) develop a retail hierarchy to ensure the orderly and logical development of retail facilities within Siyathemba. The existing and proposed business nodes for the towns in Siyathemba area depicted on Figures 38 to 40. The locations of the business nodes proposed for Siyathemba were guided by the following principles:

- The business nodes aimed to strengthen the existing business node structure, thus aimed to latch onto existing facilities.
- Where possible, a node was located in an area with enough vacant land for its further development.
- Business nodes were placed in locations that make them pedestrian-accessible to the communities they intend to serve.

Table 40 provides a list of the business nodes that are proposed within the towns of Siyathemba. The Prieska CBD is the only primary business node within Siyathemba. Prieska has 3 tertiary business nodes and 2 additional tertiary business nodes that are proposed for Prieska to cater for future residential expansion. Marydale and Niekerkshoop each have 1 secondary business node and each have 2 tertiary business nodes.

Retail and office space have been allocated to each of the existing and proposed nodes in accordance with the needs of the surrounding town environment, the nature of its potential consumer base, and the location characteristics of each node. Based on these nodal characteristics, the following need to be mentioned regarding business nodes:

a. Strengthen the Prieska primary node

The Prieska CBD or primary business node within Siyathemba. To strengthen its role as a service centre to the surrounding agricultural industry, it is proposed that this node be strengthened by an additional 11,100m² of retail space and 1,100m² of office space to this node by 2030. A significant decentralization of retail and office space to secondary or tertiary nodes must be avoided at all costs to prevent the weakening or decline of the Prieska CBD. A retail centre is being planned along on the corner of Loots Boulevard and Arbeck Street. A retail centre in this position is located within the CBD boundary and should therefore be supported. It is estimated that this centre could potentially be 10,000m² in size. The retail allocation for the Prieska CBD is sufficient to enable this retail centre to be developed.

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TABLE 40: PROPOSED RETAIL AND OFFICE FLOOR AREA ALLOCATION (2019-2030)

Node	Existing 2019		Allocation 2019-2025		Allocation 2025-2030		Total 2019-2030	
	ha	m ²	ha	m ²	ha	m ²	ha	m ²
Prieska Primary Node	1,4	5720	2,3	9344	0,7	2843	4,5	17907
Retail (70% of total)	1,4	5720	2,1	8389	0,7	2708	4,2	16817
Private Office (70% of total)	0,0	0	0,2	955	0,0	135	0,3	1091
Prieska Tertiary Nodes (5 nodes)	9,8	39020	1,4	5498	0,7	2641	11,8	47159
Retail (30% of total)	9,4	37400	1,2	4726	0,6	2515	11,2	44641
Private Office (30% of total)	0,4	1620	0,2	772	0,0	126	0,6	2518
Marydale Secondary Node	1,2	4720	0,0	0	0,0	0	1,2	4720
Retail (0% of total)	1,1	4240	0,0	0	0,0	0	1,1	4240
Private Office (0% of total)	0,1	480	0,0	0	0,0	0	0,1	480
Marydale Tertiary Nodes (3 nodes)	1,1	4400	0,0	0	0,0	458	1,1	4858
Retail (100% of total)	1,1	4400	0,0	0	0,0	436	1,1	4836
Private Office (100% of total)	0,0	0	0,0	0	0,0	22	0,0	22
Niekerkshoop Secondary Node	0,9	3480	0,4	1644	0,1	320	1,4	5444
Retail (100% of total)	0,9	3480	0,3	1354	0,1	305	1,3	5139
Private Office (100% of total)	0,0	0	0,1	290	0,0	15	0,1	305
Niekerkshoop Tertiary Nodes (2 nodes)	0,2	960	0,0	0	0,0	0	0,2	960
Retail (0% of total)	0,2	960	0,0	0	0,0	0	0,2	960
Private Office (0% of total)	0,0	0	0,0	0	0,0	0	0,0	0
Total	14,6	58300	4,1	16486	1,6	6262	20,3	81048
Retail	14,1	56200	3,6	14469	1,5	5964	19,2	76633
Private Office	0,5	2100	0,5	2017	0,1	298	1,1	4416

Source: Urban Dynamics Gauteng, 2019

b. Develop tertiary node at Marydale entrance

An opportunity exists to develop a tertiary business node at the entrance to Marydale from the N10 freeway. This tertiary node will serve both Rama Rou as a local convenience centre and capture consumer traffic passing the node on the N10 freeway. The retail potential in Marydale is small, with approximately 400m² of retail space that can be added to the proposed N10 freeway tertiary node by 2030. However, more retail can be added to this node than is allocated, taking into account the potential external consumer traffic that can be captured by this node from the N10 freeway. It is recommended that the granting of additional retail space to the proposed N10 freeway tertiary node be done based on the findings of a detailed retail study that accompanies applications for retail rights within this node.

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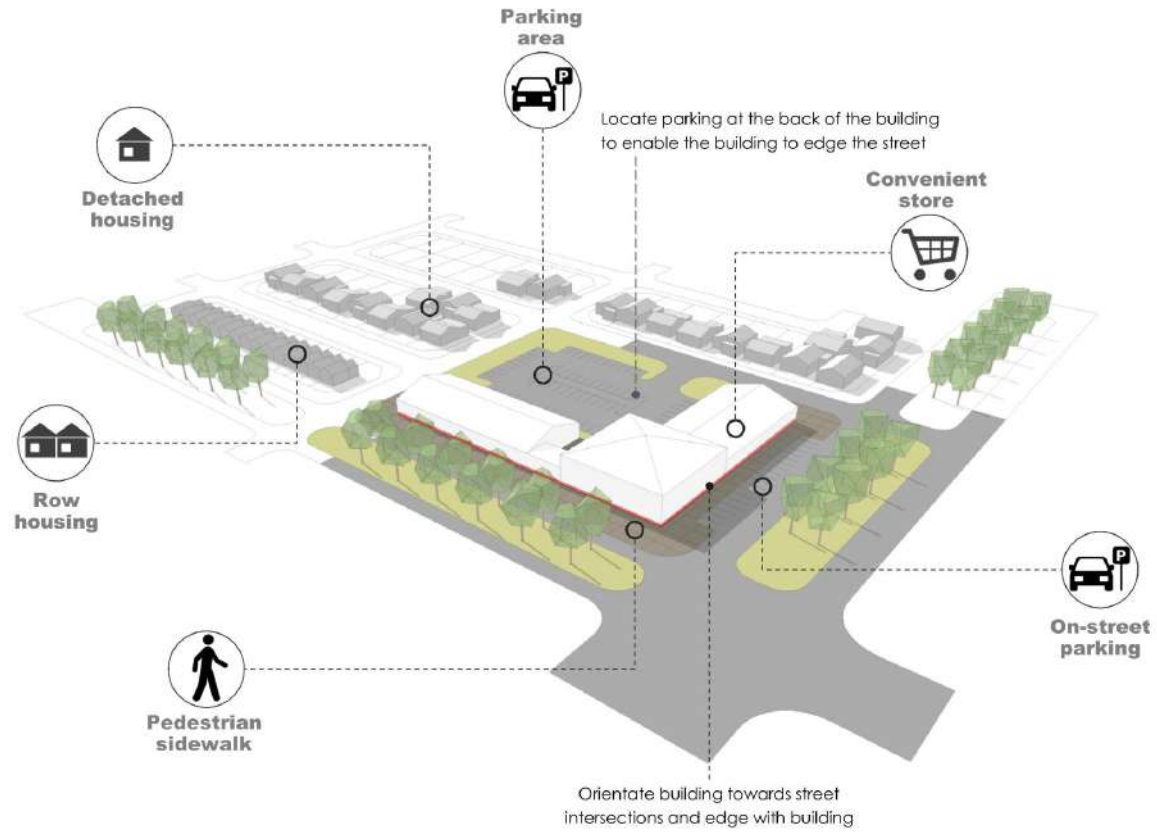


DIAGRAM 30: BUSINESS NODE DESIGN

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c. Strengthen the secondary node in Niekerkshoop

The secondary node in Niekerkshoop serve as central area within the town. However, this node is weakly defined and therefore need strengthening. It is therefore proposed that this node be significantly strengthened by adding additional retail and office space to this node. An additional 1,700m² of retail space and 1,100m² of office space has been allocated to the Niekerkshoop secondary node for the strengthening of this node.

d. Develop new tertiary nodes in Prieska

As was mentioned, Prieska has a primary business node and three tertiary business nodes. The tertiary nodes have been developed to serve the peripheral residential area of Prieska, because some of these nodes are located up to 2km of the Prieska CBD. These tertiary nodes provide day-to-day goods and services to these residential areas, therefore not compete with the Prieska CBD or primary node, which provides higher-order goods and services the local and municipal communities. Taking the above into account, two new residential areas are proposed for the expansion of Prieska to accommodate its growing population. The location of these new residential areas (see Figure 38) may require that these new residential areas also contain a tertiary business node each. To this end, a total of 7,200m² of retail space and 1,000m² of office space has been allocated for these new tertiary nodes within Prieska. It is important that this retail and office allocation not be exceeded to prevent these nodes becoming competing nodes to the Prieska CBD or primary node

In addition to the above, it is recommended that the granting of additional retail space within Siyathemba also be done based on the recommendations of a detailed retail study that accompanies each individual application for retail rights within Siyathemba. In turn, such a detailed retail study must be conducted in a manner that adheres to the objectives and guidelines set out in this Siyathemba SDF, especially with regard to the distribution of retail space between the various nodes. In other words, a single node should not be allocated a disproportionate amount of retail space that would be to the detriment of other nodes.

It is important to design and develop the existing and proposed business nodes in a manner that leads to the integration of these business nodes with the surrounding residential neighbourhood that it serves. This implies developing an 'open' land use arrangement, which allows pedestrians to conveniently access walk within the business node. To enable this, the business node layout and buildings will need to be oriented towards street intersections (see Diagram 30). The building will need to edge (frame) the streets and parking will need to be located at the back of the buildings. If developed in this way, these business nodes will enhance the rural town character and spatial legibility of business nodes within Siyathemba.

5.3.1.3. Activity Street Development

From the onset, it is necessary to point out that a nodal structure, as set out above, is the desirable spatial pattern for the concentration of business activity. This is because it concentrates business activity in a pedestrian-oriented spatial patterns. Despite this, there is usually a spatial tendency in rural towns to develop linear streets of land along the main roads passing through the town. Loots Boulevard in Prieska is a case in point. However, such linear developments are generally considered to be a less desirable spatial form, because it tends to be vehicle oriented and therefore is difficult to pedestrianize. Thus to deal with the reality of strip development in the rural towns of Siyathemba, it is necessary to avoid having to fight the pressure for strip development, but rather opt to provide principles for the development of these strips in a manner that is still spatially acceptable. The Siyathemba SDF defines an activity street as follows:

- It is found along the main street passing through a business node and town
- It usually contains the primary intersection within the business node and town
- It is distinguishable from the business node in terms of land use and function
- Importantly, it does not extend beyond the boundaries of the business node

As mentioned above, activity streets are distinguishable from business nodes in terms of land use and function and always form a sub-component of a business node. In terms of land use, business nodes tend to have retail, community and office uses, while activity streets tend to have retail, motor trade, and commercial uses. Business nodes tends to be more pedestrian-oriented, while activity streets tend to be more vehicle oriented. A primary advantage of activity streets is that it has the potential to strengthen and support business nodes. In other words, activity streets have a functional relationship within a business node.

An activity street should help attract users to the business node, but the business nodes should be the destination of the users. The Siyathemba SDF has identified a number of activity streets within Prieska, Marydale and Niekerkshoop. The localities of these activity streets are depicted on Figures 38-40. Guidelines for the development of activity streets include the following:

Principle 1: Create complete streets

Complete streets are streets that cater for everyone and all types of mobility, including pedestrians, bicyclists, motorists and transit. Such streets are designed for safe use by all users of all ages and abilities. Activity streets must therefore be designed to make it easy for pedestrians to cross the street, walk to the shop, and cycle to work. A complete street can include sidewalks, bike lanes, crossings, median islands, curb extensions, narrower travel lanes, and roundabouts.

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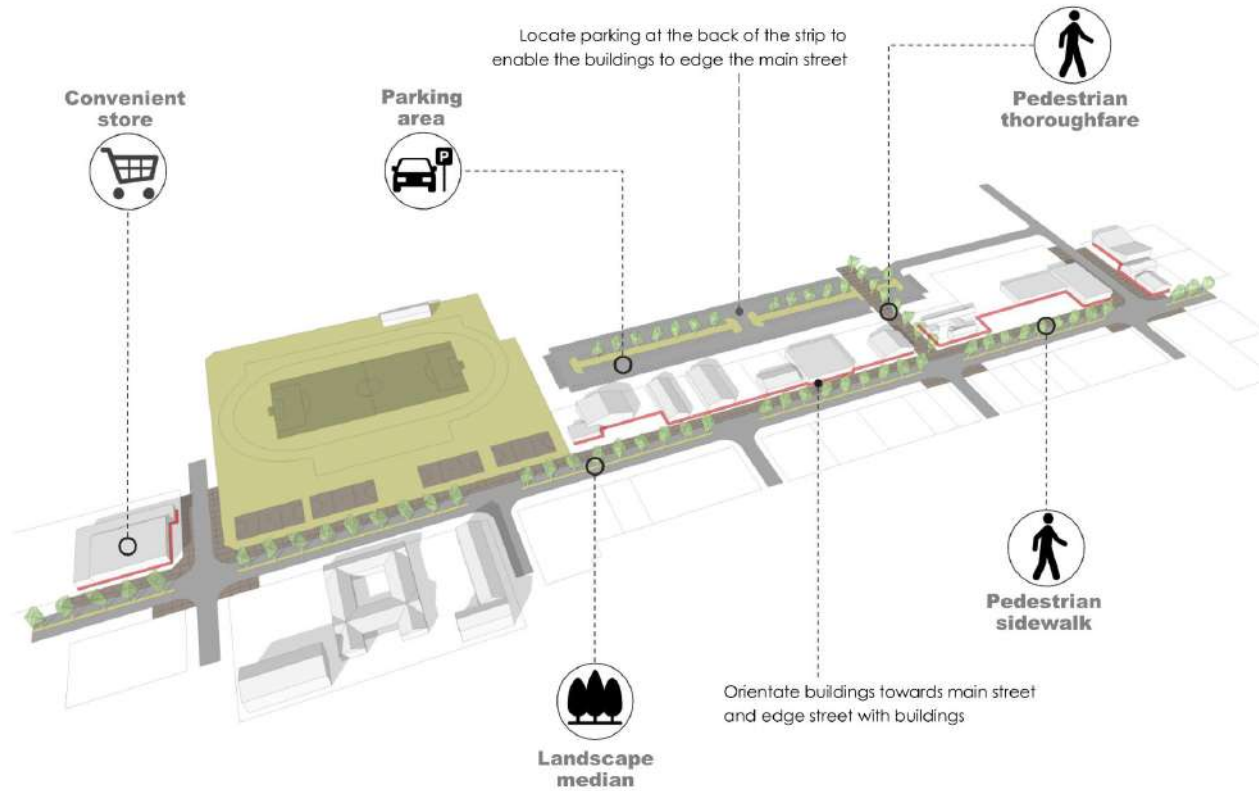


DIAGRAM 31: ACTIVITY STREET DESIGN

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Principle 2: Define and encourage active edges

Activity street should be designed based on the edge-block principle, where buildings are placed close to the stand boundary (typically 0-2m from the boundary). The buildings will need to be oriented towards the street and will need to edge (frame) the streets. The bulk of the parking will need to be located at the back of the buildings, with limited parking located in front of the buildings on the activity street. If developed in this way, the activity street will enhance the rural town character and develop an 'open' land use arrangement that allows pedestrians to conveniently access the business located along the activity street.

Principle 3: Promote activity street as public spaces

Although this principle forms part of the complete street principle, it needs to be emphasized that activity streets need to be designed as public spaces so that they can be used as public spaces. This requires enhancing pedestrian walkways with landscaping, providing street furniture, allowing residential buildings to overlook streets, and connecting the activity streets with the rest of the business node

Principle 4: Use coherent and location-relevant buildings designs

A coherent building designs styles should be used for the buildings located along the activity street. These should be coherent in building layout and façade designs. In addition, the building style used for the buildings along the activity street needs to reflect the rural region within which it is located and reinforce the architectural history of the town centre.

It is important to design and develop activity streets in a manner that enhances the business node within which it is located. This involves enhancing the rural character of the activity street through building design and positioning along the activity street and enhancing pedestrian access along the activity street. To enable this, the buildings along the activity street will need to be oriented towards the main street and its intersections (see Diagram 31). The buildings situated along the activity street will need to edge (frame) the streets and parking will need to be located at the back of the activity street. If developed in this way, the activity streets will enhance the rural town character and spatial legibility of business nodes within Siyathemba.

5.3.2. SOCIAL FACILITIES

Residential development requires the support of other land use types, such as schools and clinics, in order to create complete and sustainable residential environments. Such social facilities must be located in such a way that they are accessible to the residential communities they serve.

5.3.2.1. Social Facility and Settlement Hierarchy

The location of social facilities must be done in accordance with the hierarchy of the social facility and the size of the town in which it is to be located. In other words, a town must contain social facilities that are suited to the function of that particular town within the municipality. The proposed composition of social facilities within each town in Siyathemba is depicted in Table 41 and should serve as a guideline for the planning and provision of social facilities within these towns.

a. Primary town

A primary town, which is only represented by Prieska, serves the municipal area serving, fulfilling a role as service centre to the surrounding agricultural industry, and should therefore contain the municipality's higher-order social services. With regard to educational facilities, the primary town should accommodate the municipality's tertiary educational facilities, as well as a number of primary and secondary schools. With regard to health care, the primary town should contain the municipality's hospital, as well as other higher-order and specialized medical facilities. Other social facilities to be provided in such a town include a large community hall, police station and emergency service centre. These facilities are all highest-order facilities when compared to similar facilities provided in lower-order towns.

b. Secondary town

A secondary town should serve the town residents and the immediate surrounding rural area with social services. A secondary town should at least comprise a secondary school, primary schools, a clinic, NGO centre a community hall and a police station. These facilities must be developed at a smaller scale than those provided in a primary town.

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TABLE 41: SOCIAL FACILITY COMPOSITION

Hierarchy	Town Example	Service Area Radius	Proposed composition
Primary town	Prieska	4km	Tertiary education facility Secondary schools Primary schools Hospital Post office Library Community hall Police station Emergency service centre
Secondary town	Marydale and Niekerkshoop	2km	Secondary school Primary schools Clinic NGO centre Community hall Police station
Rural area	Rural area	n/a	Primary schools Clinic

Source: Urban Dynamics Gauteng, 2019

c. Rural area

Due to the distances involved in the rural areas within Siyathemba, some low-order social services can be provided within these rural areas to overcome the distances required to access these facilities. Providing a primary school and a clinic in rural areas would be facilities that are suited for placement in rural areas.

5.3.2.2. Social Facility Development

The Land Use Budget (Section 3) calculated the number of social facilities required within Siyathemba to support the envisaged population increase within Siyathemba. A summary of this calculation is presented in Table 42. As depicted by this Table,

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Siyathemba has an extensive social facility infrastructure network, thus requiring very little additional social facilities. This is the case, even if the future population growth of Siyathemba up to 2030 is taken into account.

TABLE 42: PROPOSED SOCIAL FACILITY ALLOCATION

Hierarchy	Primary School	Secondary School	Tertiary Institution	Clinic	Hospital	NGO Centre	Library	Post Office	Police Station	Emergency Service Centre
Prieska Primary Town	5	2	1	2	1	2	2	1	1	1
Existing 2019	5	2	0	2	1	1	2	1	1	0
Allocation 2019-2025	0	0	1	0	0	1	0	0	0	1
Allocation 2025-2030	0	0	0	0	0	0	0	0	0	0
Marydale Secondary Town	1	1	0	1	0	1	1	0	1	0
Existing 2019	1	1	0	1	0	0	1	0	1	0
Allocation 2019-2025	0	0	0	0	0	1	0	0	0	0
Allocation 2025-2030	0	0	0	0	0	0	0	0	0	0
Niekerkshoop Secondary Town	1	0	0	1	0	1	1	0	1	0
Existing 2019	1	0	0	1	0	0	1	0	1	0
Allocation 2019-2025	0	0	0	0	0	1	0	0	0	0
Allocation 2025-2030	0	0	0	0	0	0	0	0	0	0
Rural Area	2	1	0	0	0	0	0	0	0	0
Existing 2019	2	1	0	0	0	0	0	0	0	0
Allocation 2019-2025	0	0	0	0	0	0	0	0	0	0
Allocation 2025-2030	0	0	0	0	0	0	0	0	0	0

Source: Urban Dynamics Gauteng, 2019

Prieska can accommodate a limited number of additional social facilities. These facilities include a tertiary education facility (no larger than a satellite campus), and an emergency service centre. These facilities are all aimed at strengthening the primary service centre role of Prieska within Siyathemba. The proposed agri-industrial and renewable energy skills training centre (proposed in a following section of this report) is a suitable tertiary educational facility that can be developed in Prieska, and can function as a satellite campus of the Sol Plaatje University or other tertiary educational institution. This skills training centre will be a district facility, thus providing skills training to the Pixley Ka Seme District population. Neither Prieska, nor Marydale and Niekerkshoop, require additional primary or secondary schools to cater for the existing or future population of Siyathemba. However, an NGO (Non-Governmental Organization) centre can be developed in Marydale and Niekerkshoop respectively. Both these towns rely heavily on NGO assistance, such as disability care, and will therefore benefit from such a facility.

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When developing social facilities in a town, such as the proposed tertiary educational facility in Prieska, it is important to place these facilities in central locations within the town to ensure these facilities are within walking distance of neighbouring residential areas. In doing so, these facilities can become the focal points around which a town's residential neighbourhoods can be developed.

In order to develop the social infrastructure required within Siyathemba, the municipality will have to work in close relationship with the provincial governmental bodies concerned with the development and management of the social facilities, such as the Gauteng Department of Health and Welfare, and the Department of Education. The responsibility of Siyathemba will be to ensure that the necessary stands for social facilities are provided and that these stands are strategically placed within the towns. The construction and management of the relevant buildings will be the responsibility of the provincial government departments concerned.

5.3.3. OPEN SPACE AND RECREATION

Open space and recreation within Siyathemba can be divided into 2 categories: passive and active open space. Passive open space consists of land that is unsuitable or undesirable for settlement development due to topographical, ecological constraints or for flood protection. Active open space involves the recreational component of the open space system. It provides parks and sport facilities throughout a town for use by residents, local sports clubs and schools. Passive open space was dealt with in a previous section of this report and active open space is dealt with below.

5.3.3.1. Active Open Space Development Principles

Formulating principles for the development of active open spaces can help ensure that standards of quality and usefulness are achieved in the planning, design and management of such spaces. This is especially important in the case of Siyathemba, because the municipality is located within an arid region, thus making the maintenance (irrigation) of these active open spaces problematic. The following development principles need to be taken into account when developing active open spaces:

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a. Linking a use to open space

Active open spaces (or parks) that do not have a deliberate use linked to them are often not of value to a local community and often become dumping ground as a consequence. It is therefore imperative that a use be linked to an active open space to ensure the utilization of these spaces. One of the best ways of utilizing active open spaces within residential neighbourhoods is to develop sports facilities on these spaces.

b. Type of facilities provided

When planning active open spaces, it is important that appropriate recreation (or sport) facilities are provided. Often recreational facilities are provided that do not fulfill the needs of the community, usually because they are not the preferred recreational types. To prevent the provision of inappropriate recreational facilities, the recreational preferences of a local community must be established before planning and developing a recreational facility.

c. Maintenance of active open spaces

An important factor in determining the success of active open spaces is the maintenance thereof. Past experience has proved that active open spaces that are not maintained often lose their practical value to local residents. Therefore, it can be argued that larger and fewer active open spaces that are maintained are more useful than smaller, more numerous active open spaces that are not. This is especially true in Siyathemba, where it is difficult to irrigate large tracts of open space in its arid environment.

d. Accessibility of active open spaces

When locating active open spaces, it is important to ensure that these spaces are accessible to the community it serves. This implies locating an active open space within walking distance of most of the people living within a community. Locating an active open space centrally will also ensure the continued presence of people in the vicinity of such a facility, which would protect such space from vandalism.

e. Settlement form and function

In order to enhance the focal function of active open spaces, it is imperative that attention is given to the design of these active open spaces. For example, the planting of trees along the periphery of an active open space will enhance the

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identity and attractiveness of this space. If active open spaces are integrated through design with surrounding facilities, it will enhance the usage of these spaces. For example, placing an active open space next to or close to a primary school will allow the space to supplement school sport facilities.

5.3.3.2. Active Open Space Hierarchy

The limited funds available for the construction of active open spaces necessitate a critical appraisal of the generally accepted standards and norms applicable to active open space development. An approach based on practical considerations rather than on accepted norms should be followed. One of the most practical ways of utilizing open spaces is to use these spaces as sport or recreation facilities. This connects a deliberate use to open spaces, ensuring they serve a specific community need.

Taking into account the above, a 3-tier recreational town hierarchy is proposed for Siyathemba. The composition of these recreational towns should serve as a guideline for the design and development of active open spaces within Siyathemba, but can differ depending on the recreational preferences of local communities. The proposed recreational hierarchy and its composition are depicted in Table 43.

a. Primary town

A primary town (represented by Prieska) should provide recreation facilities that are significant on a municipal level, usually comprising a small stadium that would be the main recreational facility of the town. In addition to the stadium, a primary town should contain other highest-order recreations facilities, such as practice rugby or soccer fields, a cricket oval, tennis courts, a swimming pool and a multi-purpose indoor sports centre. Such an active open space must also include a parking area and must be accessible from most of the residential neighbourhoods within the town. Such a facility can be the base of the local sports club.

b. Secondary town

A secondary town should provide sport facilities that serves the town residents and the immediate surrounding rural area. Typically, sports facilities to provide on such a town include a rugby or soccer field and athletic track, practice rugby or soccer fields, and tennis courts. The rugby or soccer fields can double as a cricket oval. Such a recreational facility can serve as the base for the local sports clubs.

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TABLE 43: ACTIVE OPEN SPACE COMPOSITION

Hierarchy	Town Example	Service Area Radius	Proposed composition
Primary town	Prieska	4km	Rugby or soccer and athletic stadium Practice rugby or soccer fields Cricket oval Tennis courts Netball courts Swimming pool
Secondary town	Marydale and Niekerkshoop	2km	Multi-purpose indoor sport centre Rugby or soccer field and athletic track Practice rugby or soccer fields Tennis courts
Rural area	Rural area	n/a	Rugby or soccer field as required Tennis courts as required

Source: Urban Dynamics Gauteng, 2019

c. Rural area

Due to the distances involved in the rural areas within Siyathemba, some recreation facilities can be provided within these rural areas to overcome the distances required to access these facilities. These can include a rugby field, soccer field, and tennis courts as required. These recreational facilities can supplement the recreation facilities of rural schools and should therefore be located in close proximity of such schools

5.3.3.3. Active Open Space Development

The Land Use Budget (Section 3) calculated the open space required to support the envisaged population increase within Siyathemba. A summary of this calculation is presented in Table 44. As depicted by this Table, Siyathemba has more active and passive open space than it requires, even if the future population growth of Siyathemba up to 2030 is taken into account. The only area requiring some open space is Niekerkshoop, which requires approximately 3ha of passive open space.

An active open space issue to take into account is the amount of active open space provided within Prieska. According to the Land Use Budget, Prieska has approximately 18ha of active open space, whereas it only needs approximately 11ha of active

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open space up to the year 2030. This oversupply of active open space can place strain on the maintenance of this active open space in an arid area such as Siyathemba. It is therefore proposed that underutilized active spaces (such as the sports field in Ethembeni west) be used for other purposes.

TABLE 44: PROPOSED OPEN SPACE ALLOCATION

Hierarchy	Existing 2019	Allocation 2019-2025	Allocation 2025-2030	Total 2019-2030
Prieska Primary Town	41,2	0,0	0,0	41,2
Active open space	17,8	0,0	0,0	17,8
Passive open space	23,4	0,0	0,0	23,4
Marydale Secondary Town	47,7	0,0	0,0	47,7
Active open space	2,7	0,0	0,0	2,7
Passive open space	45,0	0,0	0,0	45,0
Niekerkshoop Secondary Town	3,8	2,8	0,2	6,8
Active open space	3,6	0,0	0,0	3,6
Passive open space	0,2	2,8	0,2	3,2
Rural Area	n/a	n/a	n/a	n/a
Active open space	n/a	n/a	n/a	n/a
Passive open space	n/a	n/a	n/a	n/a

Source: Urban Dynamics Gauteng, 2019

5.4. HOUSING

Housing is a strong form-giving element that can impact substantially of the development of a town or settlement. For example, housing can be used as an infill land use, which could enable the integration of a fragmented settlement area or town. Also, housing can provide the necessary land use densities to support retail development.

5.4.1. HOUSING TYPOLOGIES

Housing types can be categorised according to level of attachment. Level of attachment refers to the vertical and horizontal attachment of buildings. There is a tendency, when addressing the housing demand, especially for the affordable housing sector

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of the population, to provide freestanding units with little or no level of attachment. There is little exploration of the benefits of other housing typologies, such flats, walk-ups, row housing and semi-detached units.

The following discussion on typologies is not exhaustive, but rather focuses on housing and density types that are appropriate for Siyathemba. Diagram 32 illustrates appropriate rural housing typologies and Table 45 provides an easy-reference summary of the attributes of the different housing typologies and how it compares with the attributes of other housing typologies.

a. Detached housing

Detached units are standalone structures situated on a single, individually registered stand. This is the most commonly used housing type within the rural towns of Siyathemba and is used for bonded and well as affordable housing. It is also the typical housing type used in the historical development of rural towns and therefore epitomizes the rural character of rural towns. As an affordable housing unit, the design of this housing typology is usually limited to the requirements of the government housing subsidy scheme.

As is evident from the above, the densities of this housing type vary dramatically, depending on its use. As bonded housing, this housing typology is usually located on stands generally 1000m² in size and achieve an average nett density of 10u/ha. As an affordable housing option, this housing typology is usually located on stands of approximately 200m² and achieve nett densities of approximately 50u/ha. Such densities, if used extensively, tend to create sprawl and therefore lessen the walkability of rural towns. Consequently, detached housing should be used taking into account its impact on the walkability of rural towns.

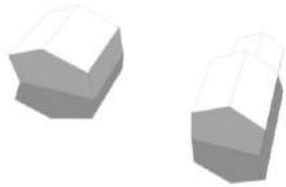
In terms of infrastructure costs, this housing typology is the most expensive housing option. The low densities and large stand sizes of this housing type result in large street frontages, which result in long infrastructure runs. This housing type is the least complicated to construct, resulting in relatively low construction costs, when compared to other housing typologies.

b. Row housing

Row housing is a suitable affordable housing option and involves 3 or more housing units attached to one another, thus sharing at least one wall of the unit. This housing type does not exclude a second storey. Ground access, a private garden and on-site parking is possible with the housing typology.

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detached housing

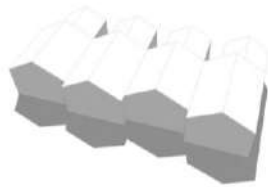


Ownership: Detached units are standalone structures situated on a single, individually registered stand and therefore allows full title ownership.

Advantages: This housing type is the least complicated to construct.

Cost: In terms of infrastructure costs, this housing typology is the most expensive housing option, because its large street frontages result in long infrastructure runs.

row housing

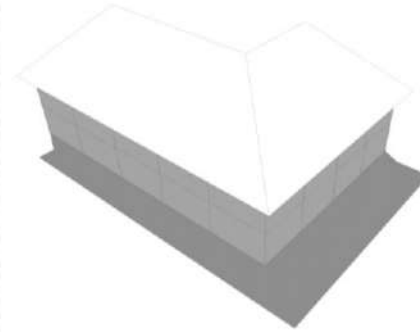


Ownership: Row houses are located on individually registered stands and therefore allows full title ownership.

Advantages: The smaller stands and higher densities achieved by this housing typology make it suitable as a means to create more dense, walkable towns.

Cost: The smaller stand sizes translate to substantial infrastructure cost savings, making row housing more cost-effective than detached housing units.

walk-ups



Ownership: This housing type involves individual housing units stacked on top of each. Consequently, full title ownership is not possible and units are either sectional title or rental units.

Advantages: This housing option can be used to enhance, densify, spatially structure town centres.

Cost: The higher densities obtained by walk-ups make substantial infrastructure costs saving possible, but complicated construction methods make the units more expensive.

DIAGRAM 32: HOUSING TYPOLOGY COMPARISON

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Row houses are usually located on individually registered stands of smaller size than those used for single detached housing. These smaller stand sizes are achieved through the use of shared walls. Stand sizes are typically 160m² and yield a nett density of approximately 60u/ha. The smaller stand sizes translate to substantial infrastructure cost savings, making row housing more cost-effective than detached housing units. Shared walls also reduce the construction costs of the buildings, compared to detached housing units.

TABLE 45: BONDED AND AFFORDABLE HOUSING TYPOLOGIES

Housing Typology	Nett Density	Stand Size	Building Height	Parking Ratio	Tenure Options
Detached bonded housing	10 u/ha	1000m ²	2 storey	2 bays/u	Full title
Detached affordable housing	50 u/ha	200 m ²	1 storey	1 bay/u	Full title
Row housing	60 u/ha	160 m ²	1 storey	1 bay/u	Full title
Walk-ups	150 u/ha	n/a	3 storey	0.7 bay/u	Rental or sectional title

Source: Urban Dynamics Gauteng, 2019

The smaller stands and higher densities achieved by this housing typology, compared to that of detached housing units, make it more suitable as a means to create more dense, walkable rural towns. This is of specific value where rural towns, such as Prieska, start to expand beyond acceptable walking distances of its town centre. In a sense, this housing typology creates a balance between creating affordable housing units (within the subsidy range) and achieving higher densities that maintain the walkability of a rural town.

c. Walk-ups

Walk-ups provide a low-rise, higher-density housing option and are suitable as an affordable housing option. With nett densities of approximately 150u/ha, this housing typology is suitable to create pockets of higher-density housing in selected locations within rural towns. Locations suitable for such housing options include the town centre and small residential area business nodes. With regard to the latter, walk-ups can effectively be used to enhance the visibility of residential area business nodes.

This housing type involves individual housing units stacked on top of each other up to 3 storeys high and is located on a single stand. Consequently, full title ownership is not possible. Such units are either sold off as sectional title units or applied as rental units. What distinguishes walk-up from flats is the fact that walk-up units are accessed via a staircase. The gardens surrounding the building are in communal ownership and use. On-site parking is possible in the form of a parking lot. At a density of 150u/ha, a parking ration of 0.7 bays/u area achieve on ground level, thus not requiring expensive underground parking to be constructed.

The higher densities obtained by walk-ups compared to detached and semi-detached housing, make substantial infrastructure costs saving possible. This cost saving not only applies to municipal infrastructure (water, sanitation and electricity), but also to the provision of roads. Despite this cost-saving, walk-up units cost substantially more than conventional affordable housing typologies and require a top-up of the government housing subsidy to construct.

5.4.2. HOUSING DEVELOPMENT

Affordable housing is a critical and central component of spatial development within Siyathemba. If developed correctly, affordable housing can contribute to the development of sustainable and livable rural town environments. To achieve such rural town environments does not have to do with the cost of affordable housing development as much as it has to do with the design of these housing units and the willingness of developers to 'go the extra mile' to achieve more residential environments that are typical and characteristic of rural towns.

5.4.3.1. Housing Development Approach

In the past, addressing the housing backlog in rural towns was largely based on chasing numbers: a mass housing approach. Through this approach, houses were built where land could be acquired cheaply and this usually perpetuated sprawl and unsustainable development, and was often at the cost of the rural character of rural towns. This approach needs to change and go beyond the simple provision of houses to build rural communities that promote sustainability that is typical of historic rural towns.

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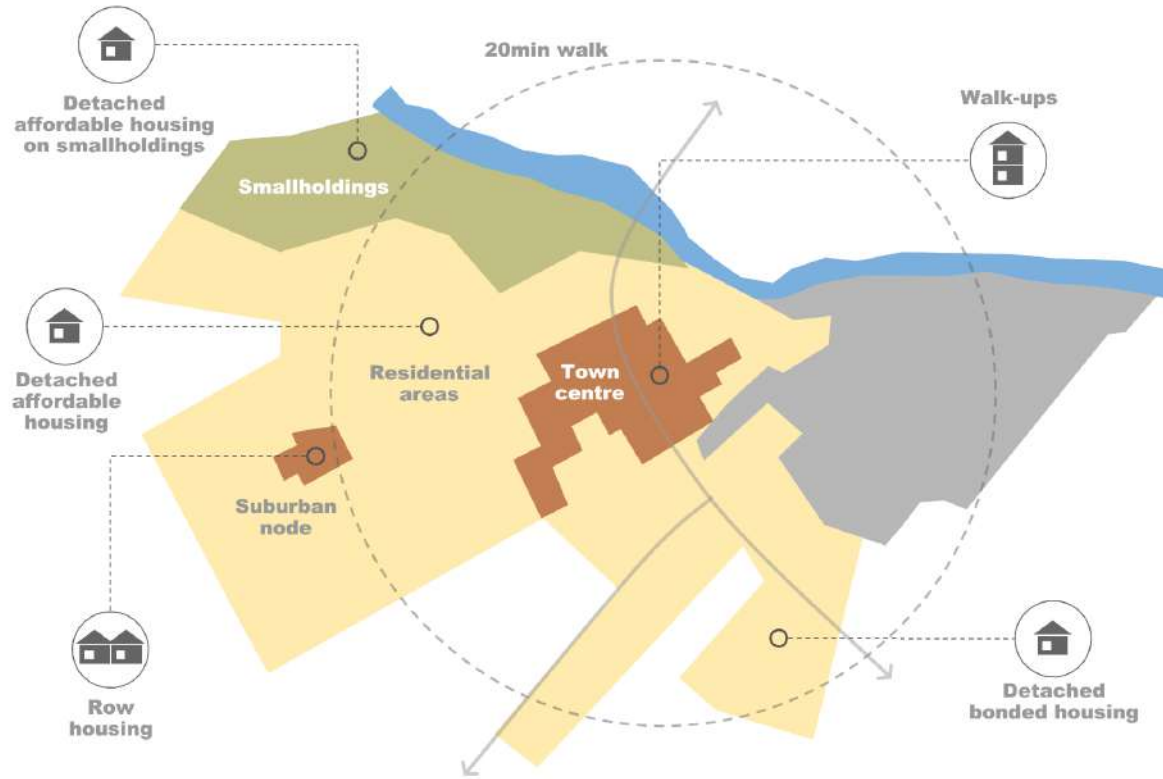


DIAGRAM 33: HOUSING TYPOLOGY DISTRIBUTION APPLIED TO PRIESKA

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Diagram 33 provides a conceptual illustration of the manner in which housing typologies can be located within rural towns and its nodal areas. This spatial pattern is encouraged to ensure that a centrifugal densification pattern is achieved around nodes, especially the town centre, with the highest housing densities located within the nodes and lower housing densities located in the peripheral areas of the towns. Such a density pattern allows the maximum utilization of existing municipal infrastructure, promotes compact town development, and limits sprawl to ensure the rural towns remain walkable.

Taking into account the historic development of rural towns, it would most probably be best to develop detached housing to further the rural character of these towns. However, rural towns such as Prieska is sprawling beyond its walk-range due to the use of detached housing typologies. The sprawling nature of these towns need to be curtailed, and this can only be done by applying higher-density housing typologies selectively, which considers and utilize different locations for these housing typologies within the rural towns. As depicted by Diagram 33, the following affordable housing approaches can be considered in this regard:

a. Town centre

Excessive residential development in larger rural towns often leads to the decline of the town's business centre. This results in property depreciation within the town centre, escalating municipal maintenance cost, and declining revenue level within the town centre. To ensure this does not happen, the redevelopment of derelict and abandoned towns centre sites with new housing stock needs to be encouraged. In turn, these localities will place new housing within walkable proximity of existing employment opportunities and social amenities found within these town centres. Although detached housing will be suitable for town centre sites, higher-density housing typologies, such as row housing and walk-ups, will also be suitable and even desirable within town centres.

b. Residential areas and nodes

The development of residential areas must not focus on a mass housing approach, but should rather be structured in a manner that places emphasis on providing a mix of housing typologies and tenure types. This will create a more varied and livable residential environment. Detached housing will, as always, remain the primary housing typology within residential areas, but can be varied with row housing development. In particular, row housing can be applied in residential area nodes to strengthen the spatial identity of these nodes.

c. Smallholdings

Smallholdings are typically used for agricultural purposes, such as vegetable crops cultivation, forestry and small livestock farming. This agricultural use can be done on a communal and individual household bases. On an individual household bases, smallholding stands can be allocated to individual households for subsistence farming purposes. This will require constructing affordable detached housing on these smallholdings, using the government housing subsidy scheme.

As is set out above, it is proposed that the housing typologies used in the rural towns of Siyathemba be slightly expanded to help contain sprawl within these towns. When applying these housing typologies, it will be important to prevent these housing typologies from ruining the rural character of these towns, because they deviate from the typical detached housing units used historically in the rural towns of Siyathemba. Even the typical affordable housing unit deviate from this historic design and have already significantly contributed to the degrading of the historic character of towns, such as Prieska. To ensure future housing development contributes to the historic and rural character of the towns in Siyathemba, it is proposed the all new housing be designed to continue the historic and rural character of the towns in Siyathemba. Compiling architectural design guidelines for Siyathemba can help blend the design of these new housing developments into the historical architectural style of the municipality.

5.4.3.2. Affordable Housing Development

It should be evident from the above that the affordable housing development challenge is to go beyond the simple provision of houses and to build communities that promote sustainability, livability and a rural way of living. Central to these objectives is building houses on land parcels that contribute to the development of compact, walkable rural towns. In other words, the goal should be to develop land parcels the are located close to the town centre, instead of land parcels that aggravate sprawl on the periphery of the towns.

It is also important to point out that no single approach should be followed to address the affordable housing development within Siyathemba. Different approaches are needed to create walkable and sustainable rural towns, as well as provide a housing typology and tenure mix. For example, new townships are necessary in towns that have a large housing backlog. So too, it is necessary to renew the town centre by adding new housing units to the existing housing mix of these centres.

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TABLE 46: AFFORDABLE HOUSING DEVELOPMENT APPROACH

Town	Suitable Typologies	Development Approach
Prieska	Detached housing Row housing Walk-ups	<ul style="list-style-type: none"> • Develop new township on land that is located within 2000m of the town centre. • Utilise vacant stands within residential area nodes for row housing. • Develop row housing and walk-ups for vacant and derelict stands within the town centre. • Develop smallholdings the periphery of the town and use a limited number of these stands for affordable housing linked to subsistence farming.
Marydale	Detached housing	<ul style="list-style-type: none"> • Develop detached housing on vacant stands within the existing town.
Niekerkshoop	Detached housing	<ul style="list-style-type: none"> • Develop detached housing on vacant stands within the existing town.

Source: Urban Dynamics Gauteng, 2019

The affordable housing development approach in Siyathemba is set out in Table 46. This approach deals with the development of affordable housing within the rural towns in Siyathemba, based on the spatial attributes of these towns. For example, it takes into account whether the town has existing vacant stand available for residential development, or whether the towns has land located within close proximity of the town centre available for residential township development. This approach is based on a number of guidelines has a number of principles, as set out below.

a. Create a housing typology mix

Although the historic development of rural towns within Siyathemba exclusively used detached housing, as greater mix of housing typologies should be used in future. The sprawling nature of towns (such as Prieska) need to be curtailed, and this can only be done by applying higher-density housing typologies. Suitable higher-density housing typologies, which can be architecturally designed to blend into the rural character of rural towns include row housing and walk-ups. These are typologies that can be developed on single stands, thus avoiding cluster housing or estate development, which undermine the character of rural towns. Creating a housing typology mix will cater for a wider range of households and income groups.

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b. Link higher-density housing to nodes

Suitable locations for the row housing and walk-ups mentioned above will be town centres and residential area nodes. In particular, vacant and derelict stands within the town centre of Prieska should be utilised for row housing and walk-up developments. Placing housing on these stands will place households in close proximity to the economic opportunities and social amenities provided within the town centre, and in turn, these households will support the businesses located within the town centre. The nodes within residential areas, such as Ethembeni, can be developed with row housing to strengthen the spatial identity of these nodes.

c. Create new towns close to town centre

New residential township development usually aims to add a significant number of affordable housing units to a town and therefore involves a mass housing approach. Although such an approach can be followed (as it has in the past), it is important that it is structured in a way that differs significantly from how it was structured recently. These township areas need to be designed to fit in within the architectural character of rural towns and they should therefore NOT replicate the typical township patterns and housing designs found in metropolitan areas. The grid pattern is the township layout typical to rural town, and a sensitive adaption thereof should rather be used. New residential townships must not be developed further than 2000m of the town centre (preferably much closer) to ensure that walkability to the town centre is retained.

d. Utilise vacant stands within existing towns

Marydale and Niekerkshoop have a number of proclaimed stands that are vacant. These stands need to be developed before any new residential townships are created within these towns. Developing these stands have many benefits. For example, it places affordable housing within walkable proximity of economic opportunities and social amenities located within these towns, and breathes new life into these towns. It is proposed that the existing vacant stands that are utilised for affordable housing are NOT subdivided into smaller stands to ensure the rural character of these towns are maintained. Instead, the affordable households occupying these stands can utilize the large stands for subsistence farming, such as vegetable gardens. In addition, only detached affordable housing unit should be constructed on these stands and the design of these units must blend in with the architectural character on the neighbouring houses.

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e. Develop affordable housing on smallholdings

Smallholdings are typically used for agricultural purposes, such as vegetable crops cultivation, forestry and small livestock farming. This agricultural use can be done on a communal and individual household bases. On an individual household bases, smallholding stands can be allocated to individual households for subsistence farming purposes. This will require constructing detached affordable housing units on these smallholdings, using the government housing subsidy scheme. Including a residential component of the smallholdings will provide a 24-hour presence in the smallholdings area, which will be beneficial from a security perspective.

TABLE 47: AFFORDABLE HOUSING ALLOCATION

Town	Township Layout	No. of Residential Stands Available	Housing Need year 2019 to year 2030
Prieska		3319	1628
Plakkerskamp	Proclaimed	64	
Lemnertsville	Proclaimed	138	
Lemnertsville South	Planned	1255	
Prieska Mine Housing		600	600
Orion Minerals	Planned	600	
Marydale		182	250
Old town	Existing	93	
Rooidal	Proclaimed	80	
Rama Rou	Proclaimed	9	
Niekerkshoop		149	181
Old town	Existing	149	
Total Stands		4250	2659

Source: Urban Dynamics Gauteng, 2019

Table 47 indicates the number of stands that are vacant, the stands that have been proclaimed and the stands that are planned for the towns within Siyathemba. Prieska has a number of stands that have been proclaimed in Lemnertsville and Plakkerskamp. It also has a large township that is planned south of Lemnertsville. This township will contain 335 bonded stands and 920 subsidized stands. This brings the total number of stands available and planned within Prieska to approximately 3,300 stands, which significantly exceeds the approximately 1,600 stands needed within Prieska up to the year 2030. In addition to the above, a township of approximately 600 stands is being planned in Prieska that will accommodate the mine worker households of the Copperton mine, should the mine be reopened.

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Marydale has approximately 180 existing vacant stand and stand that already have been proclaimed. This is slightly smaller number of stands than the 250 residential housing units that will be required in Marydale by the year 2030. Niekerkshoop has approximately 150 existing vacant stands located in the old town of Niekerkshoop. This is a slightly smaller number of stands than the 180 housing units that will be required in Niekerkshoop by the year 2030. Most of the stands within the old towns of Marydale and Niekerkshoop are in private ownership. To acquire these stands for subsidized housing, the Municipality can approach the owners of these stand and make them an offer, which can be funded through the housing subsidy. This will require drawing the title deeds of the properties to obtain the contact details of the owners of the properties. Tracking the owners can best be achieved through a conveyance attorney.

5.5. AGRICULTURE

The aim of this section is to ensure that high-potential agricultural land is adequately preserved and made accessible to both commercial and community-based farmers. Even though agriculture is the responsibility of national and provincial government, local government still has a role to play in terms of land use management and the facilitation of investment opportunities to increase agricultural activities and production where possible.

Siyathemba is an important agricultural region within the Northern Cape Province, with both extensive and intensive farming constituting the agricultural sector within Siyathemba. There is thus a need to protect the high potential agricultural land found within Siyathemba, provide mechanisms and incentives for the promotion of agricultural development, and determine the most appropriate subdivision criteria for agricultural land to ensure sustainability within the agricultural sector.

5.5.1. AGRICULTURAL DEVELOPMENT

Over the past decade, sustainable agriculture has been gaining increasing support and acceptance within the agricultural sector, because it is seen as a means of addressing the many environmental concerns that have arisen in relation to agricultural practices, including water shortage. Since agriculture is a primary economic activity within Siyathemba, the mismanagement of agricultural resources can have an adverse effect on Siyathemba at large. The need for the sustainable development of agricultural land in Siyathemba is driven by the following overarching factors:

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a. Agricultural land is a limited natural resource

There is limited agricultural land in South Africa. South Africa has 122 million hectares of land surface, but only 82 million hectares is used for agriculture, of which most is used for grazing purposes. It is estimated that only 16 million hectares can be used for crop production and that only 3 million hectares of this land can be classified as high-potential agricultural land. Only 1.3 million hectares of this land is irrigated.

b. Food security

Food security exists when a country's people have access to sufficient food products to meet their dietary needs. Therefore, food security is not only dependent on how much food is available, but it is also dependent on the range of food products needed by dietary requirements. A productive and diverse agricultural production sector is therefore fundamental to the food security of the country.

c. Climate change

Climate change, which is causing changes in the environment, is occurring at an ever-increasing rate. Data shows that Southern Africa is experiencing longer dry seasons and rainfall that is becoming less reliable year-on-year. Such climatic factors will influence agricultural production over the long run. Consequently, there will be an increasing need to preserve land for food production and to ensure food security.

Based on the principles of sustainable agricultural development, it is necessary to preserve land with high-potential agricultural soils to ensure food security, even if such land is not currently used for agricultural purposes. In part, this will require creating awareness about the value of agricultural land and the need to preserve it. The municipality will also need to provide a high level of certainty to landowners, decision makers and other stakeholders with regard to the status and future of agricultural land. This will require effective decision-making on applications relating to the subdivision of agricultural land and the change in use of agricultural land.

5.5.2. LAND USE CHANGE

Land use change refers to applications which will result in farming activities ceasing and alternative uses brought about on land that is currently used for agricultural purposes. Activities that are typically considered agricultural land uses are (a) the cultivation of land for crops or the grazing and breeding of animals, and (b) an enterprise for the processing of agricultural products, such as a canning factory. Other than this, there are non-agricultural uses that can be considered on agricultural land. These are as follows:

a. Mining and waste disposal sites

Mining and waste disposal sites could have severe impacts on agricultural activities if developed within agricultural areas. These could include damage to crops and livestock as a result of increased dust and ground water pollution, increased heavy vehicle traffic that damages roads, the fragmentation of farm land, and the impact on the long-term desirability of farming in the area. Thus, considering applications to allow for mining or waste disposal sites within Siyathemba, must require an impact assessment to determine the impact of these uses on agriculture within Siyathemba. In addition, a set of conditions will be required to mitigate such impacts. No such development should be allowed on high potential agricultural land. Although the approval of mining operations is not a function of municipal government, but a function of national government, Siyathemba should aim to be clear on their position with regard to an application for mining rights. Siyathemba should, as far as possible, aim to influence the National Department of Minerals and Energy in this regard.

b. Nature reserves and resorts

Applications for land use change to allow for nature reserves or resort developments on agricultural land do pose certain concerns. Of greatest concern with such developments is that permission for such land uses often initiates the drive to obtain more land use rights for the nature reserve or resort in future. Often such additional rights involve application for low-density residential development. In general, land use change to nature reserves or resorts should only be considered under the following conditions:

- Resorts must not be permitted on high-potential agricultural land
- Resort accommodation units should be clustered.
- Developers should indicate how potential impacts on adjacent agricultural land will be mitigated
- No water reserved for agricultural purposes may be used to serve the resort development
- The potential to re-establish the natural habitat where a nature reserve is being proposed must be demonstrated.

c. Game farms

A switch from livestock to game farming does not require permission for land use change, except where tourist accommodation is provided. It also does not require consent, except where veterinary permits are needed for the importation and keeping of certain animal species. With regard to accommodation for tourists, the criteria for resort developments should be made applicable. Secondary activities on game farms, such as farm stalls and function venues, can have potential impacts on surrounding agricultural activities, which should be taken into account. These could include noise and other types of pollution, additional non-farm related traffic volumes, and a general impact on the long-term desirability of agriculture in the area.

5.5.3. SUBDIVISION OF FARMLAND

The subdivision of farmland is largely underpinned by the principle of retaining viable economic farm units, because farm units that are too small are not able to provide a sufficient and sustainable income. Aspects that need to be considered when determining the viability of a farm unit in terms of its size, is the capacity of natural resource, particularly water, to support viable farming, and the yield potential of the agricultural soils.

Based on the above, the following rural subdivision typologies can be identified and densification allowed accordingly, subject to the approval of the Department of Agriculture:

a. Rural residential areas earmarked for rural lifestyle living

When viewing rural residential areas within the context of the larger municipal area, they fill a characteristic residential gap within the municipal area. These rural residential areas typically provide a rural lifestyle for families who wish to have such a lifestyle or for families who are already functionally part of a rural settlement. An important factor in defining these areas is the availability of bulk water, electricity and sewer.

The primary aim of rural residential areas must be to maintain and enhance the rural character of rural areas. Applying appropriate residential densities is central to maintaining such a rural character. Conventionally, a minimum subdivided stand size of 1 hectare should be supported within rural residential areas. The subdivision of farms to stand sizes of between 1 and 4 hectares must be subject to the following conditions:

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- Piped water is provided by a relevant authority;
- That the subdivision will not pose any pollution problems related to sanitation, and
- That the road infrastructure can handle the resulting increased traffic volumes.

b. Small farms earmarked for intensive farming purposes

Small farms provide farmland for intensive farming purposes and in particular for irrigation farming purposes. Access to a river for irrigation purposes is therefore an advantage. The densities of these farms are much lower than those used for rural residential purposes, partly because they need to be of a sufficient size to enable viable farming, but also due to the limited capacity of transport, utility and social infrastructure. In many cases the need to protect the natural landscape and rural character of an area is also a factor. Typically, such rural areas have stand sizes of between 4 and 20 hectares in size. The subdivision of farms to farming units of between 4 and 20 hectares in size must be subject to the following conditions:

- The owner must prove to have adequate water supply from local sources, such as boreholes;
- That the subdivision will not pose any pollution problems related to sanitation, and
- That the road infrastructure can handle the resulting increased traffic volumes.

c. Commercial farms earmarked for extensive farming purposes

Commercial farms consisting of cadastral units that are larger than 20 hectares should be retained as such. The status quo of such areas in terms of farm unit size and land use should thus be maintained, except in the following cases:

- Subdivision needed for infrastructure development, such as a road or railway line.
- Subdivision needed for existing or proposed community facilities, such as community halls, churches and schools.
- Subdivisions in order to consolidate to create more functional agricultural units.

The Subdivision of Agricultural Land Act (Act 70) controls the subdivision of agricultural land, which falls under the jurisdiction of this Act. The National Department of Agriculture is responsible for the Act and therefore deals with the subdivision of agricultural land. Land within Siyathemba that does not fall under Act 70, falls within the jurisdiction of Siyathemba. Where land is not under the jurisdiction of Siyathemba, the Municipality can make comments on the applications for subdivisions, based on the guidelines set out above.

5.5.4. SMALL HOLDINGS

The irrigation agriculture industry located along the Orange River is a fully established and highly-developed agricultural sector. This agricultural sector draws irrigation water from the river, which in turn allows this agricultural sector to exist in an otherwise arid environment.

Currently, only the formal, highly-developed agricultural enterprises access irrigation water from the orange River. To enable greater farming equity, the Orange River and its agricultural benefits also needs to be made accessible to small and subsistence farmers within the region. A practical way to do this will be to develop small-scale and subsistence farms on smallholdings along the Orange River and providing irrigation infrastructure to these smallholdings from the Orange River. In turn, this will further expand and build the industrial sector within Siyathemba.

Taking into account the above, it is proposed that smallholding be developed north and northeast of Ethembeni for small-scale and subsistence farming. The aim of these smallholdings will be to give the local residents of Prieska and opportunity to establish irrigated farmland, small-scale commercial farming enterprises, and subsistence farming to supplement local food supplies.

The smallholding area proposed north of Prieska that is mentioned above is illustrated on Figure 38. This smallholding area will serve as a transition area from the denser northern suburbs of Prieska to the less dense rural areas situated along the Orange River. The extension of the smallholding area up to the Orange River enables irrigation water to be extracted from the Orange River for crop farming on the smallholdings. This will require the design and implementing of an irrigation system that extracts water from the Orange River and transports it via irrigation channels to the individual smallholdings.

It is proposed that the development of the smallholdings and its irrigation system be developed according to the Pixley Ka Seme District Municipality One Hectare One Household Strategy (see Status Quo section), as set out in its District Rural Development Plan (DRDP). The DRDP requires identifying suitable locations for the implementation of this strategy based on a number of criteria, which the proposed smallholding area in Prieska complies with. These criteria are the following:

- Water: Access towards water is a critical factor and should weigh the highest when finding suitable locations;
- Biodiversity: High biodiversity areas need to be protected and are therefore not suitable for this strategy;
- Crop suitability: High potential for crop suitability is based on the opportunity for irrigation on a subsistence farming land that could prove to be viable compared to other regions.

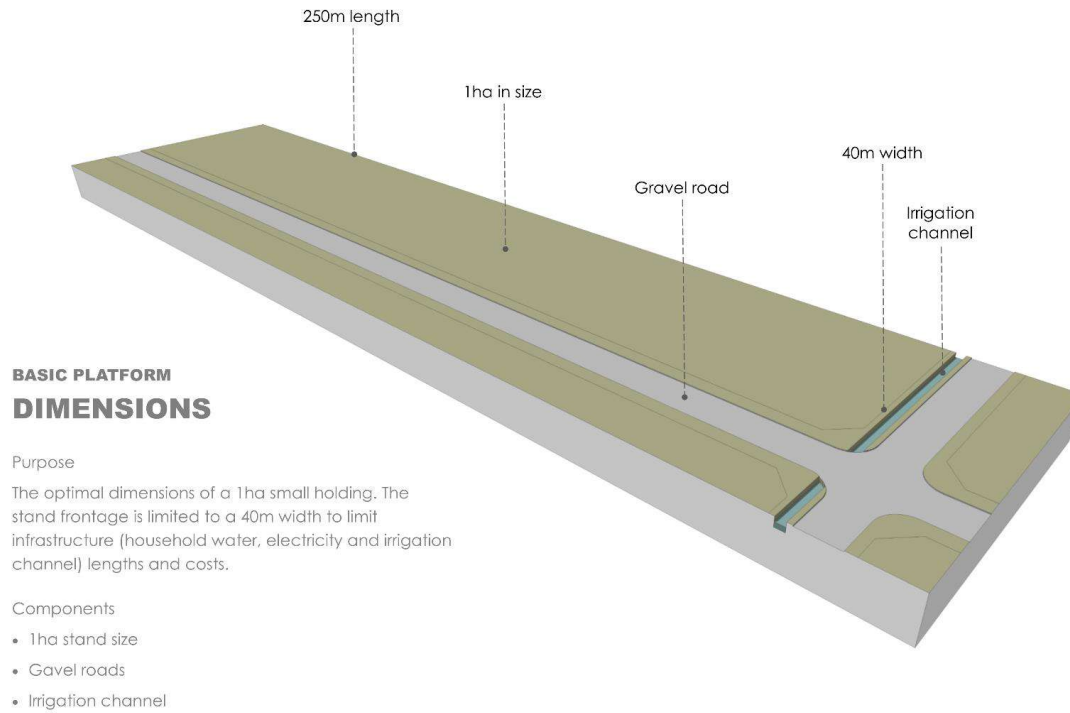


DIAGRAM 34: DIMENSIONS OF SMALL HOLDING

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Guidelines for the development of smallholding areas within Siyathemba will need to be followed to ensure the effective implementation and management of these smallholding areas. The following guidelines are proposed for the design, development and management of smallholding areas within Siyathemba:

a. Smallholding design

The aim of this guideline is to promote the design of an optimal smallholding that is flexible to allow the use of the smallholding for a number of agri-related uses. To enable this, it is proposed that a minimum and average smallholdings size be 1.0ha be used. This smallholding size is large enough to allow most agricultural uses to be operated on it, while it is small enough to qualify it for small-scale farming.

A maximum stand frontage of 40m must be allowed to limit municipal and irrigation infrastructure costs. By limiting the stand frontage, infrastructure lengths are limited and infrastructure costs are curtailed as a result. In selected cases the stand frontage may be reduced, but not to a level where it impacts movement and operations on the stand.

When designing a smallholdings area, the design of the smallholding area must consider the landscape's natural topography, physical features and heritage elements. This can be done by avoiding the fragmentation of large wetlands, mitigating for environmental impacts, and mitigating nuisance impacts on adjacent town land uses. A detailed, site specific, biophysical assessment must be required before development of a smallholding area is approved by Council and the development of the smallholding area must be made subject to the land use bylaw of Siyathemba.

b. Smallholdings uses

In part, the development of the smallholding area proposed for Prieska is intended to uplift and help generate economic opportunities for local residents in Prieska, thereby reducing the need for local residents to search for employment opportunities elsewhere. As such, it will be necessary to design smallholdings that are flexible to allow the smallholding to be used for a number of agri-related communal farming and agri-business uses. Identified uses that can be developed on the smallholdings are depicted on Diagrams 34-44 and listed on Table 48. These Diagrams and Table can be used to guide the development of the proposed smallholding area north of Prieska.

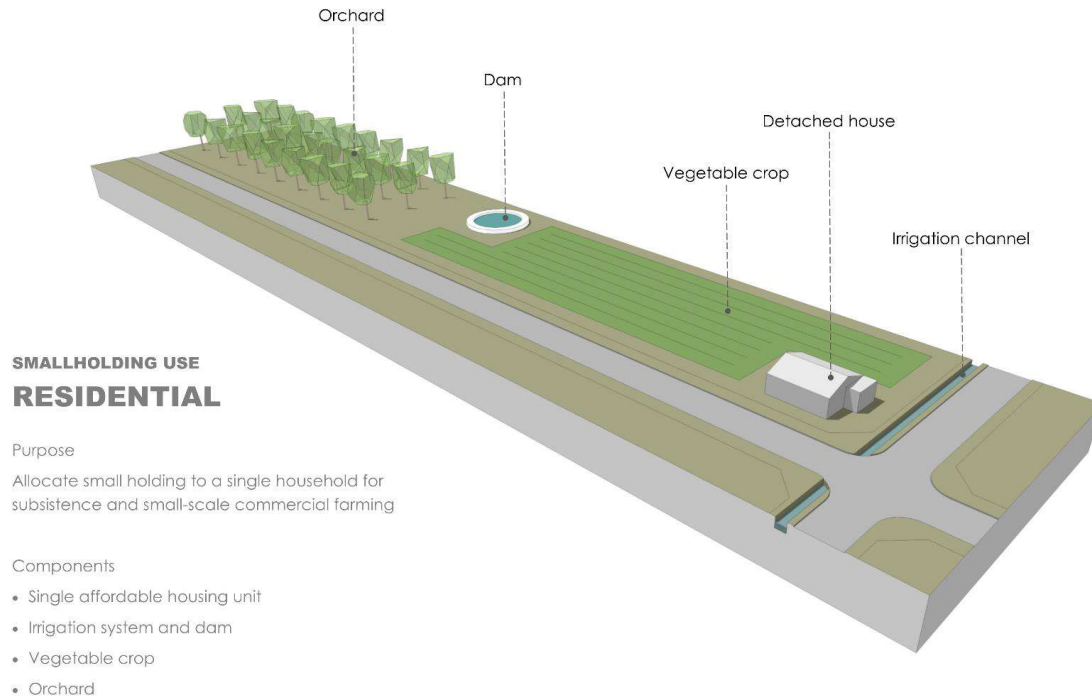
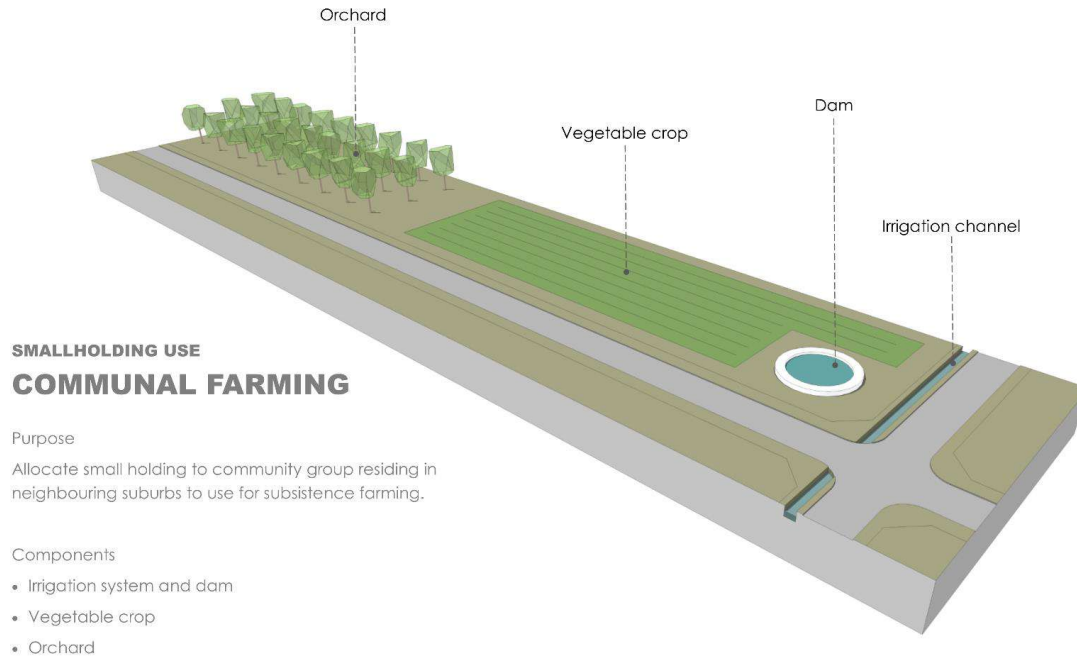


DIAGRAM 35: SMALLHOLDING USED FOR RESIDENTIAL



**SMALLHOLDING USE
COMMUNAL FARMING**

Purpose

Allocate small holding to community group residing in neighbouring suburbs to use for subsistence farming.

Components

- Irrigation system and dam
- Vegetable crop
- Orchard

DIAGRAM 36: SMALLHOLDING USED FOR COMMUNAL FARMING

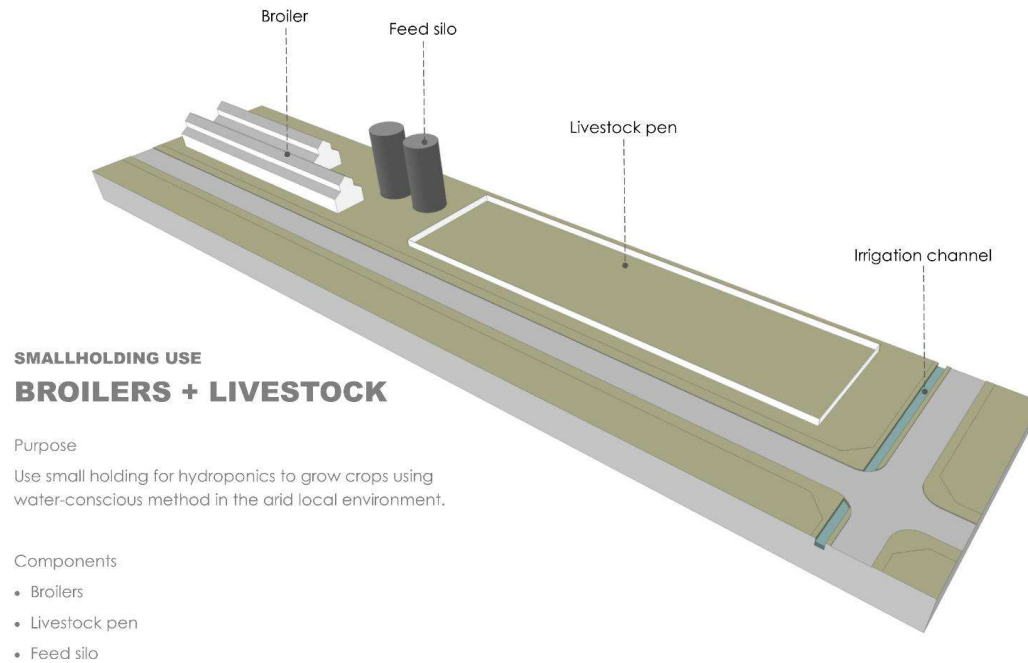
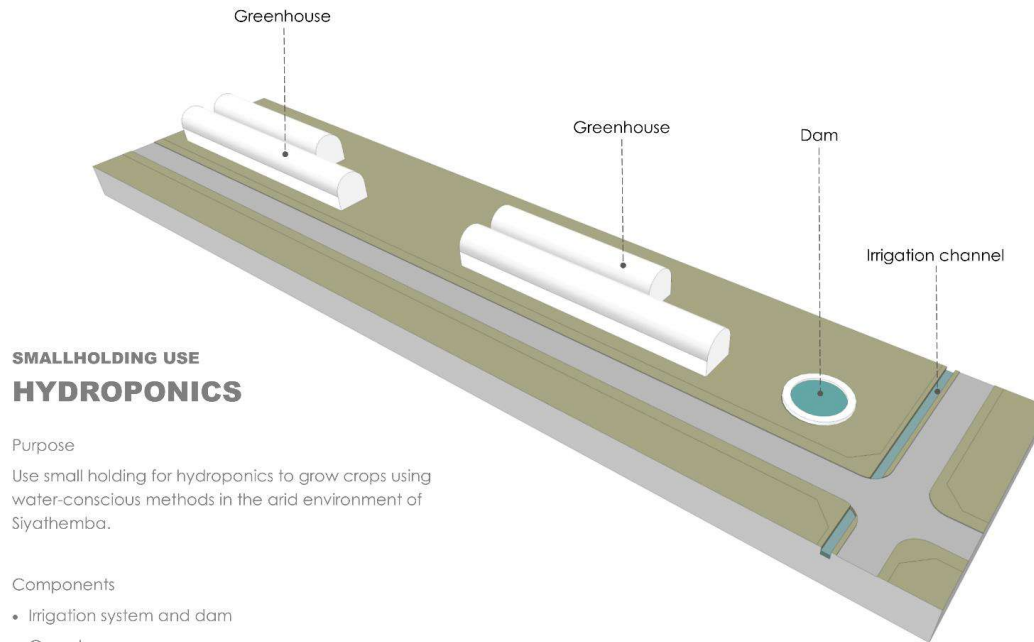


DIAGRAM 37: SMALLHOLDING USED FOR LIVESTOCK



**SMALLHOLDING USE
HYDROPONICS**

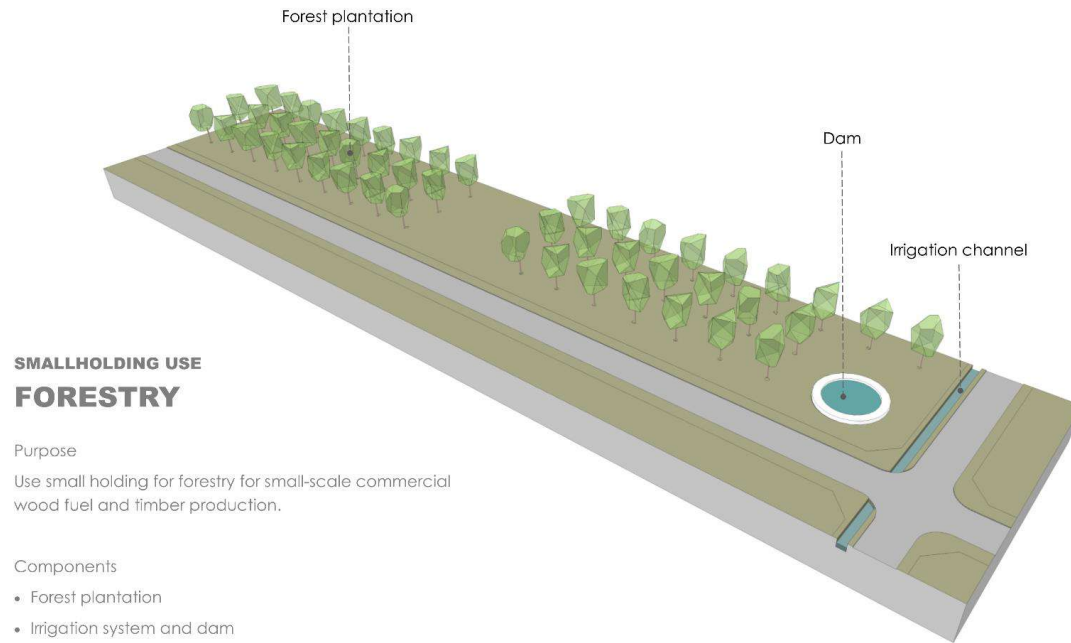
Purpose

Use small holding for hydroponics to grow crops using water-conscious methods in the arid environment of Siyathemba.

Components

- Irrigation system and dam
- Greenhouses

DIAGRAM 38: SMALLHOLDING USED FOR HYDROPONICS



**SMALLHOLDING USE
FORESTRY**

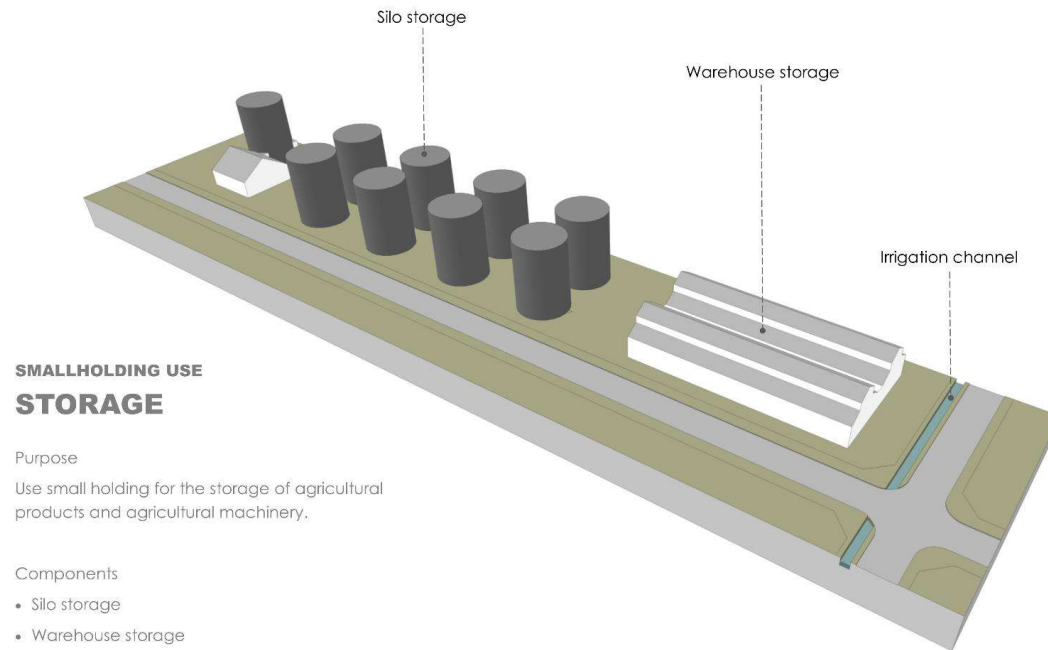
Purpose

Use small holding for forestry for small-scale commercial wood fuel and timber production.

Components

- Forest plantation
- Irrigation system and dam

DIAGRAM 39: SMALLHOLDING USED FOR FORESTRY



**SMALLHOLDING USE
STORAGE**

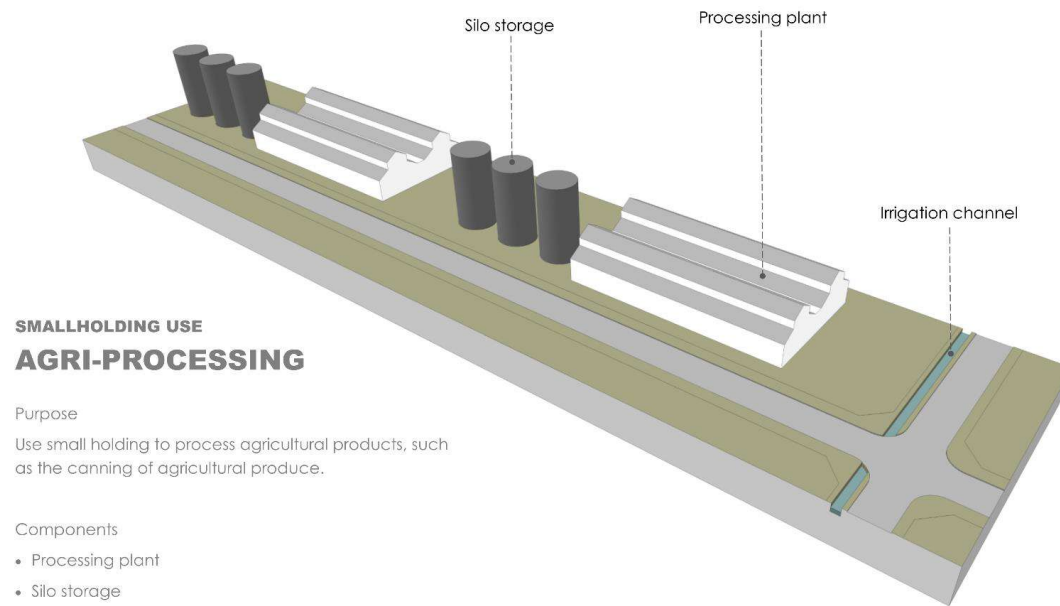
Purpose

Use small holding for the storage of agricultural products and agricultural machinery.

Components

- Silo storage
- Warehouse storage

DIAGRAM 40: SMALLHOLDING USED FOR STORAGE



SMALLHOLDING USE
AGRI-PROCESSING

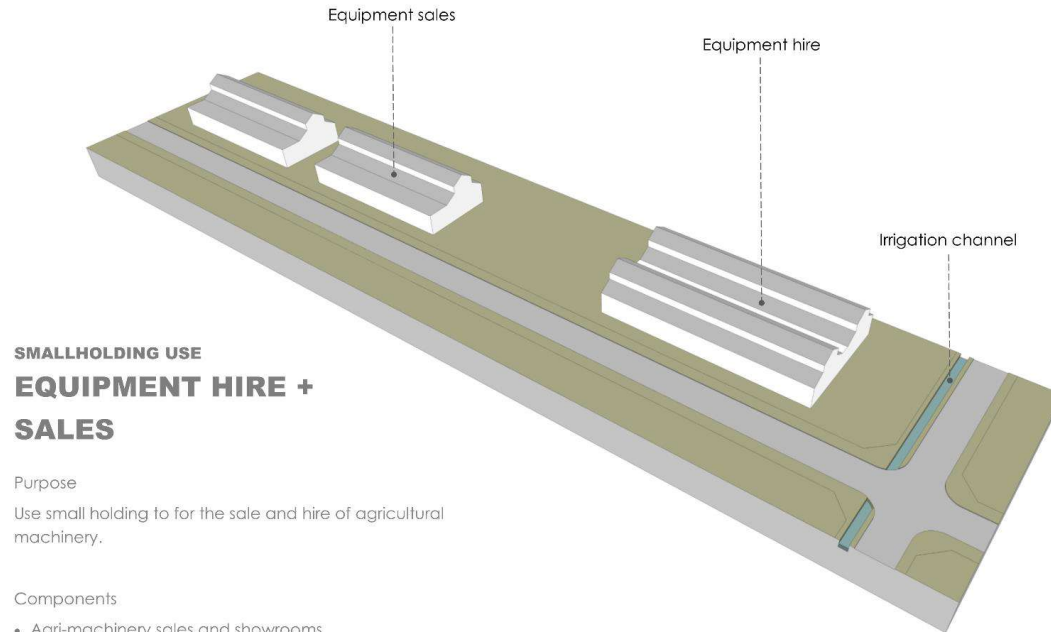
Purpose

Use small holding to process agricultural products, such as the canning of agricultural produce.

Components

- Processing plant
- Silo storage

DIAGRAM 41: SMALLHOLDING USED FOR AGRI-PROCESSING



**SMALLHOLDING USE
EQUIPMENT HIRE +
SALES**

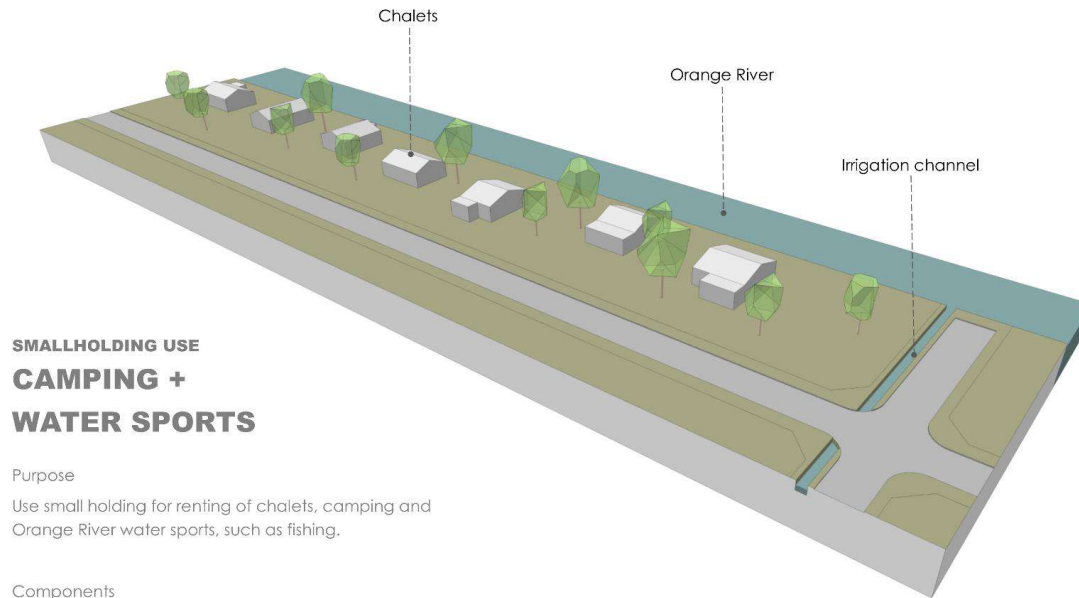
Purpose

Use small holding to for the sale and hire of agricultural machinery.

Components

- Agri-machinery sales and showrooms
- Agri-machinery hire

DIAGRAM 42: SMALLHOLDING USED FOR EQUIPMENT HIRE AND SALES



SMALLHOLDING USE
CAMPING +
WATER SPORTS

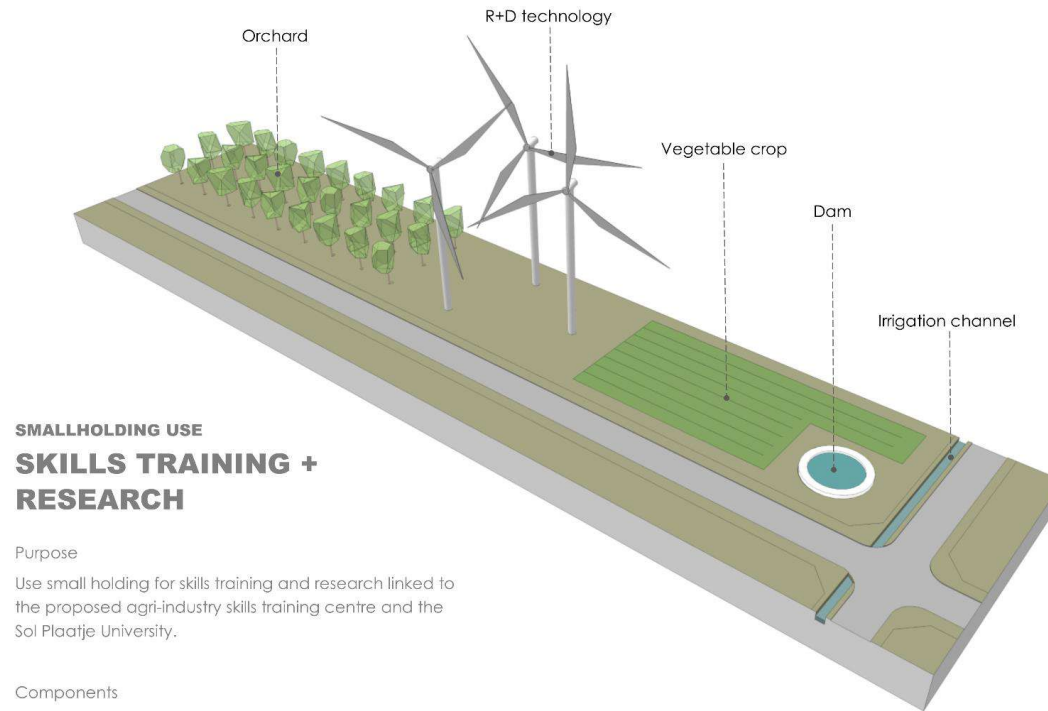
Purpose

Use small holding for renting of chalets, camping and Orange River water sports, such as fishing.

Components

- Chalets and camping facilities
- Water-related recreation facilities

DIAGRAM 43: SMALLHOLDING USED FOR RECREATION



SMALLHOLDING USE SKILLS TRAINING + RESEARCH

Purpose

Use small holding for skills training and research linked to the proposed agri-industry skills training centre and the Sol Plaatje University.

Components

- Irrigation system and dam
- Vegetable crop
- Orchard
- R+D technology

DIAGRAM 44: SMALLHOLDING USED FOR SKILLS TRAINING AND RESEARCH

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TABLE 48: PROPOSED SMALLHOLDINGS USES

Category	Use	Purpose	Components
Farming	Residential	Allocate small holding to a single household for subsistence and small-scale commercial farming	<ul style="list-style-type: none"> • Single affordable housing unit • Irrigation system and dam • Vegetable crop • Orchard
	Communal farming	Allocate small holding to community group residing in neighbouring suburbs to use for subsistence farming.	<ul style="list-style-type: none"> • Irrigation system and dam • Vegetable crop • Orchard
	Hydroponics	Use small holding for hydroponics to grow crops using water-conscious methods in the arid environment of Siyathemba.	<ul style="list-style-type: none"> • Irrigation system and dam • Greenhouses
	Broilers and livestock	Use small holding for hydroponics to grow crops using water-conscious method in the arid local environment.	<ul style="list-style-type: none"> • Broilers • Livestock pen • Feed silo
Agri-business	Forestry	Use small holding for forestry for small-scale commercial wood fuel and timber production.	<ul style="list-style-type: none"> • Forest plantation • Irrigation system and dam
	Storage	Use small holding for the storage of agricultural products and agricultural machinery.	<ul style="list-style-type: none"> • Silo storage • Warehouse storage
	Agri-processing	Use small holding to process agricultural products, such as the canning of agricultural produce.	<ul style="list-style-type: none"> • Processing plant • Silo storage
	Equipment hire and sales	Use small holding to for the sale and hire of agricultural machinery.	<ul style="list-style-type: none"> • Agri-machinery sales and showrooms • Agri-machinery hire
Tourism	Camping and water sports	Use small holding for renting of chalets, camping and Orange River water sports, such as fishing.	<ul style="list-style-type: none"> • Chalets and camping facilities • Water-related recreation facilities

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Category	Use	Purpose	Components
Education	Skills training and research	Use small holding for skills training and research linked to the proposed agri-industry and renewable energy skills training centre and the Sol Plaatje University.	<ul style="list-style-type: none"> • Irrigation system and dam • Vegetable crop • Orchard • R+D technology

Source: Urban Dynamics Gauteng, 2019

i. Farming

First and foremost, the smallholdings must be utilised for agriculture, such as vegetable crops cultivation, forestry and small livestock farming. This agricultural use can be done on a communal and individual household bases. On a communal bases, local communities from neighbouring residential areas of Prieska can collectively be allocated smallholdings to farm on. On an individual household bases, smallholding stands can be allocated to individual households who qualify as being experienced and capable to farm on the smallholding. For example, such households must be trained at the proposed agri-industry and renewable energy skills training centre in Prieska before receiving such a smallholding.

ii. Agri-business

In addition to farming on smallholdings, smallholdings can be used for agri-businesses, such as the small-scale agriculture support services, agricultural product processing, agricultural product storage, and agri-equipment supplies. To promote opportunities for the upliftment of local communities, it will be necessary to encourage small-based agri-businesses on the smallholdings that serves the local small-scale agricultural industry. In time, these agri-businesses can grow to serve the local large-scale, commercial agricultural industry.

iii. Tourism

Small-scale agri-tourism and nature-based tourism should also be encouraged on the smallholdings, especially on those smallholdings located next to the Orange River. When developing such tourism facilities, it will be necessary to limited onsite environmental impacts, adjacent land uses will need to be compatible with tourism facility; and the smallholding will require levels of infrastructure which meet the requirements of municipal standards and regulations regarding accommodation establishments.

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iv. Education

As mentioned, the development of the smallholding area proposed for Prieska is intended to uplift and help generate economic opportunities for local residents in Prieska. By default, this implies that these residents are most likely inexperienced in agricultural practices and business. To address this and ensure that the initiative is viable over the long term, it will be necessary to have an ongoing involvement of provincial or national government in the area and its development. In this regard, it is proposed making the Sol Plaatje University involved in supplying agri-related education at the proposed agri-industry and renewable energy skills training centre in Prieska, and to practically apply this education to develop the smallholding enterprises mentioned above.

c. Community facilities and schools

To ensure the viability of the smallholdings, the households residing on these smallholdings will require access to community facilities and schools. However, because the residential densities on the smallholdings will be so low, reaching the thresholds to provide these facilities within the smallholding areas will most likely not be reached.

To address the above, it is therefore proposed that the households residing on the smallholding utilize the community facilities and schools located within neighbouring residential areas, such as Ethembeni. When additional community facilities or school space is needed, it would be better to expand the existing schools within these residential areas of Prieska than developing new schools within the smallholding areas. Following this approach will require providing efficient road and pedestrian linkages between the smallholdings and the community facilities and schools located within the residential areas of Prieska.

d. Streets and municipal services

To ensure the viable development of the propose smallholding area, a suitable street network will have to be developed that allows for the efficient movement of people, agricultural equipment and goods within the smallholding area, as well as to neighbouring areas. All new stands have access to a road. It is proposed that a grid road network be developed to serve the smallholding area, and that these roads are only developed as gravel roads to limit implementation costs.

As a minimum, on-site electricity, water supply and sewage disposal must be provided on individual smallholding stands. The servicing of the smallholdings can either occur through the extension of the municipal service infrastructure network from Prieska into the smallholding area, or to allow the development of individual, private on-site water and wastewater

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services. The system chosen will depend on local conditions, such as the distance of the smallholding area from existing bulk municipal infrastructure.

e. Conservation

It is important to ensure the conservation of rural landscapes, natural landscapes and heritage elements when developing smallholdings areas. Areas to be protected within the proposed Prieska smallholding area include:

- The banks of rivers, streams, natural watercourse and other natural water body, especially where public access is desired;
- Environmental features that enhance the visual character of the area; and
- Environmentally significant areas, especially if they create natural linkages with other environments features to create an open space lattice.

It is important that the smallholding developments retains the natural topography of the area, retain indigenous trees where possible, and provides protection for watercourses and other environmental features. The retention of wetlands is of specific importance.

Mining operations must not be allowed within the smallholding areas. To mitigate nuisance impacts resulting from smallholding operations, reduce the impacts of these operations with buffering, site orientation and other techniques. Encourage the generation of renewable energy to provide energy for smallholding operations.

5.5.5. AGRI-INDUSTRY

Agri-industry refers to buildings and infrastructure that are required to accommodate the processing of agricultural products. In fact, a large part of agricultural production undergoes some degree of transformation between harvesting the agricultural products and final use. It includes industries that are engaged in the initial processing of agricultural commodities, such as rice and flour milling, leather tanning, cotton ginning, oil pressing, saw milling and fish canning. It also includes industries that undertake further manufacturing operations on products made from agricultural materials, such as bread, biscuit and noodle making, textile spinning and weaving, paper production, clothing and footwear manufacturing.

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The development of agri-industries can have many beneficial feedback effects on agriculture itself. The most direct one is the stimulus it provides for increased agricultural production through market expansion. The promotion of agri-industries usually facilitates a substantial increase in employment opportunities. Even if the agri-industrial process is itself capital-intensive, considerable employment may be created. When developing agri-industries, the location of these industries are of critical importance, as it is with any other industrial type. The following locational requirements need to be taken into account:

a. Location advantages for agri-industries

The location of agri-industries is largely linked to the availability of agricultural raw materials and low-cost labour. Other factors, such as transport, also determine the location for an agri-industry. Most agricultural products either lose weight and bulk in processing, meaning they can be transported more cheaply after they have been processed, or they are perishable and so can be more easily transported in processed form. The location of agri-industries is also affected by the availability of power and other infrastructure. Based on the above, the following location criteria should apply when evaluating an application for the establishment of an agri-industry:

- The agri-industry should be located near the agricultural product to be processed
- The agri-industry should be located near an unskilled labour market
- The agri-industry must have access to a major road network. This requires careful consideration to avoid overloading and traffic congestion
- The agri-industry must have access to electrical power infrastructure and capacity and in selected cases abundant water sources
- If possible, agri-industries should be grouped to achieve economies of scale
- Agri-industries should preferably not be located on high-potential agricultural soils

b. Limiting environmental pollution when locating agri-industries

Despite the important contribution of agri-industries to overall agricultural development, agri-industries can also give rise to undesirable environmental side-effects. Left unchecked, agri-industries can create environmental pollution through the discharge of organic or hazardous wastes into water supplies or the emission of dust or gases that could affect air quality. The risks of pollution are smaller at the initial stages of processing, but they tend to increase with the level of physical and chemical alteration, particularly in the industries using outdated equipment and technologies. The size of the industry could also be an important factor. Smaller industries often tend to be more polluting than larger agri-industries. This is so because small industries often lack the financial resources to use modern and clean technologies.

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Another form of pollution is visual pollution. This type of pollution occurs where an unsightly building is placed in a scenic environment. This type of pollution can have many negative impacts, such as impacting on the tourism potential of an area or reducing the value of neighbouring residential properties. To this end, agri-industries must not be located in gateway positions, near tourist attractions, along scenic routes, or in highly visual positions that disrupt views of natural landscapes.

Taking the location principles set out above into account, the best location for agri-industries within Siyathemba would be in within the proposed industrial expansion area proposed south of the existing Prieska industrial area. This locality is located near the agricultural farmland situated along the Orange River, it is located near an unskilled labour market residing in Prieska, and it has access to the N10 freeway and freight railway line. In addition, this site is not located near tourist attractions, scenic routes or natural landscape features.

5.5.6. SKILLS TRAINING CENTRE

The overall development framework proposed in this report provides the platform for the design of specific sites within Siyathemba and Prieska in particular. One such a site is the old mill site, located on a disused park situated between the Bill Pickard Hospital and Loots Boulevard. It is proposed that this site be developed as an agri-industry and renewable energy skills training centre to serve the Pixley Ka Seme District population. Such a facility will build upon the agricultural history of the municipal area and its current function as agricultural hub along the banks of the Orange River. Important internal and external linkages can also be established through this skills training centre (see Diagram 45), such as linking it to the Sol Plaatje University, who can provide the training and mentoring courses at the skills training centre. Linkages between the skills training centre and the proposed small holding north of Prieska. The latter can be used for the practical application of agri-industry skills training courses provided at the skills training centre.

To show the potential of the site for this proposed use, a conceptual design of the site is proposed. However, it is important to note that this conceptual design only aims to provide a vision for the development of the site and provide an understanding of what an appropriate design for the sites should look like. In other words, the conceptual design is not intended for detail design and implementation purposes. This conceptual design will be supported by design principles, which can be applied to the detailed designs of the site.

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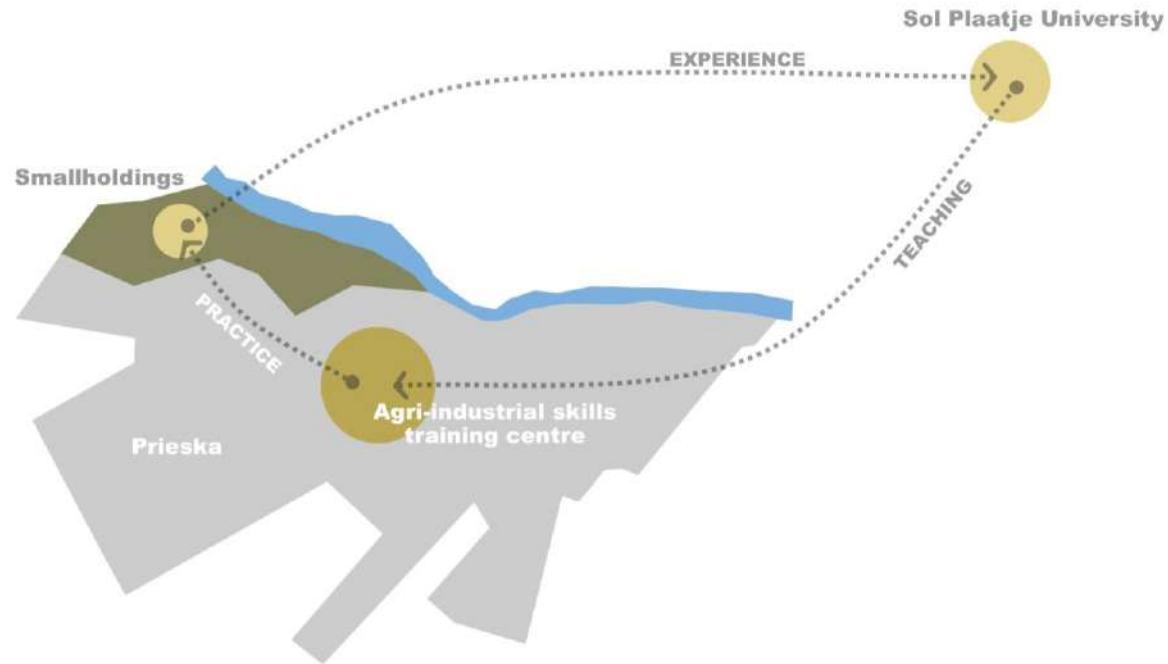


DIAGRAM 45: SKILLS TRAINING CENTRE SYNERGY CYCLE

5.5.6.1. Site Attributes

As mentioned, the Old Mill site is situated between the Bill Pickard Hospital and Loots Boulevard, thus forming part of the Prieska CBD or primary node. Historically, this site was affected by asbestos contamination caused by the use of the site as the area in the town where asbestos was received for processing. Consequently, there is a need to rehabilitate the site to address the health risk.

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associated with asbestos contamination. The rehabilitation of the site was successfully completed by 2011. The site was covered with a layer of soil and strong Polysoil (a commercial soil bonding agent) to ensure a stable, hard cover layer that encapsulates the asbestos underground. A park was developed on top of the site, but this park has since deteriorated due to a lack of maintenance to the point where it can no longer be used as a park. A more sustainable use for this site therefore needed to be found.

Apart from the logic of developing a skills training centre to strengthen Siyathemba's role as an agricultural hub along the Orange River, the Old Mill Site was chosen for the agri-industry and renewable energy skills training centre because of its potential to deal with the failures of the existing park on this rehabilitated asbestos site. The park failed because it could not be maintained in this arid environment of this part of the Northern Province. The idea of the skills training centre is to completed cover the site hard surfaces, comprising building and paved town squares. These hard surfaces will not require the greening of the site and will only involve planting of indigenous trees that are acclimatized to the local arid conditions. In addition, paving the entire site will limit dust pollution in the CBD area and it will create an additional layer of protection from the rehabilitated soils underlying the site. It is currently sealed by a layer of Polysoil, which is a commercial soil bonding agent.

The land use pattern surrounding the Old Mill site can broadly be described as residential, retail and community uses. The residential component, comprising mostly of detached housing, is located north and south of the site. The Bill Pickard Hospital is located on the western boundary of the site. The retail/ business strip located along Loots Boulevard is situated east of the site. Because the site separates the hospital from the Loots Boulevard retail strip, and both land use elements form part of the Prieska CBD, it will be necessary to design the site to integrate these spatial elements of the CBD into a single nodal area.

5.5.6.2. Site Design

The Old Mill site is situated between the Bill Pickard Hospital and Loots Boulevard, thus forming part of the Prieska CBD or primary node. As such this site should be designed to enhance the role of the Prieska CBD as the primary node of Siyathemba. This will require integrating the site with the surrounding land uses of the nodal area. Therefore, the aim of the site design is to create a compact town centre, which integrates the land uses within the town centre transport, create a suitable pedestrian environment, and enhances the character of the town centre. A compact town centre promotes walking within the town centre as a primary means of movement, because it places a diversity of land uses (shopping, housing, and social facilities) within walking distance of each other. In turn, this creates a vibrant and a pedestrian scale environment; which are critical elements that support nodal development. The design of the proposed skills training centre is depicted on Diagrams 46 to 51.

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DIAGRAM 46: CONCEPTUAL SITE LAYOUT OF SKILLS TRAINING CENTRE

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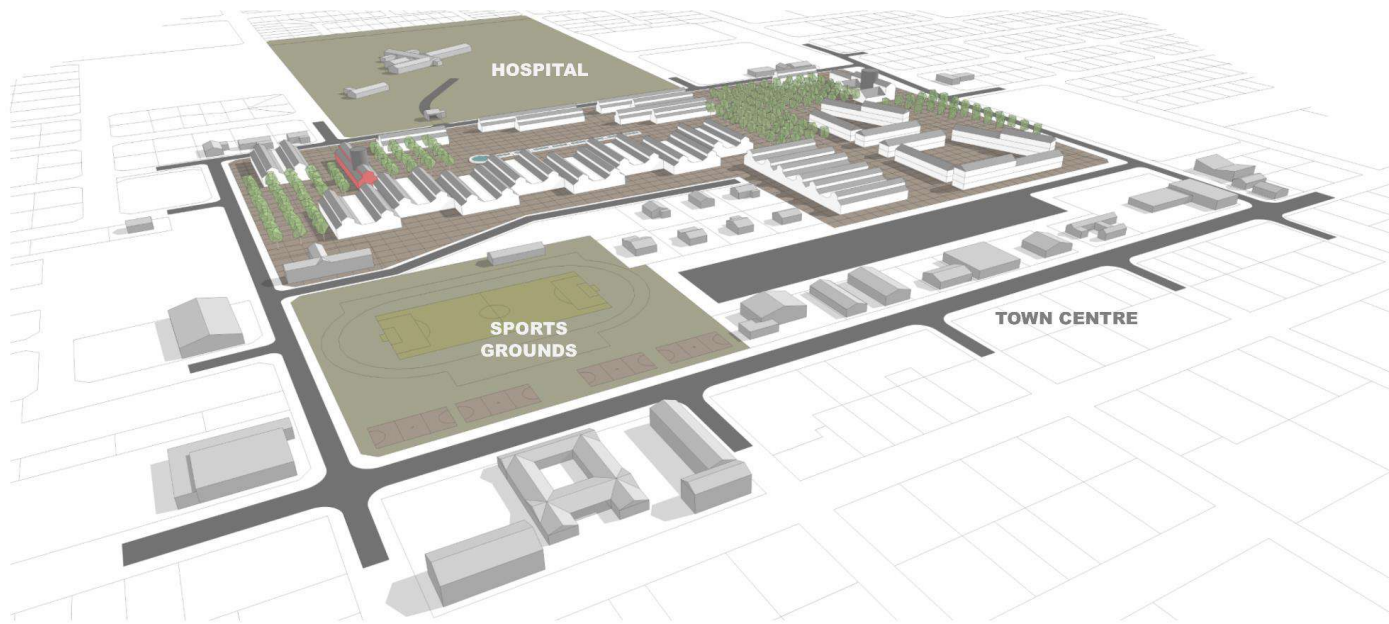


DIAGRAM 47: OVERALL PERSPECTIVE OF SKILLS TRAINING CENTRE

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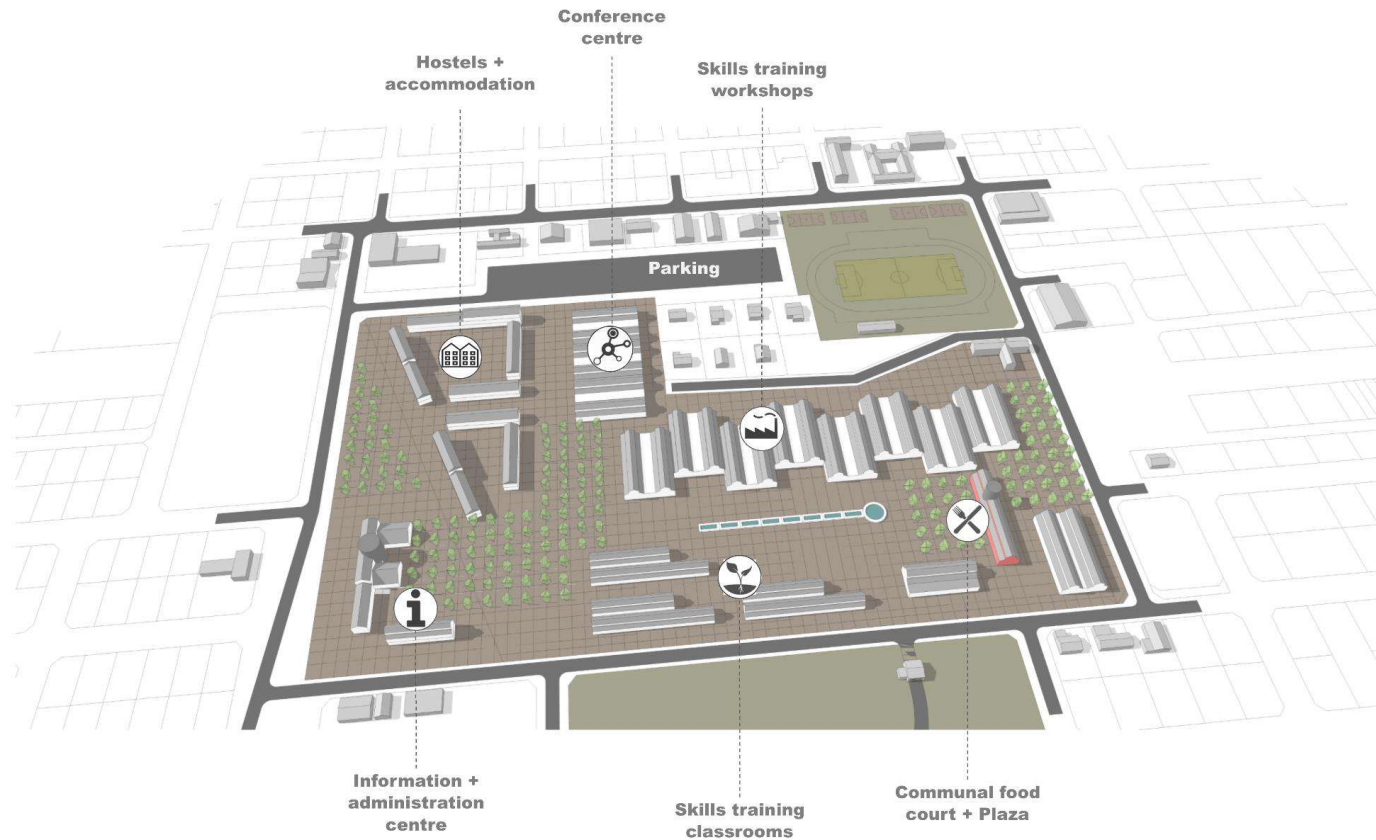


DIAGRAM 48: SKILLS TRAINING CENTRE FACILITIES

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DIAGRAM 49: PERSPECTIVE OF ACCESS TO PLAZA

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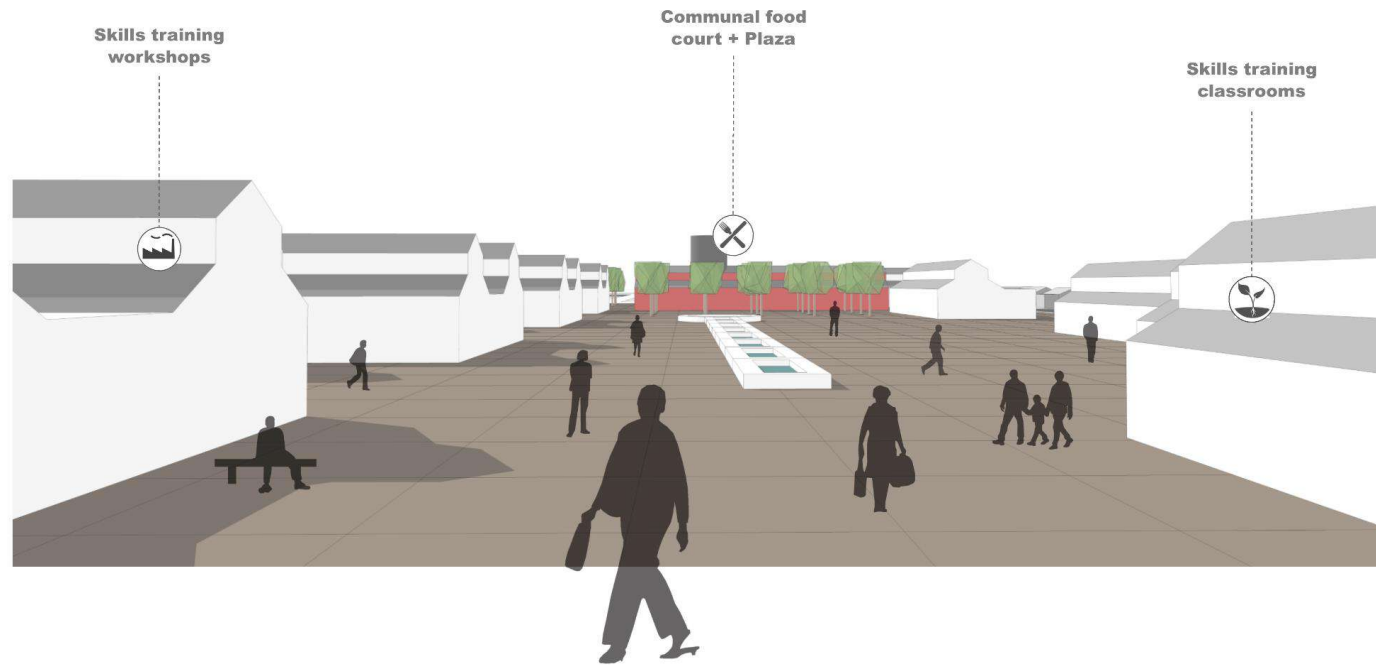


DIAGRAM 51: PERSPECTIVE OF FOOD COURT AND PLAZA

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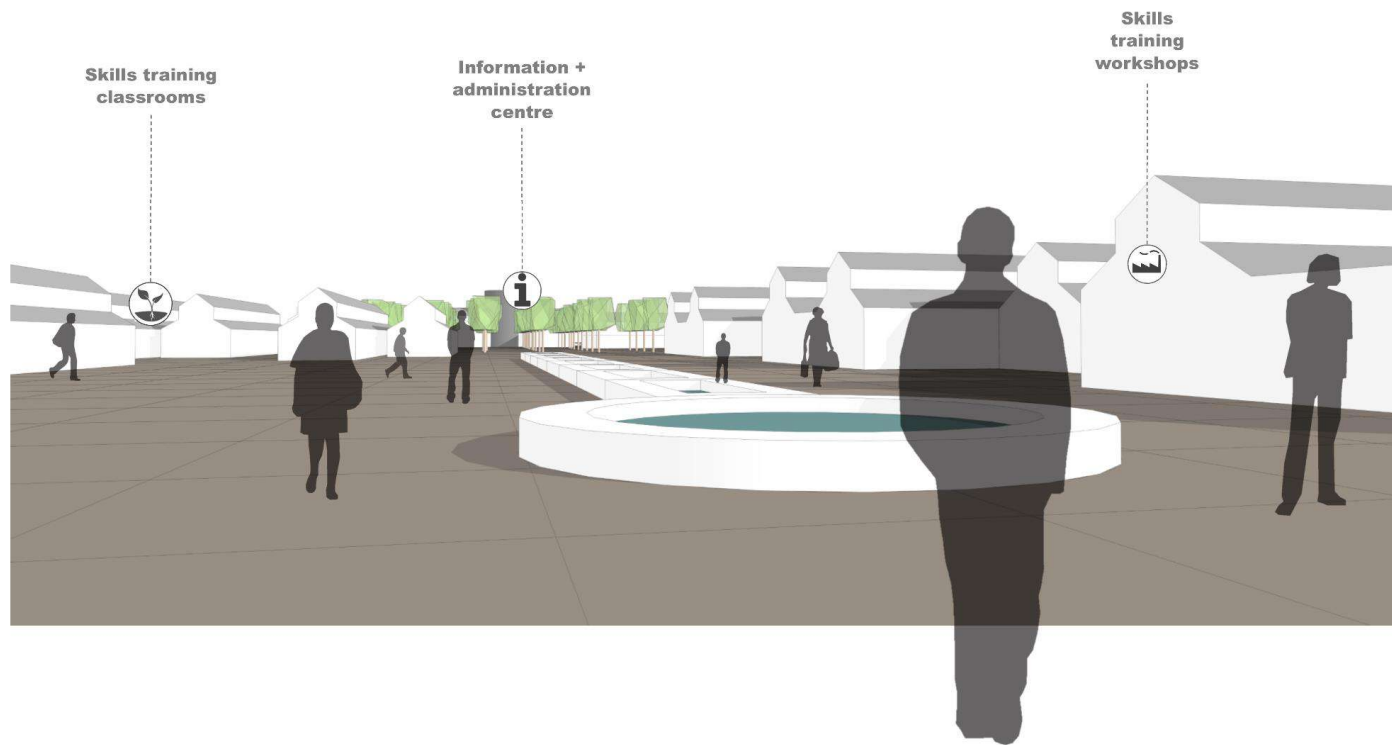


DIAGRAM 51: PERSPECTIVE OF ADMINISTRATION CENTRE

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A basic requirement for an efficient nodal pedestrian network is pedestrian access. It is therefore important to design the skills training site in such a way that it would encourage direct pedestrian movement between the land uses and facilities within the CBD. This is called pedestrian permeability and is best achieved by creating many accesses to the site and pedestrian routes across the site. Designing such as permeability pattern requires linking the site to the surrounding street network. Public squares can be developed along these pedestrian routes on the site to enhance the character of the site and provide opportunities and reasons for people to use the site. In turn, this will create a vibrant atmosphere on the site and in this way make the site a valuable community asset.

Another important aspect to address through site design is edges, because edges encourage activities and a rich public life within a town centre. Edges refer to the intersections between public and private spaces, such as the interaction between a public square and an educational building. A number of design interventions create good edges. For example, building facades need to respond to street corners and public squares, allowing building entrances to face streets or public squares. This helps create active street frontages and public squares. In turn, there is a direct linkage between setbacks and edges, because setbacks determine how close a building is located to a street edge or public square. Large setbacks tend to separate buildings from the street edge or public square, which causes poor street-space and public square definition. The design of Old Mill site thus proposes that all the skills training facilities, such as workshops, classrooms and hostel buildings be located near the street edge or public squares to create active edges and enclosed street and square environments.

5.5.6.3. Land Use Structure

The land uses proposed for the Old Mill site can broadly be divided into educational, conferencing and industrial uses, which all form part of the agri-industry and renewable energy skills training centre. In other words, they make up the various components of the skills training centre. These land uses consist of a number of specific facilities, which are as follows:

a. Information and administration centre

The information and administration centre will be the locality where the day-to-day activities of the skills training centre, which are related to the data administration, financial planning, personnel, building maintenance, are conducted. Students enrolled at the skills training centre or the public may visit the administration centre to get information or assistance. The information and administration centre are a key building within the skills training centre and should therefore

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be located within the focal location on the site. The design of the buildings should also convey its importance and set the design style of the skills training centre as a whole.

b. Hostel and accommodation

The skills training centre will require a residential component comprising 2 to 3 storey hostel-type buildings. These hostels will need to provide enough dwelling units to accommodate the 'out-of-town' students enrolled at the skills training centre, but also needs to provide accommodation for visiting lecturers, such as those from the Sol Plaatje University. The massing and height of the hostel buildings can effectively be used to create spatial form and character within the skills training centre.

c. Conference centre

The conference centre needs to be a large building that is designed to hold conferences. The convention centers must have sufficient floor area to accommodate several hundred attendees and should typically have at least one auditorium, lecture halls, meeting rooms, and conference rooms. In other words, it should provide facilities that allow for small and large meetings, seminars, corporate functions and events. Apart from using the conference centre for agri-education events, the conference can also be used for other business events. This will link the conference centre to the business tourism objective proposed in the Development Concept of the SDF.

d. Skills training classrooms

Skills training classrooms need to be designed and developed to provide the students enrolled in the skills training centre with the targeted training they need to gain the knowledge and abilities necessary in agri-industrial job positions. These skills training classrooms can also be used to re-educate and retrain existing employees in the agri-industrial sector in new agri-industrial technologies, processes or systems. The design of the classrooms needs to be specifically designed the fulfill the education needs and styles of the agri-industry training process.

e. Skills training workshops

In addition to the skills training classrooms, skills training workshops need to be development to provide space for practical training in agri-industrial skills. It needs to provide design-specific spaces where intensive educational program for a relatively small groups of people can be done that focuses especially on manufacturing or handicrafts techniques and

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skills in the agri-industrial field. The workshop building will need to contain the necessary tools and machinery needed for making or repairing things. A strip of industrial buildings can be developed, with each industrial building utilised for a different and specific application in the agri-industrial process.

f. Communal food court and plaza

Public spaces or squares are the heart of town centres because they are the places of economic, civic, and cultural life, and human interaction. The design of the skills training centre provides an opportunity to provide a town square within the Prieska CBD and therefore needs to be incorporated into the design of the skills training centre. The public squares proposed for the skills training centre must be located in accessible positions throughout the site, primarily along envisaged pedestrian routes flowing across the site. A food court can be placed within the central square and have multiple food vendors and a common area for self-serve dinner. The food court will cater for students enrolled at the skills training centre, but can also be used by locals and visiting business tourists. As with the information and administration centre, the food court will be a key building within the skills training centre and should therefore be located within the focal location on the site. The design of this building must convey the design style of the skills training centre as a whole.

5.5.6.4. Design Principles

Designing and developing the proposed agri-industrial and renewable energy skills training centre will require applying a number of design principles. These design principles need to address a wide range of issues. For example, it is important to know how the specific design of pedestrian routes and public squares can encourage a rich public life within the skills training centre and the town centre as a whole. It is also important to know how the buildings of the skills training centre can reinforce the identity of the town centre as a whole. Based on the above, the following design principles need to be taken into account when designing and developing the proposed skills training centre:

Principle 1: Consider site permeability and pedestrian linkage

The pedestrian routes across the site must reinforce direct pedestrian access and movement across the site to existing retail and community facilities neighbouring the site. To this end, the site's pedestrian routes need to be extended across the site and 'stitched' to the surrounding street network. As many linkages to the surrounding street network must be provided as is permitted by the design of the site to increase accessibility.

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Principle 2: Create spaces for multiple users

Public space within the skills training centre, such as squares, need to cater for everyone and different types of mobility, including pedestrians and cyclists. Such spaces must be designed for safe use by all users of all ages and abilities. These spaces must therefore be designed to make it easy for pedestrians to cross the space and walk to the skills training centre buildings and facilities.

Principle 3: Use building height to create spatial form

The buildings of the skills training centre must utilize its height to signal the location of key facilities, such as the information and administration centre and the food court building. Building heights can be lowered where it is necessary to enable a better density interface with neighbouring residential areas. Buildings height should be used to 'frame' the public spaces proposed for the skills training centre, creating pleasant pedestrian environments.

Principle 4: Use coherent and location-relevant buildings designs

A coherent building designs styles should be used for the buildings of the skills training centre. These should be coherent in building layout and façade designs. In addition, the building style used for the skills training centre needs to reflect the agricultural region within which it is located and reinforce the architectural history of the town centre. Although industrial-style buildings can be used for buildings such as the workshops and conference centre, the external finishes of building should be of a high quality.

Principle 5: Encourage active edges and use building security

The skills training centre must be designed based on the edge-block principle, where buildings are placed close to the street boundary and allow direct interaction between a public squares and buildings of the skills training centre. For example, building facades need to respond to street corners and public squares, allowing building entrances to face streets or public squares. This helps create active street frontages and public squares. Fencing is undesirable from a design perspective, because it tends to limit pedestrian access and movement across the site and illuminate the possibility of creating suitable edges. No fencing should therefore be allowed. Instead, security must be enabled at building level, with access control at all building entrances.

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Principle 6: Define public and private spaces

A clear distinction should be made between what is public space and what is private space within the skills training centre. No ambiguous spaces should be allowed. Skills training centre buildings should be enclosed to form inner courtyards where needed that are controlled private spaces. While private space should be protected, maximum permeability of the public spaces within the skills training centre must be enabled.

Principle 7: Create locality relevant public spaces

Develop the public spaces for the skills training centre for community interaction. The public spaces should therefore be developed at key pedestrian intersections on the site to increase access to and use of these spaces. These public spaces of the skills training centre must be linked to the larger Prieska town centre pedestrian network to create a pedestrian lattice that connect the skills training centre to the rest of the town centre. The public space must include ample trees to provide pedestrian shading in the arid environment of Siyathemba.

Principle 8: Consider in impact of parking areas

The skills training centre will require parking for lecturers, students and visitors. To avoid these parking areas becoming barriers to pedestrian movement, they must not be located in front of buildings, requiring pedestrians to cross the parking area to access the buildings. Where possible, parking areas should be provided at the back of the skills training centre allow the buildings and public squared to remain pedestrian spaces. The impact of the parking areas can be reduced with trees, landscape features and surface treatments.

5.6. RENEWABLE ENERGY

Technological change and concerns about climate change threats, energy security, air pollution reduction and fossil fuel power costs have recently driven advancements in renewable energy, including solar and wind energy. In turn, renewable energy development is driving significant changes in the rural regions of the Northern Cape, which includes Siyathemba. This trend is supported by national government who, responding to climate change, have begun adopting policies and strategies to promote the uptake of renewable energy. In response to this, it is important that land use planning provides effective guidance on the development of renewable energy plants, from the siting of plants to the alignment of electricity grids.

5.6.1. CHALLENGES AND ACTIONS

According to the Provincial Spatial Development Framework (PSDF), the development of renewable energy plants within the province requires clear guidance to ensure it does not negatively affect the aesthetics and tourism potential of the province. On the other hand, the PSDF states that the renewable energy economy can potentially create enormous economic opportunities for the Northern Cape Province. The PSDF also highlights that a critical aspect of renewable energy development is the siting of renewable energy plants. Inevitably, this requires siting large-scale renewable plants along bulk electrical infrastructure. Taking into account the above, Siyathemba must consider the following challenges and actions to ensure the development of the renewable energy sector within the municipality is effective and sustainable:

a. Role of land use planning

Traditionally, land use planners have assessed the acceptability of different types of development. Site-specific issues are then addressed through the development approval processes. There are, however, still relatively few land use planning policies and guidelines for engaging effectively with the development of renewable energy land uses. Municipalities, such as Siyathemba, which are affected by renewable energy development urgently need to develop practical guidance for the development of these projects. These guidelines need to address issues that include, but are not limited to, site selection, rezoning, ecological impact minimization, social-economic development and stakeholder engagement.

b. Grid Design

In order to deploy renewable energy on a large scale with a rural area, access to a strong national transmission grid is required. However, the most prevailing challenge to the development of renewable energy projects within rural areas pertains to the state of the national electricity grid, which is not adequate to deal with the additional loads placed in it by newly constructed renewable energy plants within rural area. In fact, the lack of adequate transmission and distribution infrastructure was identified as one of the main impediments to the development of the renewable energy sector within South Arica.

The grid challenge set out above, often requires rural areas that are not yet connected to the grid to be urgently connected to the grid. One option for a lack of grid access in rural areas is to follow a progression approach, from off-grid to mini-grids and eventually to interconnected national grids. There is often a willingness from renewable energy investors

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to provide off-grid and mini-grids solutions at their own risk. However, these have to be eventually integrated to the national grid.

An advantage of grid limitations is that the location of the grid can help concentrate solar development in specific location within the rural municipality, simply because the grid network does not cover the entire municipal area. This can help protect natural areas or high-potential agricultural lands from being converted to renewable energy plants by simply not providing grid access to these areas. In other words, such a strategy can help limit the impact of renewable energy plants on development-sensitive areas within the municipal area.

c. Siting of renewable energy plants

The siting of renewable energy plants can have local impacts that can become important when choosing a site to deploy such a plant. These impacts can cause significant local opposition to the siting of renewable electricity plants and its associated transmissions lines. National government typically has primary jurisdiction over the local deployment of electricity generation, transmission, and distribution facilities. It is therefore national government that needs to take responsibility of the complex environmental and land use impacts of the siting of renewable energy plants. While this situation is not unique to energy generation, national government will need to consult local government and local communities when siting a plant. They need to do this to achieve some level of coordination and agreement when siting a renewable energy plant. The following impacts caused by the siting of renewable energy plants need to be taken into account:

i. Resource impact

The primary resource impact of renewable energy plants is land. The renewable energy plants (e.g. comprising wind turbines and solar panels) need to be installed over large areas to capture sufficient energy to generate electricity. Land is also required for the transmission lines needed to connect these renewable energy plants to the national electricity grid. In turn, the national electricity grid distributes the electricity to cities. Despite the need for land, the land-use impacts tend to remain localized and do not spread beyond the land areas directly used for renewable energy plants. Moreover, some land that is affected by renewable energy plants (such as wind farms) can also be used for other purposes. For example, the land between wind turbines can be used for agriculture.

The only other resource consumed by renewable energy plans is water. Solar farms and wind farms, the two types of renewable energy plants suitable for Siyathemba, use relatively low volumes of water and therefore does not

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stress this natural resource. They also have much smaller impacts on water quality than do nuclear, natural gas or coal-fired electricity generation technologies. Other renewable electricity technologies, such as biopower, high-temperature concentrated solar power, and some geothermal technologies do, however, consume significant volumes of less water.

ii. Atmospheric impact

Renewable electricity technologies have inherently low CO₂ emissions when compared to fossil-fuel-based electricity production. Most emissions relating to renewable electricity technologies occur during manufacturing and deployment of renewable energy plants and transmission lines. Renewable electricity generation also involves inherently low emissions of other regulated atmospheric pollutants, such as sulfur dioxide, nitrogen oxides, and mercury.

iii. Environmental impact

Electric generation and delivery impose significant impacts on the environment at the local and regional levels. However, these environmental impacts range widely in intensity and significance depending on the type of energy generated and means used to deliver the energy. Regarding renewable energy, one of the potentially most significant environmental impacts is posed by the development of large-scale solar power plants, which can threaten the resilience and effectiveness of protected or sensitive natural areas if sited incorrectly. This is because these solar power plants use large arrays of solar photovoltaic panels. Although renewable power plants are relatively flexible in its siting, it is influenced by factors such as the slope of the land and the distance to the nearest transmission line. Transmission line extensions are expensive and this expense can be exacerbated by siting difficulties. These factors can contribute to a decision to locate a renewable energy plant within or near an ecologically sensitive area.

There are many opportunities to site solar power plants in ways that minimize impacts on protected or sensitive natural areas. For example, the importance of buffer zones between renewable energy plants and protected areas cannot be overstated and has been proven to help protect natural areas and sustain the flow of organisms through these natural areas. Such buffers zones can be demanded by the local municipality. Also, proactive electricity planning for conservation can prevent impact on ecologically sensitive areas, while still gaining access to high-quality solar and wind localities. In addition, the improved understanding of the environmental impacts of large-scale solar plants can lead to ecologically sustainable renewable energy planning. The local municipality can assist

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renewable energy companies in this regard, considering their knowledge of the municipal area's natural environment.

iv. Agricultural impact

Renewable energy generation and distribution does not have the impact on water, human health or the climate that conventional energy plants have. However, renewable energy plant siting practices can dramatically alter the agricultural landscape. This is especially so when developing large solar power plants, which use expansive arrays of solar photovoltaic panels. These solar plants are destructive if they are located on cultivated land or high-potential agricultural soils. In turn, this creates potential conflicts between using the land for food or energy production.

Developing large solar power plants on cultivated land or high-potential agricultural soils can be avoided by placing solar plants on land with degraded soil or soils that is unsuitable for agriculture. The Copperton mine with its soils that have been degraded by mining activity, is a case in point. On the whole, the challenges of and solutions to protect agricultural land is in many ways the same as discussed for the environment above. The only exception or addition is the use of wind farms instead of solar farms on cultivate land or high-potential agricultural soils. Productive agricultural lands can simultaneously be productive farms and be used for wind farms, because of the small footprints of wind turbines, thus maximizing the value of agricultural land and minimizing the loss of agricultural land.

d. Skills Development

The level of technical skills and knowledge about renewables plays a role in their adoption in rural areas. Skills development in renewable energy technology is an area that needs attention in South Africa, especially in the rural areas where these renewable energy plants are constructed. Skills training initiatives in renewable energy technology in rural areas will go a long way in addressing the knowledge gaps between rural and urban areas. It will also impart skills and technical expertise to renewable energy practitioners living within the in rural areas. One way of doing this is to draw experience and knowledge from neighbouring universities (such as Sol Plaatje University or Free State University), who can impart these skills in rural areas by means of training workshops and other interventions. An opportunity exists to use the proposed skills training centre proposed for Prieska for this purpose (see previous section of this report).

e. Stakeholder beneficiation

National policy requires companies developing renewable energy projects in South Africa to engage in the development of local communities neighbouring the project sites. National government partially awards projects to companies based on the size of the contribution made towards local economic development. These companies are required to spend a certain amount of their generated revenue on Socio-Economic Development (SED), Enterprise Development (ED), or share ownership in the project company with local communities.

Because renewable energy companies often lack the capacity and find it difficult to appropriately engage in local development planning, these companies often approach the investment of the allocated benefits in various ways. For example, companies tend to establish community trusts, fund bursary schemes or fund established NGOs, instead of engaging local communities and local government directly regarding the investment of the benefits allocated to local community development. This often leads to confusion amongst local communities, which in turn carries the risk of causing unintended consequences.

Another key challenge is that the renewable energy projects usually only create temporary employment opportunities, mainly for unskilled workers from local communities. While appropriate in many communities, this does not lead to permanent job creation. This is a reality that is often misunderstood by local communities and local municipalities. Employment for local unskilled workers occurs mainly during the construction phase of projects. This needs to be effectively communicated to the local communities in order to manage expectations. The Siyathemba municipality can play a key role in this regard. In fact, a number of steps can be implemented by the municipality to maximize developmental benefits of renewable energy projects, while mitigating unintended consequences through public participation. These are:

i. Improve communication

Information about public participation and its benefits needs to be widely disseminated. The implementation of renewable energy projects brings economic benefits for the regions where these projects are implemented. The local economic benefits need to be communicated to the public through meaningful engagement. The local municipality can play an important role in this process.

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ii. Foster collaboration

Open engagement is needed between local government and the renewable energy companies. These companies are concerned about complying with the project requirements and aim to make a meaningful contribution to local community development. The local municipality has the opportunity to enhance the local community development programmes of these companies by fostering dialogue between these companies and local community stakeholders.

iii. Support sustainability

The renewable energy companies and the municipality need to develop long-term strategies for local community development. Such strategies must allow for the initial training and employment benefits to be continued after the construction of the renewable energy plant has been completed. Enabling this requires sufficient communication and collaboration between the municipality and the relevant renewable energy company, as well as the ability to ensure the beneficiation plans are comprehensive and sustainable.

f. Summary

A number of steps can be taken by the local municipality to address the issues set out above. A summary of these include the following:

- The municipality must prepare a renewable energy policy on how to deal with the development of renewable energy plants within its area of jurisdiction, and its impact of local communities and the environment. This policy can be used when dealing with the renewable energy companies and national government.
- Support renewable energy planning at master planning stage to enable an agreed approach to the development of renewable energy in the municipality
- Bring awareness and understanding on renewable energy issues amongst the local communities and planning professionals. In particular, this can include issues surrounding the siting of renewable energy plants and consultation with local communities.
- Encourage university involvement in local skills training in renewable energy technologies to empower the young generation to become involved in the local renewable energy sector.

5.6.2. SEZ DEVELOPMENT

The Northern Cape Provincial Growth and Development Plan (PGDP) 2018 proposes that the Pixley Ka Seme District is suitable for the development of a Special Economic Zone (SEZ) linked to the renewable energy sector. This type of SEZ is described as a “Single Factory EPZ, which can comprise a Renewable Energy Technology Park with a single large anchor tenant. The key goals behind the development of the SEZs are to:

- Encourage cluster development to create easy supplier access, allow for skills transfer between the members of the cluster and improve production efficiency.
- Promote investment through industrial infrastructure creation
- Promote public-private cooperation

According to the PGDP, this Renewable Energy SEZ can either be based in De Aar or in Prieska. The Siyathemba SDF wishes to argue that Prieska is ideally located and suited for the proposed Renewable Energy SEZ for the following reasons:

a. Located near existing renewal energy projects

Siyathemba is the location of a number of existing and in-process solar and wind energy projects. The reason for this is the fact that Siyathemba is located within the ‘Solar Corridor’ (stretching from Upington to Colesberg), it is located next to the Orange River that provides easy access to water, it has an abundance of suitable (flat) land, and it has access to the national power grid. These characteristics ensures that Siyathemba will remain a choice location for future solar and wind energy projects. A decision to develop a SEZ at Prieska ensures it is located near existing and future renewable energy projects.

b. Existing demand for a SEZ

The construction of existing and future renewable energy sector in Siyathema requires industrial land for the manufacturing, assembly and storage of renewable energy infrastructure. This is especially relevant for the wind energy technologies, because wind turbines are prohibitably large for long distance transport, and is therefore ideally manufactured and assembled on or close to the project site. In fact, all the available industrial stands within the existing Prieska industrial area have been allocated for the local solar and wind energy industry. As a consequence, the current growth in the solar and

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wind energy sector in Siyathemba is placing a demand on additional land for their purposes. Thus, developing an SEZ in Prieska will fulfill an existing demand for such a facility in the region.

c. Proposed and easy expansion of industrial area

Due to the expressed need for additional industrial land in Prieska by the renewable energy sector, the Siyathemba SDF proposes the expansion of the existing Prieska industrial area to fulfill this need. This expansion area will be located south of the existing industrial area in Prieska and will be extended up to the N10 freeway. Extending the existing industrial area will allow the rail sidings, which serve the existing Prieska industrial area, to be extended into the new the industrial area. The industrial area will also have direct access to the N10 freeway, which is the primary freight route traversing Siyathemba. The ability to easily expand the existing Prieska industrial area, while ensuring good access the road and rail infrastructure, provides the essentials for the development of an SEZ.

d. Focus on skills training

The Siyathemba SDF proposes that an agri-industry and renewable energy skills training centre be developed in Prieska. The old mill site, located on a disused park situated between the Bill Pickard Hospital and Loots Boulevard, has been identified for such a facility. The Siyathemba SDF proposes that this facility be linked to a tertiary education institution, such as the Sol Plaatje University, to provide training and mentoring courses at the skills training centre. Linkages between the skills training centre and the SEZ will add an additional and practical purpose to the skills training centre, while in turn linking the SEZ to a local skills training program and potentially to the Sol Plaatje University

5.7. MINING

The Siyathemba mining sector currently only contributes a small percentage to the local economy, with the larger mines located outside the boundary of the municipal area or mines within located within Siyathemba no longer in operation, such as the Copperton mine. One approach to advance the mining industry within Siyathemba can be by promoting small-scale mining within Siyathemba, aimed at community empowerment and local beneficiation.

Significant copper and alluvial diamond reserves situated within Siyathemba are currently underexploited by limited mining and quarrying activity. These mining reserves represents a local resource, providing opportunities and potential for economic growth,

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job creation and overall development enhancement in the Siyathemba area. However, it is important to note that policies that pertain to the advancement of mining activity within municipal areas are generally outside the ambit of local governmental planning and capacity. Policy is devolved from national (mainly DME and DTI) and provincial government. Despite this, the advancement of mining related activity within a municipal area is, at times, endorsed through documents such as IDPs (Integrated Development Plans) and LED (Local Economic Development) strategies. Aspects regarding the mining industry that could be relevant to Siyathemba include the following:

a. The role of government

The Department of Minerals and Energy's (DME) has the objective of advancing the orderly development of the country's mineral resources. It determines the development of sector-specific strategies and key action plans for mining sector development. Its stated objectives are to facilitate economic diversification, expedite progress towards a knowledge-based economy and attain incremental GDP growth through the mining industry. This strategy is based on intensive coordination and close collaborative effort by the private and public sector, including particularly the Departments of Minerals and Energy, business and labour. The strategy components include infrastructure development, investment facilitation, skills development, and technology advancement. The implications of the above for Siyathemba are that the DME objectives of diversification, a knowledge based economy and increased GDP growth are all in line with Siyathemba's vision and goals. However, all mining initiatives in Siyathemba will need to be based on the area's comparative and competitive advantages when compared to mining hubs such in the province and country

When developing the mining industry within Siyathemba, it is important that decisive action is taken by the municipality in this regard. This includes research and planning, but also transforming such plans into action-oriented decisions. Decisive action can include the municipality clarifying its position regarding the development of mining within Siyathemba, a clear business concept being developed in conjunction with prospective miners, the establishment of roles and responsibilities in line with the intended objectives, and ensuring that agreed upon decisions are implemented, monitored and reviewed. With regard to the latter, it is important the all relevant stakeholders are managed and harnessed to activate, rather than throttle mining development.

b. Mining and sustainable development

The sustainable development of mining in Siyathemba will affect the long-term sustainability of mining activity in the municipal area. Sustainability in this case, relates to economic, social and environmental sustainability. Some of the issues

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that are identified as having an impact on the sustainability of mining activity include governance, biophysical constraints, the social sphere, climate change, small, and scale mining. The objectives of sustainable development are to ensure that:

- Community empowerment and social rights are central and that all those operating within the mining sector adhere to these.
- The mining sector moves towards sustainable environmental outcomes to avoid negative outcomes costs and its and associated consequences.

Generally, larger mining companies operating within a municipal area are reputable companies with clear environmental and rehabilitation policies in place. Despite this, such mines must continually be encouraged to mitigate the environmental effects caused by mining operations. For example, the location of mine dumps must be carefully considered, bearing the visual impact, disaster potential and dust pollution on the environment and neighbouring settlements in mind.

c. Small-scale mining

Small-scale mining activity occurs with Siyathemba. However, many of these small-scale activities are illegal in nature and are therefore not regulated. This situation needs to be corrected by creating a framework for small-scale mining within Siyathemba. Small-scale mining can be categorised by the mine's reserve quantities, output volumes, capital investment, employment profile (productivity and numbers) and managerial structure. By these, small-scale mining can thus range from subsistence operations to profit-driven financially viable entities.

Small scale mining is often poverty driven, seasonal and involving minimal machinery. Small scale mining is frequently undertaken to supplement other economic activities such as agriculture, and is often done outside the legal framework for mining. Current estimates show that only 30% of small-scale miners in South Africa operate legally, which poses risks in terms of occupational health and safety, water and soil pollution, and environmental degradation. On the other hand, one has to recognize the role that small-scale mining plays in poverty alleviation through employment creation and local economy stimulation.

Issues inhibiting sustainable small-scale mining includes difficulty accessing finance, regulation complexities, procurement difficulties, health and living conditions, lack of infrastructure to support small scale mining, marketing constraints, and inadequate provision of partnerships with government and its allied agencies. To address these issued, guidelines for small-scale mining are:

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- Providing an enabling mechanism or institution to smooth out all regulatory and legislative processes.
- Setting measures to enforce environmental protection and minimise environmental degradation.
- Establishing a viable and efficient financing and credit systems to ensure viability of all projects.
- Enabling simple and effective marketing methods to increase producer access to commodity markets

The role that the Siyathemba Municipality can play in ensuring a viable and sustainable small-scale mining industry can include determining the full extent of small-scale mining initiatives within Siyathemba, including economic benefits, social disruptions, health implications and environmental degradation. In addition, any small-scale sustainable mining initiative will need to be founded on a culture of meaningful public participation and community involvement.

d. Mining and settlement development

Mining impacts on an area in many ways economically, environmentally, physically and socially. In turn, this situation impacts on many other sectors of a municipality, such as the housing market. Taking into account the possibility that the Copperton Mine in Siyathemba could be reopened in future, a spatial strategy for dealing with mine-related housing needs to be considered.

The recent trend in the mining industry is not to develop mining communities at each mine, but rather to accommodate the work force at the nearest towns or settlements, using housing subsidies. This gives neighbouring towns and settlements the opportunity to grow and develop and make it easier to integrate the mining community into existing communities once mining ceases. If a mine such as Copperton mine is reopened, the identification and development of mining-related settlements, with its necessary physical and social infrastructure, will be a priority. This will require close collaboration between the municipality and the relevant mine. In such a case, it is important that mines should not be allowed to shift the entire responsibility of this into the hands of local government, but should be held accountable for the orderly and sustainable settlement of its workforce.

5.8. TOURISM

The natural environment and tourism go hand-in-hand. Without beautiful, protected and well-managed natural environment, the tourism potential on any region will be severely diminished. Based on this point of departure, tourism development must adhere

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to two basic principles: quality and accessibility. Quality refers to aspects such as environmental management, availability of municipal services infrastructure for tourist facilities, land use management in tourism areas, and architectural standards of tourist facilities. Accessibility refers to the availability of transportation infrastructure, such as roads and railway lines, as well as the quality of transport services.

In the Development Concept it was argued that Siyathemba focusses on business tourism instead of tourism in a broader sense. This was proposed because there appears to be a strong linkage between the Siyathemba tourism industry and the mining, renewable and military technology industry. Keeping the Development Concept objective in mind, attempts are made in this section to address these principles and propose ways in which tourism development can be encouraged in Siyathemba.

5.8.1. ORANGE RIVER FOCUS

Prieska, the location of most of Siyathemba's tourism industry, is situated on the banks of the Orange River; the largest river flowing through South Africa. Consequently, there should be tourism advantage to create a better connection between Prieska and its river environment. Up to now, much of the town has been developed without much regard for this natural feature, therefore not fully utilizing the potential of the river. Although the basic structure of the town has already been established, for example the location of the town centre, there are spatial measures that can be implemented, which would improve the connection between the town and the Orange River for tourism purposes. These spatial measures are depicted by the conceptual diagram (Diagram 52), which comprises the following:

a. River corridor

The Orange River should be seen as a corridor, rather than a boundary located on the edge of the town. Viewing the river as a corridor will help focus prime development on the river front and avoid locating peripheral uses, such as industrial areas, next to the river.

b. Connection

To prevent the Orange River from becoming an exclusive resource for only those living next to the river, it will be necessary to establish linkages between the river and the town centre where possible. This will make the river more accessible to the larger Siyathemba population. This connection needs to be established on two levels. The first level involves an ecological

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linkage, whereby the stream flowing through the town into the Orange River are uninterrupted and protected. The second level involves linking the town centre and suburbs to the Orange River using pedestrian walkways and pedestrian bridges where necessary.

c. Access

The public requires access to the Orange River waterfront (at least at certain points) to prevent the river from becoming the exclusive property of the landowners that have properties that border the river. There are two ways of providing public access to the riverfront. The first is to get land owned to provide paid access to the river, such as a resort would typically do. The second is to provide and develop parks that border the river, such as 'Die Bos'. In addition to existing waterfront parks, the Municipality can purchase additional land on the river and proclaim these as public parks.

d. Nodal development

The development of a clear nodal structure along the Orange River will increase spatial legibility along the river. In turn, this will help focus the tourism industry on the river, thus enhancing tourism within Siyathemba. It will also provide distinct destinations along the river for day-visitors (business tourists) and longer duration visitors. Creating nodes will require focusing development at key intersections along the river. Various types of nodes can be developed. For example, a node can be a resort on the river, it can be a recreation area situated on the waterfront, or it can be a cluster of restaurants situated on the waterfront.

e. Variety of uses

It is important that a variety of uses be encouraged along the Orange River. This will ensure that the river caters for the needs of day-visitors (business tourists) and longer duration visitors. Uses can range from using the river for water sports (such as boating and fishing) to using the river for more passive uses (such as braaiing or bird watching). Understanding the needs of business tourists can go a long way in determining the functions that the river will need to fulfill.

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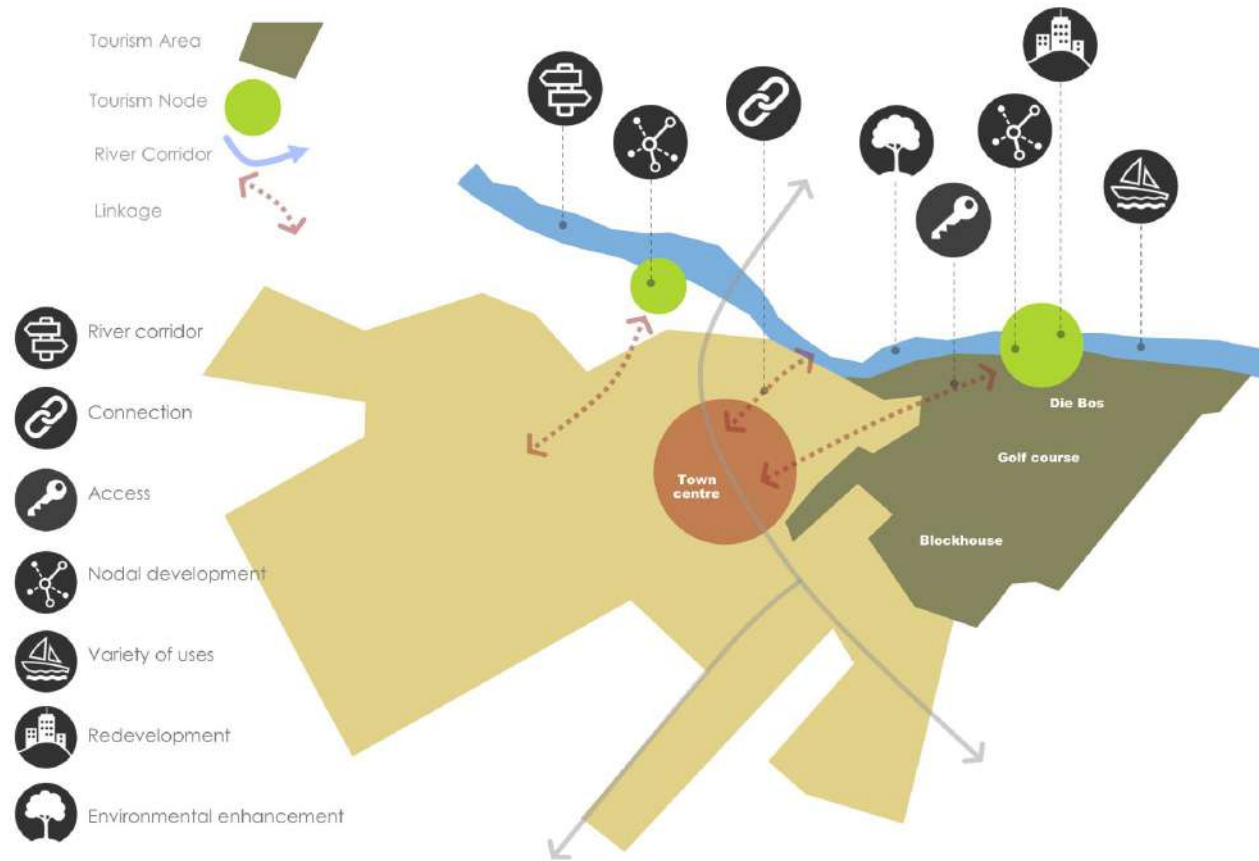


DIAGRAM 52: ORANGE RIVER TOURISM CONCEPT

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f. Anchor development

Up to now, only a small number of smaller accommodation establishments have been developed along the Orange River, without much regard for the potential of the river as a larger tourist destination. To fully utilize the potential of the Orange River at Prieska, the Municipality can embark on securing a resort developed for the redevelopment of Die Bos into a more contemporary tourist facility, containing riverfront uses, such as hotels, restaurants and waterparks.

g. Community development

The Orange River tourism potential must provide economic opportunities for all the community within Siyathemba. Such an opportunity exists along the banks of the Orange River, located northwest of the Prieska town centre. The land is also the land proposed for small holding development in a previous section of the report. It is therefore proposed that a number of these small holdings, which are located next to the river, be developed as tourist facilities in conjunction with communities such as Ethembeni, Lemnertsville and Plakkerskamp.

h. Environmental enhancement

The Orange River environment will need to be protected and enhanced where environmental degradation has taken place, if the tourism potential of the Orange River is to be realised. This will require steps such as removing and curbing alien plant species invasion, the rehabilitation of degraded water courses and wetlands, and the planting of indigenous vegetation to enhance recreation areas along the river.

5.8.2. TOURISM DEVELOPMENT

Nationally, there is a strong tendency towards nature-linked tourism and nature-linked tourist destinations within South Africa. As a result, areas with natural beauty are popular tourist attractions. Siyathemba has the scenic Orange River and this provides Siyathemba with tourism potential, especially with regard to business day-tourist originating from other parts of the country. This tourism potential must be centred on the following orange river-related tourist attractions, as summarized in Table 49:

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a. Die Bos

Die Bos was established years ago with the aim of promoting tourism development within Prieska. It has in recent years been severely neglected to the point where it is no longer functioning as a viable tourist attraction. To reinstate the tourism role of this facility, it is proposed that the facility be re-evaluated to determine how to better utilize this tourist resource. It may be advantageous for the Municipality can embark on securing a resort developed for the redevelopment of site into a more contemporary tourist facility, containing riverfront uses, such as hotels, restaurants and waterparks.

TABLE 49: PROPOSED RIVER-RELATED TOURISM ATTRACTIONS

Tourism area	Attraction	Access	Potential uses	Intervention
Die Bos	Riverfront resort	Indirect and neglected	Resorts, water sports (boating) and formal tourist accommodation (e.g. lodges)	Embark on securing a resort developer for the redevelopment of Die Bos
Proposed Small Holdings	Riverfront	Indirect and poorly developed	Water sports (boating), informal tourist accommodation (e.g. caravan parks and camping) and guesthouse accommodation	Control land use development to retain scenic quality of the area
Blockhouse	Heritage Site	Direct and well developed	Open air museums and tourist day facilities (e.g. restaurants and curio shops)	Developed historical site on an ongoing basis
Town Centre	River	Direct and well developed	Tourist day facilities (e.g. restaurants and curio shops) and guesthouse accommodation	Encourage a better linkage between the town centre and river

Source: Urban Dynamics Gauteng, 2019

b. Proposed small holdings

The land proposed for small holding development along the banks of the Orange River, located northwest of the Prieska town centre, can partly be used for tourism facility development as part of an initiative to give communities, such as Ethembeni, Lemnertsville and Plakkerskamp, access to the economic tourism potential of the Orange River. This scenic river environment at this location can form the basis for eco-tourism activities, such as camping sites and water sport-related activities. It is imperative that strict land use control be exerted on the proposed small holdings along this stretch of the Orange River so that the scenic quality of the area is not diminished.

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c. Blockhouse

Although limited, the Blockhouse has the potential to attract day visitors and tourists. To enhance this potential, an emphasis should be placed on the ongoing development of this historical site. Such initiatives could potentially draw day visitors and tourists, which in turn will encourage the growth of the local tourism sector and help diversify the local economy.

d. Town centre

The Prieska town centre has direct access to the river, which in turn provides it with tourism potential. The characteristics of the town centre, especially its historic architecture, makes it suitable for day-tourist facilities (e.g. restaurants and curio shops), as well as business and weekend-tourist facilities (e.g. guesthouse accommodation). A means of improving the tourist potential of the town would be to improve the linkage between the town centre and the Orange River. This linkage should focus on pedestrian access and the need to provide safe, leisurely access to the river.

In addition to the tourism areas mentioned above, gateways are important areas related to the tourism industry. Gateways can be defined as the entry and exit points to a tourism region. They are important because they give visitors and tourists to the region their first and lasting impression of the region. For this reason, it is necessary that gateways are treated in a manner that will attribute to a good impression, which has specific reference to the aesthetic and scenic qualities of gateways. The entrance into Prieska from Kimberly is an important gateway, because Prieska is the core area of the tourist industry within Siyathemba. To visually protect this gateway, the industrial area should not be allowed to further encroach on this gateway and should be screened of using as much as possible using indigenous trees.

5.8.3. ACCOMMODATION

Tourism development can potentially create job and investment opportunities within Siyathemba and stimulate the economic development of the area. However, this will require investment in tourism infrastructure, such as access roads and tourist accommodation. The development of tourist accommodation is central to tourism development within Siyathemba and needs to be done according to a set of criteria that is applicable to Siyathemba. This needs to be done to ensure a quality tourism environment is created and maintained within Siyathemba, which at the same time addresses the needs for local economic development and job creation associated with the tourist sector.

5.8.3.1. Accommodation Facilities

The development of tourist accommodation within Siyathemba must be managed and guidance must be provided when considering applications for such uses. The management of the development of tourist accommodation must aim to (a) address the need for access to economic opportunities by supporting the tourist accommodation industry, (b) promote a responsible and sustainable approach to tourist accommodation development, (c) promote and safeguard the quality of life enjoyed by local residents, and (d) clearly state the land use requirements for establishing tourist accommodation.

The different tourist accommodation typologies that can be identified and applied to Siyathemba are set out in Table 50. These tourist accommodation typologies have the following characteristics, which can be used to evaluate and manage the development of the tourist accommodation sector within Siyathemba:

a. Camping and caravanning

Camping and caravanning sites are usually located in a unique and attractive natural environment. As such, a camping and caravanning site should be developed as a low impact and low intensity use that is in keeping with the context of the area and its surrounding character. A camping and caravanning site can consist of multiple free standing or linked structures of a temporary nature, and may include caravans and tents. Day visitors may be permitted and facilities for their use can be provided. The enterprise may be either in public or private ownership.

b. Bed and breakfast

Part of a dwelling house or second dwelling can be converted to accommodate guests. Breakfast is usually served to residents. Guests may share communal facilities, such as bathroom facilities, or it may be en-suite and private. The architectural appearance and scale of the single residential dwelling unit must be maintained in order to continue to fit the character and context of surrounding residential environment.

c. Guesthouses

Guesthouses may be part of a larger single-family dwelling house or second dwelling converted to accommodate guests. Part of the dwelling may be provided in a second dwelling. Buildings can be free standing or linked structures. Council may restrict the number of rooms per establishment to mitigate the impact of the establishment on the surrounding residential area. Breakfast is usually served to guests. Guests may share communal facilities or may have en-suite facilities.

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TABLE 50: TOURIST ACCOMMODATION TYPOLOGIES

Typology	Description	Uses Included
Camping and Caravanning	A property used for erection of tents or other temporary structures for temporary accommodation for visitors or holiday-makers, which includes ablution, cooking and other facilities that are related to camping. This includes a caravan park, whether publicly or privately owned.	<ul style="list-style-type: none"> • Tents • Caravans • Communal Ablution Facilities
Bed and Breakfast Establishment	A dwelling house or second dwelling in which the owner of the dwelling supplies lodging and meals to guests who have permanent residence elsewhere; provided that the primary use of the dwelling-house concerned remains for the living accommodation of a single family.	<ul style="list-style-type: none"> • Second Dwelling • Residential Building
Guesthouse	A dwelling house or second dwelling which is used for the purpose of supplying lodging and meals to guests in an establishment which exceeds the single-family house restriction of a bed and breakfast establishment. A guesthouse may also have meeting and function rooms.	<ul style="list-style-type: none"> • Second dwelling • Cottages • Self-catering units • Meeting / Function Rooms • Residential Building
Backpackers Accommodation	A building where lodging is provided, and may incorporate cooking, dining and communal facilities for the use of lodgers. It includes a building in which rooms or beds are rented for residential purposes, such as a boarding house or youth hostel.	<ul style="list-style-type: none"> • Backpackers Lodge • Boarding House • Youth Hostel
Self-catering Units	A building or group of buildings consisting of separate accommodation units, each incorporating a kitchen facility, and which may include other communal facilities for the use of guests, which are rented for residential purposes. It may include holiday flats.	<ul style="list-style-type: none"> • Self-catering units • Communal Facilities • holiday flats
Hotel	A property used as a temporary residence for guests, where lodging and meals are provided. It may include restaurants, conference and entertainment facilities that are ancillary to the primary use as a hotel.	<ul style="list-style-type: none"> • Restaurant or bar • Conference Facilities • Entertainment Facilities • Wellness Centre and Spa
Resort or Lodge	Guest accommodation is subsidiary to the main use, which is of a recreational nature. The main use could be a golf course or similar recreational use.	<ul style="list-style-type: none"> • Clustered dwelling units • Restaurant or bar • Wellness Centre and Spa
Game Farm	Guest accommodation is subsidiary to the main use, which is for the keeping of certain wild animal species. Game farming is further controlled by environmental and tourism legislation.	<ul style="list-style-type: none"> • Clustered dwelling units • Restaurant or bar • Wellness Centre and Spa

Source: Urban Dynamics Gauteng, 2019

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d. Backpacking and youth hostels

Backpacking and youth hostels provide low cost accommodation to traveling persons whose primary need is for a sleeping facility. Backpacking and youth hostels may contain communal areas, such as kitchen and dining areas and meeting rooms for the exclusive use of lodgers. A kitchen is available for self-help, but no meals are provided for guests. All facilities are communal. Usually there are no restrictions on the number of rooms or beds, but these must be appropriate for the building and surrounding area. However, Council may restrict the number of beds or rooms per establishment in cases and lay down conditions necessary to mitigate the impact of the establishment on the surrounding residential areas.

e. Self-catering apartments

Self-catering apartments is located in a building or a group of buildings consisting of separate accommodation units rented for residential purposes. Each unit incorporates a kitchenette and an ablution facility. The establishment may also provide meals communally to guests. There are usually no restrictions on the number of rooms or beds. However, Council may restrict the number of beds or rooms per establishment in cases where it is necessary to mitigate the impact of the establishment on the surrounding residential environment.

f. Hotels

Hotels are purpose-built building, which may consist of multiple free-standing structures or a multiple storey single structure. These establishments provide separate rooms with at least one communal dining facility. Breakfast lunch and dinner is served. No provision is made for self-catering. All provided facilities are for the exclusive use of the residing guests. No restrictions are placed on the number of rooms or beds. Council may, however, restrict the number of beds or rooms per establishment to mitigate the impact of the establishment on the surrounding areas. Proximity to major transport routes is an advantage.

g. Lodges and resorts

Lodges and resorts are purpose built and designed guest accommodation units for short term occupancy or use on time sharing basis. Such developments are often located in a unique environment. It can consist of multiple free standing, linked or single structures. Lodges and resorts may include ancillary facilities which are related to the establishment, such as ablution facilities, tourist facilities, recreation facilities, sports facilities, lecture rooms, restaurants, conference facilities, spa and wellness centre, caravan park and camping site. The scale of development is to be determined by contextual

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information, such as the environmental sensitivity of the area in which it is located, scenic or panoramic views, the carrying capacity for the environment, etc.

h. Game farms

Game farms are purpose built and designed guest accommodation units for short term occupancy or use on time sharing basis for holiday or recreational purposes. It is always located in a unique environment related to wildlife preservation, hunting or fishing recreation. It may include ancillary facilities that are related to the game farm, such as ablution facilities, tourist facilities, recreation facilities, sports facilities, and restaurants. A game farm consists of multiple free-standing dwelling units that may or may not be linked to each other. All of the dwelling units must be clustered together and must not deter from the main function of the game farm. The density and design of the game farm must be determined by contextual information, such as environmental sensitivity, scenic views, and the carrying capacity for the natural environment.

The above is an attempt to provide a uniform approach to the management of tourist accommodation across all accommodation typologies within Siyathemba. It attempts to provide assessment criteria for each of the accommodation typologies that can be used to approve a consent use or a rezoning application for the establishment of guest accommodation. It is recommended that a Site Development Plan be submitted prior to the approval of any consent use and rezoning right for the establishment of tourist accommodation.

5.8.3.2. Guesthouse Guidelines

Guesthouses are the primary tourist accommodation facility applied within Siyathemba. Consequently, the development of guesthouses within Siyathemba needs to be guided by a set of guidelines. A primary goal of the guidelines must be to ensure that the residential character of the guesthouse property remains intact. In addition, guesthouses must not severely impact on the surrounding residential neighbourhood in terms of air pollution, noise pollution or visual pollution. For example, high-mast towers can be considered excessive visual pollution and loud music often associated with entertainment uses can be considered excessive noise pollution. In assessing applications for the development of a guesthouse on a property, several circumstances in relation to each individual case and its merits need to be taken into account. These must include:

- Whether the proposal would be consistent with the general planning and specific policies for the area concerned
- Whether the proposed development could be accommodated within the existing municipal services capacity of the neighbourhood

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- Whether the traffic likely to be generated by the proposed development could be accommodated adequately on the road network
- Whether adequate provision is made for parking

Based on the above, the following guidelines are set for the approval of a guesthouse specifically, primarily because guesthouses are the primary tourist accommodation facility applied within Siyathemba:

a. Setbacks and interface

If the guesthouse requires the extension of the existing dwelling unit, setbacks of the extension must be required and determined on the basis of the setbacks for the existing detached house. Greater setbacks may be required in some cases in order to ensure that neighbouring dwellings are private and retain sufficient daylight. All setbacks must be in lines with the Scheme Regulations for Siyathemba. Applicants for dwelling unit extension for guesthouses must be required to show what impact building or demolition proposals will have on adjacent properties. In particular, vehicle access and parking areas will need to be related to adjacent developments.

b. Architectural character

The character of a residential neighbourhood is made up of the architectural design of the houses and the landscape setting. The design of a guesthouse building, be it an extension of the existing building or the conversion of a part of the existing building, will need to be assessed in relation to the neighbourhood character and in particular the existing house on the stand. Development of a guesthouse must be harmonious in scale, materials, form and character with the existing house on the site and with other dwellings in the neighbourhood. If a contrasting architectural style is proposed, which contrasts the style of the original buildings (e.g. old versus new), this needs to be done by a competent architect who understands the use of contrast to enhance the overall building design and appearance.

c. Building height

The impact of an extension of the existing house to accommodate a guesthouse may be most apparent in the addition of an extra storey. It is therefore considered important to limit the building height of an extension to the conditions that neighbours could have expected under the existing design and positioning conditions of the stand in question. The maximum height, where a guesthouse requires the extension to an existing house, must be in accordance with the Scheme Regulations for Siyathemba.

d. Parking

Vehicle parking spaces for guesthouses are required to be provided at the parking ratios as set out in the Scheme Regulations for Siyathemba. The construction of a carport or garage must comply with the design and positioning conditions of the title deed of the stand in question. Unless parking is controlled it will have an adverse impact on the existing residential character of a residential area. Where possible, parking should be provided at the back of the existing house, to allow the front of the properties to retain its garden and its residential character. Where there is no option but to place the parking area in front of the house, it must be a condition of approval that the area in front of the house is landscaped and not simply converted into a 'car park'.

e. Landscaping

The quality of a residential environment is largely determined by the street landscape (e.g. tree-lined streets), which is reinforced by the front gardens of residential properties. It is essential that when developing a guesthouse, that the area between the existing house and the front property boundary does not deteriorate. Deterioration could occur through the introduction of an additional vehicular access, parking in front of the building or through a lack of significant planting.

Applicants for a guesthouse should be encouraged to take access from the same driveway that the existing house does, in the interests of preserving the existing streetscape. Existing street trees are to be retained where possible, especially existing mature trees on the stand. In order to achieve this, the Municipality can require the submission of a landscape design. Screening by using landscaping may be required to prevent overlooking of neighbouring property.

f. Municipal services

The requirements of the municipality to maintain municipal services capacity must apply. The cost of any augmentation of municipal services infrastructure and the cost of service connections must be borne by the applicant for a guesthouse.

g. Signs and advertising

Signs or advertisements on the premises of guesthouses aim to draw attention to the services available at the premises where the advertisement is being displayed. The signs or advertisements of guesthouses must not be intended to permit all forms of outdoor advertising on the premises. It must only permit advertisements for the services available at the particular

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premises. The regulation of signs and outdoor advertisements must be in accordance with the Scheme Regulations for Siyathemba.

h. Community involvement

Prior to consideration of an application for guesthouses, neighbours will need to have been informed of the proposal. Neighbours in this case are considered having a mutual boundary with the property on which the guesthouse is considered. Where comments are received from neighbours, these comments must be used to determine whether or not the conditions for the development of a guesthouse are satisfied and to establish conditions for approval so that the intentions of the Scheme Regulations for Siyathemba can be met. The invitation to comment must apply to the impact of the guesthouse on neighbouring properties and not to the applicant's opportunity to develop a guesthouse.

i. Rights granted

Guesthouses should be granted a consent use to operate their business, as stated in the Scheme Regulations for Siyathemba. The municipality must grant these consent uses for a limited number of years, with the right to revoke these rights after this period, should the Municipality find that the property owners has not complied with the conditions of granting the consent use in the first place. Reasons for not renewing the consent use could be a failure of the property owner to implement the landscaping condition, or the guesthouse causing excessive air, noise or visual pollution.

5.8.4. TOURISM FACILITIES

Apart from tourist accommodation, tourism facilities can be developed within Siyathemba that specifically aims to provide services and goods to tourists visiting Siyathemba. Tourism facilities can include cultural villages, farmer's markets, information centre, etc. Importantly, tourism facilities must aim to depict the culture, activities and artifacts of the Siyathemba region. The following guidelines should inform the establishment of tourist facilities:

a. Space and infrastructure

The amount of space needed for the envisaged buildings and visitor facilities of a tourism facility needs to be assessed before the approval of land use rights. Assess to municipal water and electricity capacity and adequate road access also needs to be determined before granting land use rights for the establishment of a tourism facility.

b. Parking

Sufficient parking needs to be provided to cater for tourists that arrive in their own transport. Thus, it is important to estimate beforehand the number of visitors that are envisaged. Importantly, parking for tour buses must be provided if tourist groups are to visit the tourism facility.

c. Amenity value

The location of tourism facilities must be such that the attractiveness of the surrounding area enhances the value of the tourist facility for visitors and tourists. For example, the site for the tourist facility must be free from unpleasant odours often associated with commercial farming practices.

d. Roads and accessibility

The location of tourism facilities must be such that it is easy for tourists using their own transport to find the facility. Thus, the tourism facility should preferably be located within reasonable distance of a main road that is frequented by tourists. Permission must be obtained from the Provincial Department of Transport to construct new access points onto main roads.

e. Signage

Permission must be obtained for the erection of any signs advertising the location of a tourism facility. To erect a road sign in the road reserve (as distinct from on your own property) to advertise a tourism facility will require approval from the Department of Transport in the case of national roads, the Provincial Department of Transport in the case of secondary roads, and the Local Municipality in the case of local roads.

f. Zoning

Where the tourism facility will significantly change the currently land use, application must be made for a change in land use. Any special environmental, mining or other zones that could conflict with the intended tourism facility should be determined before granting land use rights for the development of tourism facilities.

g. Licensing and registration

The tourism facility may need to be registered as a business with the Local Municipality. If the tourism facility intends to serve meals, a trading license will need to be purchased. If liquor is to be sold by the establishment, application will need to be made for a liquor license.

h. Employment and partnerships

It is important to establish partnerships with neighbouring communities in order for them to have a sense of ownership in the tourism facility. As such, it is important for local people to be employed in the operation. The adequate training of tourism facility staff is also vitally important.

5.9. ALIGNMENT WITH PSDF

A number of policy documents affect spatial development within Siyathemba. Amongst other, these include the Northern Cape Spatial Development Framework (PSDF) 2018, which is recognized as the basic points of departure in the formulation of a municipal SDF, such as the Siyathemba SDF. It is therefore necessary to align the Siyathemba SDF with the PSDF to ensure that the Siyathemba SDF meets the objectives of the PSDF, which aim to integrate spatial development on a provincial and regional level.

5.9.1. ALIGNMENT WITH PSDF STRATEGIES

Five growth and development strategies were proposed by the Northern Cape PSDF to assist the province and municipalities in managing future growth of settlements. These five growth and development strategies are as follows:

- Strategy 1: A diversification and maintenance strategy for settlements with a low social need and high development potential.
- Strategy 2: A growth management strategy for settlements with a high social need and high development potential.
- Strategy 3: A migration and maintenance strategy for settlements with a high social need and low development potential.
- Strategy 4: A sustainable livelihood strategy for settlements with low social need and low development potential.
- Strategy 5: Mining development management strategy.

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Amongst other towns within the Northern Cape Province, the 3 towns within Siyathemba was also listed according to these strategies. Prieska was listed under Strategy 1 (a diversification and maintenance strategy for settlements with a low social need and high development potential) and Marydale and Niekerkshoop was listed under Strategy 2 (a migration and maintenance strategy for settlements with a high social need and low development potential). Table 51 provides the strategy components applicable to Strategy 1, as well as how the Siyathemba SDF proposals for Prieska complies with these strategy components.

TABLE 51: DIVERSIFICATION AND MAINTENANCE STRATEGY FOR PRIESKA

Application	Settlements with low social need and high development potential
Rationale	<ul style="list-style-type: none"> • Strengthen the economies' position; • Focus on growth and expansion; • Government investment focused on strategic projects; • Focus on diversification and identification of new opportunities including: <ul style="list-style-type: none"> ○ Value chain development; ○ SMME development; and ○ Private Public Partnerships. • Ensure attractive building stock and physical business environment; • Investment marketing; • Provide basic services to: <ul style="list-style-type: none"> ○ Ensure efficient supply of water, electricity and waste management services to sustain additional industry growth; and ○ Eradicate backlogs in water and sanitation, electricity, housing. • Provide social services infrastructure including: <ul style="list-style-type: none"> ○ Education, health, sport facilities to enhance human capital development; ○ Training facilities for artisans; and ○ Public transport to long distance commuter areas. • Eradicate backlogs in social infrastructure; • Enhance Economic Infrastructure providing: <ul style="list-style-type: none"> ○ Roads, rail, pipelines, ICT broadband fiber access to stimulate growth in main industries; and ○ Improve access from long distances commuter areas to enhance employment opportunities. • Enhancing the urban environment through ongoing urban regeneration initiatives; • Focused intervention is required to protect investments from declining cycles and stabilising the municipalities' rates base.
Initiatives	<ul style="list-style-type: none"> • Protect and expand investment and municipal tax base; • Develop a framework with regard to priority investment areas and liaise with the business community; • Expand the nodal hierarchy – and the urban property markets accommodated within key nodes;

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Application	Settlements with low social need and high development potential
	<ul style="list-style-type: none"> • Diversify the local economy – focus on forward and backward linkages; • Uphold business environment and property investment maintenance – contribute to retain and instill business confidence; • Ensure effective municipal management and service excellence; and • Uphold public sector commitment – maintenance and expansion of existing public infrastructure and amenities.
Siyathemba SDF Response	<ul style="list-style-type: none"> • The economy of Prieska is promoted through the expansion of the industrial area, enabling the further growth and strengthening of its CBD, enabling skills development of its population, and providing linkage with the Copperton high-tech sector to sustain and grow Prieska's business tourism industry. • The maintain and enhance the physical business environment, urban design guidelines are proposed to deal with retail development and the design and development of new CBD facilities, such as the proposed skills training centre. • Social infrastructure proposals are made, such as the proposed skills training centre and long-distance commuter transport hub, located on the N10 freeway. The need for social facilities has been calculated and proposals made accordingly, such as the need for an emergency service centre. • To enhance Prieska's economic infrastructure, proposals were made to more effectively link to the N10 freeway. This was done by proposing a transport hub near to existing industrial area, which could be used for long-distance commuter travel and freight logistics.

Source: Northern Cape PSDF 2018 and Urban Dynamics Gauteng, 2019

In the same manner as above, Table 52 provides the strategy components applicable to Strategy 3 and the way in which the Siyathemba SDF proposals for Marydale and Niekerkshoop complies with these strategy components.

TABLE 52: MIGRATION AND MAINTENANCE STRATEGY FOR MARYDALE AND NIEKERKSHOOP

Application	Settlements with high need and low development potential
Rationale	<ul style="list-style-type: none"> • Encouraging no growth or limited growth in population and public investment accommodating the trend of migration of people to urban regions and regional growth centres; • Enhancing ICT connectivity; • Uphold public sector commitment in: <ul style="list-style-type: none"> ○ Maintaining basic services; ○ Provide green infrastructure e.g. water tanks, renewable energy; and ○ Maintaining basic social amenities. • Enhance human capital development by:

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Application	Settlements with high need and low development potential
	<ul style="list-style-type: none"> ○ Providing access to basic education facilities; ○ Enhancing existing skills base; and ○ Increasing access to internet-based skills training. ● Promoting private investment only in cases where: <ul style="list-style-type: none"> ○ Sustainable opportunities exist for the use of the settlements for other purposes such as tourism development, retirement villages; and ○ Independent town management is feasible making the settlements less government dependent.
Initiatives	<ul style="list-style-type: none"> ● Service maintenance; and ● Public sector commitment – basic public sector infrastructure and amenities.
Siyathemba SDF Response	<ul style="list-style-type: none"> ● Growth of these settlements are not encouraged. To this end, existing vacant residential stands are used to accommodate the housing need, instead to future expanding these towns. Only small residential extensions are encouraged, mostly comprising already planned extensions that have not yet been developed. ● Calculations were made to ensure these towns have the necessary basic social amenities and municipal infrastructure.

Source: Northern Cape PSDF, 2018 and Urban Dynamics Gauteng, 2019

5.9.2. PSDF SPATIAL PLANNING CATEGORIES ALIGNMENT

The Northern Cape PSDF is structured according to the Spatial Planning Categories (SPC's). The PSDF uses the SPC's to provide a framework in terms of which land-use decisions can be standardised throughout the province. Thus, the SPC's aim to foster an organised process that enable planners to work together in a coherent manner. It is important to note that the SPC's do not change existing zoning or land-use regulations or legislation. SPC's merely help to clarify and facilitate coherent decision-making that can lead to better zoning, laws and regulations. The SPC's is based upon UNESCO's biosphere reserve zoning model (Diagram 53). The model provides for three broad land-use categories, namely a core conservation area (SPC A), a conservation-focused buffer area (SPC B) and a transition area (SPC C-F).

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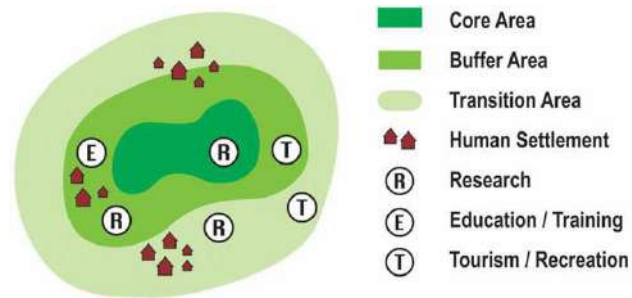


Diagram 53: Classification model adopted for the Northern Cape

The PSDF proposes that all municipalities within the Northern Cape should use the SPC's as the foundation of spatial planning. Consequently, the SPC's need to be applied to the Siyathemba SDF. Table 53 applies the Siyathemba SDF proposals to the SPC's, addressing alignment issues regarding conservation, agriculture, urban, industrial and infrastructure land uses.

TABLE 53: APPLICATION OF PSDF SPATIAL PLANNING CATEGORIES

			Description	SDF Proposal Alignment
A	A.a	A.a.9	CORE	
			Statutory Protected Areas	
			Mountain Catchment Areas	<ul style="list-style-type: none"> • Protect the scenic quality of the Doringberg mountain range, as well as the environmental value of this mountain range by categorizing it as high priority topographical feature that needs to be protected. • Only low-impact developments on must be considered on this mountain range, and only after submission of a specialist impact study. • Acknowledge the Doringberg mountain range to be an ecological support area of the Orange River and must therefore be protected. • Protect the Doringberg mountain range from inappropriate agricultural practices. • Include the Doringberg mountain range into the open space lattice of Siyathemba to enable fauna migration

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		Description	SDF Proposal Alignment
			along this environmental corridor.
B	B.b	BUFFER Ecological Corridors Freshwater Ecosystem Priority Areas	<ul style="list-style-type: none"> Protect Orange River and Brak River and its embankments as important environmental corridors to supports regional sustainable development. Implement an effective water management plan for the Orange River corridor to ensure the optimal use and conservation of water as a scarce resource in this arid region. The banks of the Orange River are used for intensive agricultural purposes. Thus, conservation of the Orange River will require employing responsible farming practices along the banks of the river to avoid polluting the river. Create environmental corridors that enable fauna migration by utilizing rivers and tributaries as corridors linking critical biodiversity areas. The non-perennial rivers that flow into the Orange River need to be protected by placing buffers zones along the banks of these rivers and protecting these buffer zones from settlement development, intensive farming and mining activities. A number of non-perennial streams also flow south-westwards towards Verneukpan and should also be protected using buffer zones.
	B.b.1	Rivers or riverbeds (incl. 32 m buffer)	
C	C.a	AGRICULTURAL AREAS Extensive agricultural areas	<ul style="list-style-type: none"> Encourage the use of agricultural land that does not have access to irrigation sources for livestock or game farming. Discourage the subdivision of extensive farms (larger than 20ha in size) to ensure the viable operation of the commercial farming enterprises. Protect and enhance the existing commercial agricultural industry. Maintain and strengthen linkages between the agriculture industry and Prieska, which is the agri-service
	C.b	Intensive agricultural areas	

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		Description	SDF Proposal Alignment
C.c	C.c.3	Other agricultural areas Urban Agriculture	<p>centre to the local commercial agricultural industry.</p> <ul style="list-style-type: none"> • Make the Orange River and its agricultural benefits accessible to communities within Prieska. • Develop smallholdings at Prieska to give the local residents an opportunity to establish irrigated, small-scale subsistence farming enterprises.
D		URBAN RELATED	
D.a		Main Town	<ul style="list-style-type: none"> • Allocate most land for residential expansion within Prieska, the primary town of Siyathemba. • Strengthen the Prieska CBD as the agricultural service centre of Siyathemba.
D.b		Local Town	<ul style="list-style-type: none"> • Maintain Marydale and Niekerkshoop in terms of municipal services, social amenities and existing affordable housing needs.
D.f	D.f.1	Institutional Areas Place of Instruction	<ul style="list-style-type: none"> • Develop the old mill site in Prieska as an agri-industry and renewable energy skills training centre. • Link this skills training centre to the Sol Plaatje University (or other tertiary educational institution), who can provide the training courses at the skills training centre. • Fully integrated the proposed skills training centre to the existing Prieska CBD to ensure that it is developed as a single node.
D.h		Residential Areas	<ul style="list-style-type: none"> • Develop a medium-density residential area in Prieska, located along Upington Way. Develop this residential area for affordable and bonded housing purposes. • Develop a residential area in Prieska along Arbeck Street to house mine workers of the Copperton mine. Only develop this township if the mine is reopened. • Although the proposed Prieska smallholdings will be farmed on a communal bases by local communities from neighbouring residential areas, a limited number of these smallholdings must be allocated to individual households to farm on these smallholdings. • Develop the small parcels of land have been allocated

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	Description	SDF Proposal Alignment
D.i	Business Areas	<p>for medium residential density expansion in Marydale, such as the extension of Rooidal and Rama Rou.</p> <ul style="list-style-type: none"> • Purchase the existing vacant stands within Marydale and Niekerkshoop. Utilise these stands for affordable housing purposes. • Retain the Prieska CBD the primary business node of Siyathemba. It is especially important to protect the Prieska CBD from the retail and office decentralization to residential areas. • If a shopping mall is proposed for Prieska in future, such a shopping mall must be located within the bounds of the CBD and the integrated through design into the spatial fabric of the CBD. • Expand the Prieska CBD to further establish it as the agricultural service centre of Siyathemba. The Prieska CBD can expand south-westwards, unto the vacant land surrounding the Bill Pickard Hospital. • Strengthen the secondary business nodes in Marydale and Niekerkshoop as the town centres of these towns, if possible. • Develop two new tertiary business nodes in Prieska to serve new residential expansion areas within Prieska. The business nodes can be located along Upington Way and along Arbeck Street. • It is important that the tertiary business nodes in Prieska are not developed in competition to the Prieska CBD, but that the focus on providing day-to-day goods and services to the surrounding residential area. • Design and develop the existing and proposed business nodes in a manner that leads to the integration of these business nodes with the surrounding residential neighbourhood that it serves.
D.n	Cemeteries	<ul style="list-style-type: none"> • Expand the existing cemeteries in Prieska, Marydale and Niekerkshoop as is required. • The approval of cemetery development and expansion must be made subject to geotechnical investigation and

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Description		SDF Proposal Alignment
D.q	Resorts and Tourism Related Areas	Environmental Impact Assessment. <ul style="list-style-type: none"> • Protect and enhance the linkage between the high-tech and the Prieska accommodation industry, such as creating an on-demand shuttle service between Prieska and Copperton. • Develop resort and adventure tourism along the Orange River to entice tourists to stay in the region for longer periods of time. • Expand the game and hunting industry to enhance eco-tourism in the region.
E	Industrial Areas	
E.b	Industrial Development Zone	<ul style="list-style-type: none"> • Expand the existing Prieska industrial area southward up to the N10 freeway. • Provide direct access to the N10 freeway, which is a primary freight route. • Cater for the manufacturing, assembly and storage of renewable energy infrastructure. • Designate the industrial area a Renewable Energy Zone (SEZ) as per the PGDP
E.e	Extractive industry	<ul style="list-style-type: none"> • Encourage the reopening of the Copperton mine for copper and zinc extraction. • The municipality must clarify its position regarding the development of mining within municipal area • The roles and responsibilities of the mine and the municipality must be defined and its implementation monitored.
F	SURFACE INFRASTRUCTURE AND BUILDINGS	
F.e	Heavy Vehicle Overnight Facilities	<ul style="list-style-type: none"> • Develop a transport hub on the intersection of the N10 and the R387 • The transport hub can include a public transport stop, a truck stop, a large filling station, accommodation facilities, restaurant facilities, and a small retail outlet. • Other related commercial land uses, such as warehousing and vehicle and truck repair workshops, can also be included in this transport hub.
F.i	Renewable energy structures	<ul style="list-style-type: none"> • Encourage the clustering of renewable energy projects

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Description	SDF Proposal Alignment
	<p>along the high-tech corridor between Prieska and Copperton.</p> <ul style="list-style-type: none">• Ensure the siting of renewable energy projects do not have adverse resource, atmospheric, environmental and agricultural impacts.• Utilise the proposed skills training centre at Prieska renewable energy skills training.• Manage renewable energy issues and beneficiation amongst the local communities.

Source: Northern Cape PSDF, 2018 and Urban Dynamics Gauteng, 2019

SECTION 6: LAND USE MANAGEMENT

The Development Framework proposed in the previous section of this report, provides the platform for a Land Use Management System (LUMS). The Land Use Management System is therefore informed by the Development Framework and should aim to manage the implementation of the framework proposals.

6.1. LUMS TERMINOLOGY

The concept of a Land Use Management System (LUMS) is fairly simple. A municipality creates zones within its municipal area and regulations for the use of land inside those zones. The creation of these zones and regulations are designed to benefit the municipal area by promoting growth and development within the municipal area in a sustainable and viable manner. The use of a LUMS is accompanied by a set of zoning terminology, such as nett density, building height, coverage and Floor Area Ratio (FAR). The zoning terminology used in this report, which is related to the use of the LUMS, is as follows:

a. Building Height

The height of a building can either be measured as the height of the roof of the building or as the number of storeys of the building. In this document, the number of storeys is used as the measurement of building height. A storey is that part of a building between the surface of one floor and the ceiling immediately above. Basement parking is not considered a storey in this document.

b. Coverage

Coverage means the area of a property which may be covered by a building, as seen vertically from the air, excluding roof overhangs. It is expressed as a percentage of the area of the property.

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c. Residential Density

Density refers to the intensity of development within a LUMS zone. In residential areas, density is generally measured by the maximum number of dwelling units permitted per hectare of land (e.g. 20 units/ha). Residential density can be expressed as nett or gross density. Nett residential density (see Diagram 54) refers to the density on a specific site, excluding public roads, social facilities and public open space, thus including only the area allocated for residential use. Gross residential density refers to the density of a specific site including the land occupied by infrastructure, social and economic facilities, such as schools, shops, open space and roads. Nett density is used when referring to residential density in this Land Use Management section of the Siyathemba SDF.

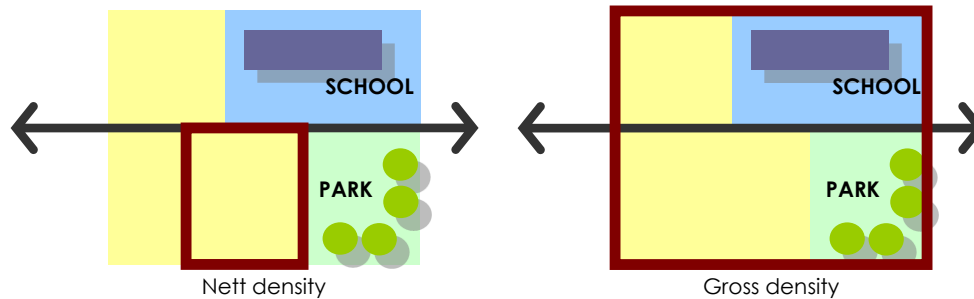


DIAGRAM 54: DENSITY MEASURES

d. Floor Area

The floor area of a building is the sum of the area of each floor of the building, excluding fire escapes, parking space, access passages, lift housing, and balconies.

e. Floor Area Ratio (FAR)

FAR is a density measure that is applied to mixed-use buildings that contain both residential and other uses. The floor area ratio (FAR) is the ratio of total building floor area to the area of the property. FAR is calculated by dividing the floor area of the building by the total area of the property (see Diagram 55).

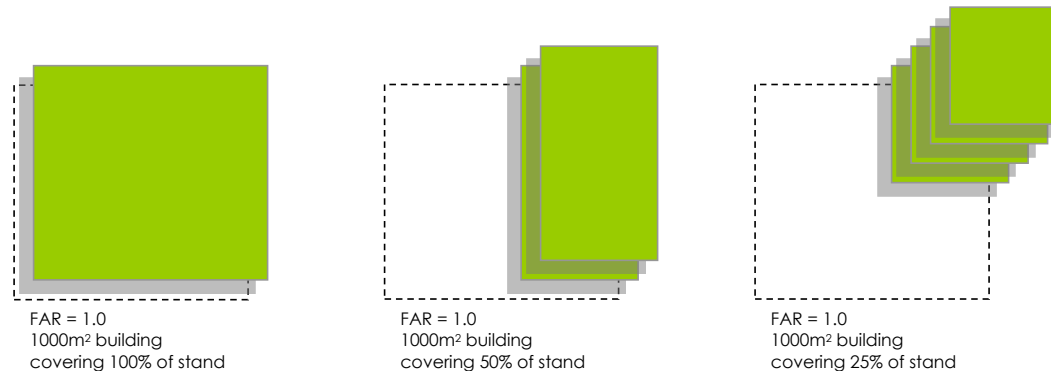


DIAGRAM 55: CALCULATION OF FAR

f. Parking Requirement

Parking requirement is the number of parking bays required for each use or facility provided within a development. Parking requirement is usually expressed as the number of parking bays to be provided per building floor area (m²) covered by the use or facility. Parking to floor area ratios are calculated based on the amount of traffic generated by specific uses or facilities.

6.2. LUMS ZONES AND MATRIX

The Land Use Management System aims to implement the Development Framework proposals through applications for land use change, such as township establishment applications. The Land Use Management System comprises the following mutual supporting elements:

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- Demarcated zones: Prieska, Marydale and Niekerkshoop were divided into a number of Land Use Management zones. These zones aim to promote the development of a specific land use character (as defined in the Development Framework) through the use of land use mix and density.
- Land use matrix: The Land Use Management zones are linked to a matrix. The matrix defines the land use mix and density to be allowed within each demarcated zone. In turn, the land use matrix was aligned with the Spatial Planning Categories (SPCs) of the Northern Cape Provincial Spatial Development Framework (PSDF).

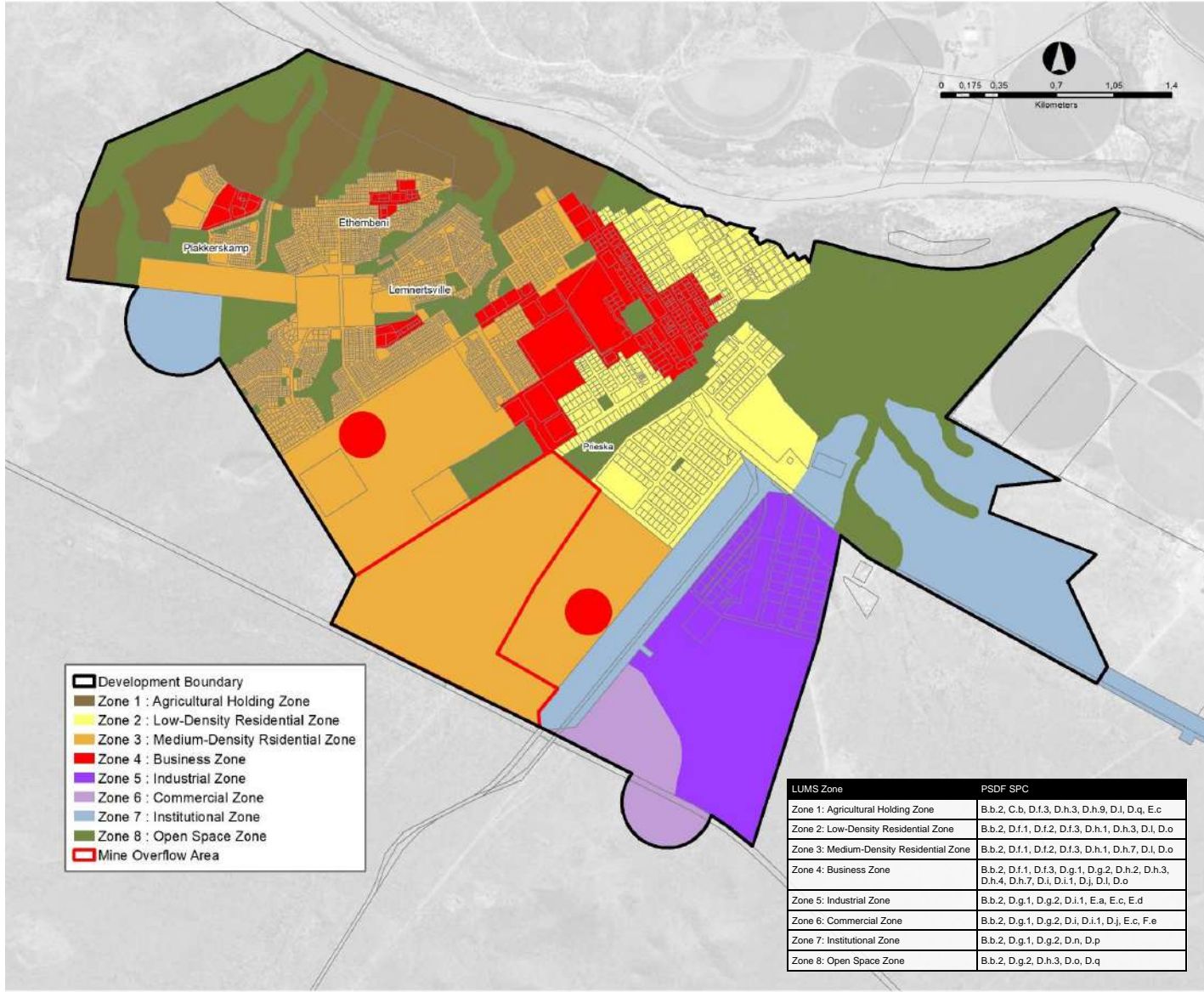
The Land Use Management (LUMS) zones aims to achieve specific objectives, as is set out below. **The Land Use Management (LUMS) zones are demarcated on Figures 41 to 47. The land use matrix, containing the land use mix and density, which are linked to these zones, are set out in Table 55.**

Zone 1: Agricultural holding zone

Zone 1 is an agricultural holding zone that allows for the development of agricultural holdings where appropriate. Using these agricultural holdings for subsistence farming and small-scale commercial farming, to the benefit of local communities, is the primary focus of this zone. To this end, intensive agricultural uses are to be encouraged within Zone 1, which include micro enterprises associated with rural living, such as farm stalls, light industrial and commercial uses for agri-industries, and intensive farming, such as small livestock farming and irrigation cultivation. The maximum residential density allowed within this zone is 1 unit per hectare. Residential supporting facilities to be developed within this zone include, social facilities and guesthouses.

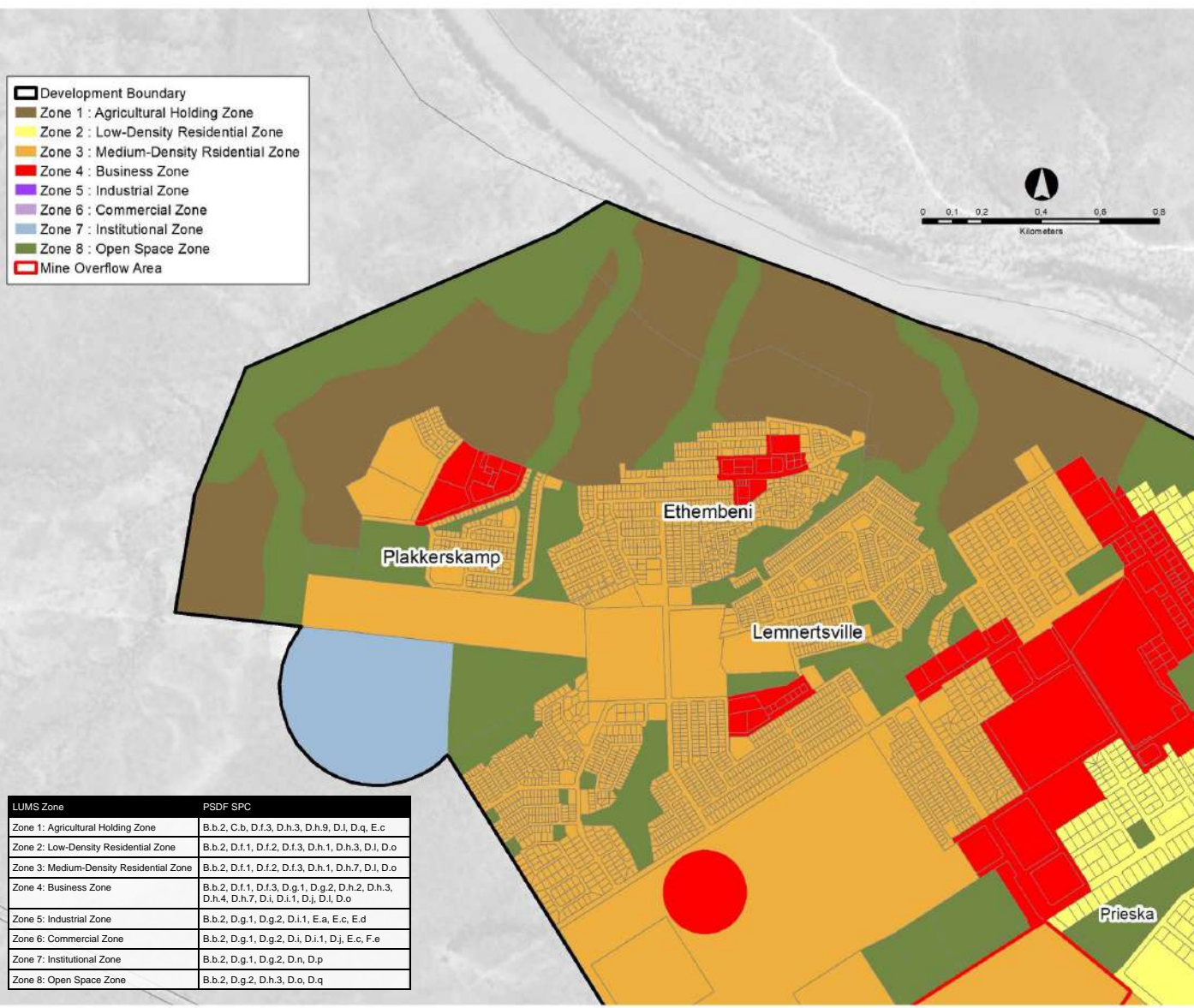
Zone 2: Low-density residential zone

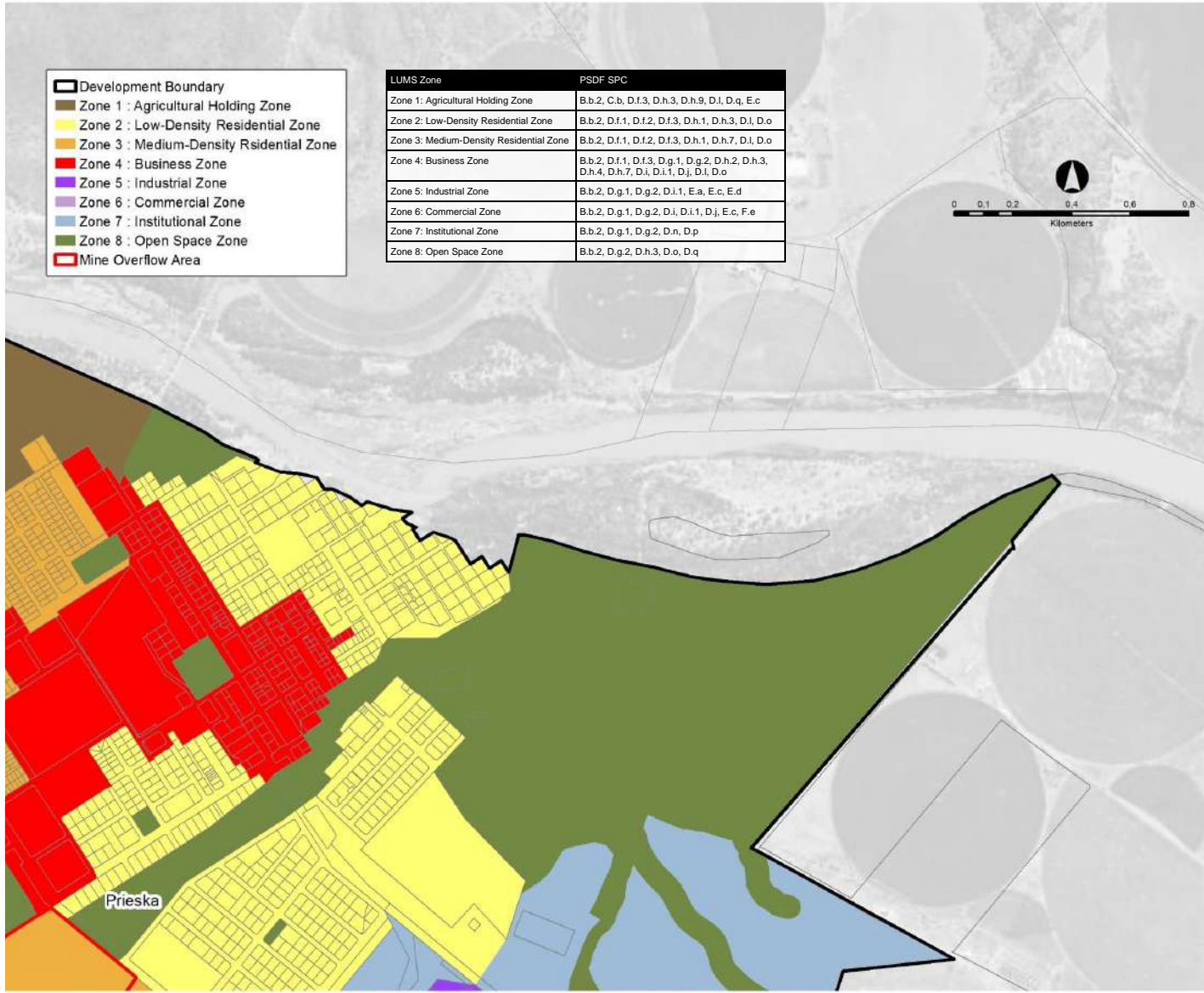
The aim of Zone 2 is to develop and maintain the residential character of historical residential neighbourhoods within the towns, which reflect the rural character of these towns. This involves the management of land use development within these residential areas and curbing the proliferation of noxious and disturbing land uses within these areas. Zone 2 does allow for the establishment of guesthouses with the aim to support and promote the local business tourism sector. However, consent for the establishment of guesthouses need to be lightly managed by the Guesthouse Regulations, set out in paragraph 7.3 below. A maximum residential density of 20 units per hectare should be supported in Zone 2. Residential supporting facilities to be accommodated within this zone include schools, social facilities and recreational facilities.



**FIGURE 41 | LUMS PRIESKA
OVERALL VIEW**

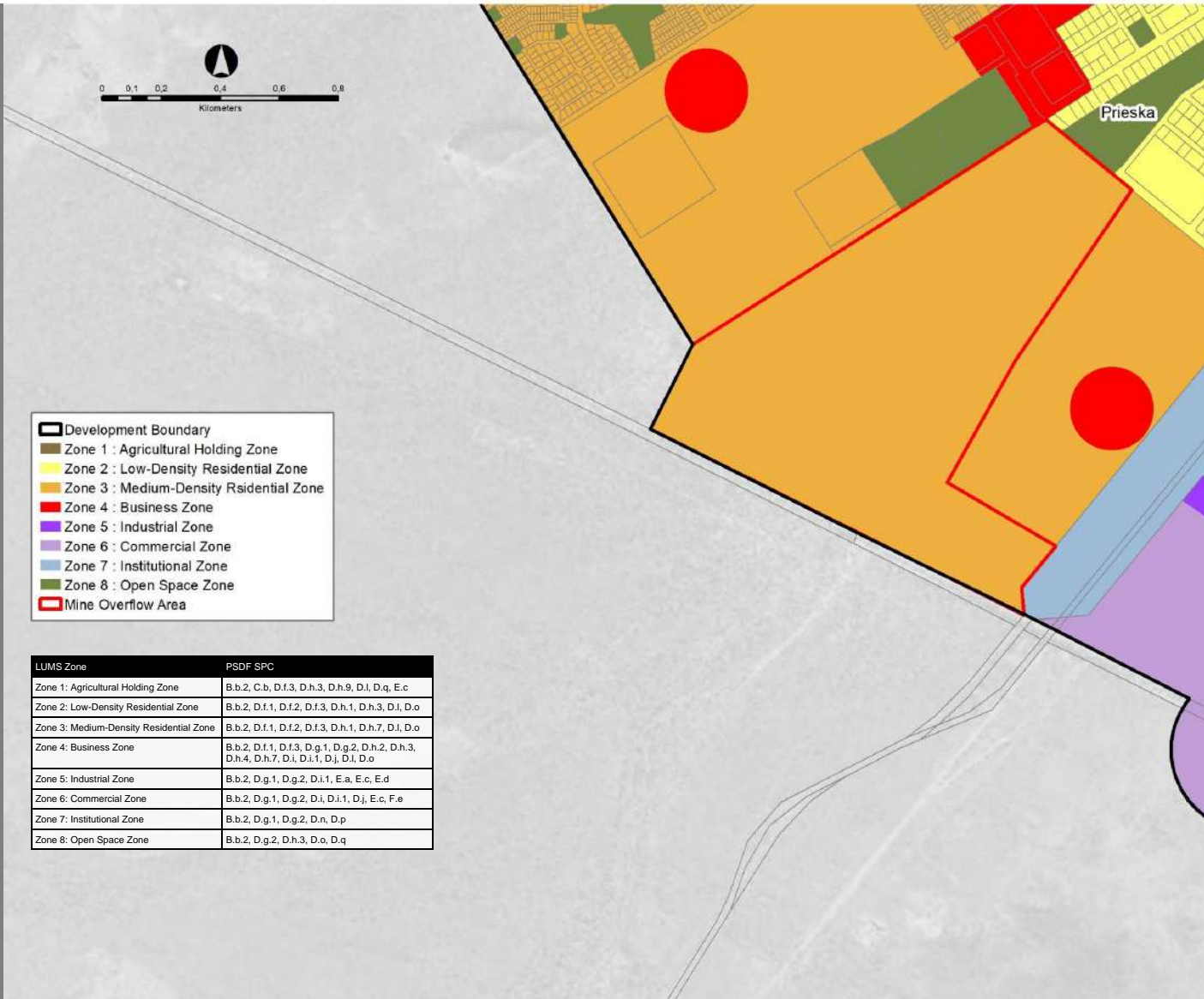
FIGURE 42 | LUMS PRIESKA NORTHWEST QUADRANT

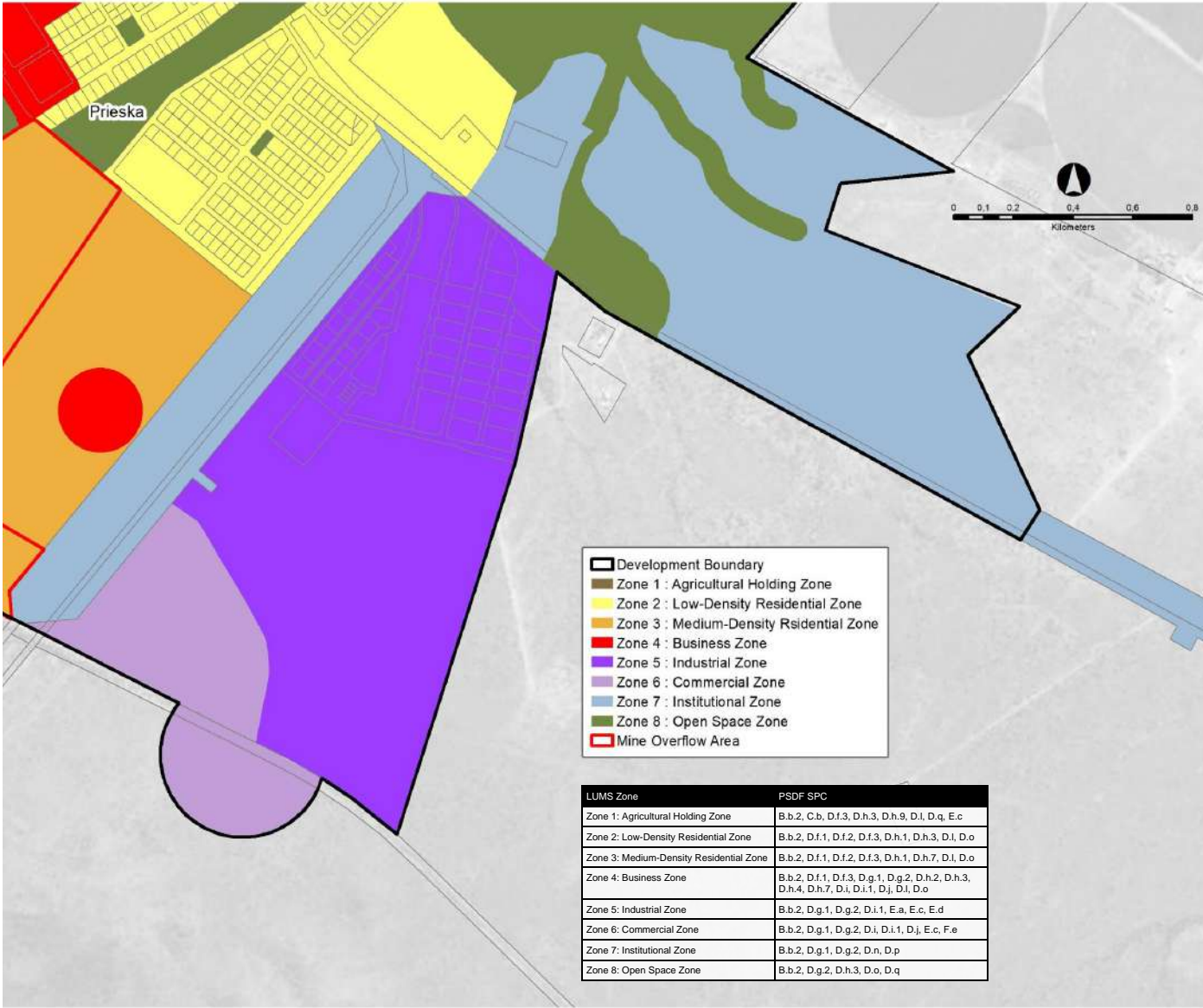




**FIGURE 43 | LUMS PRIIESKA
NORTHEAST QUADRANT**

FIGURE 44 | LUMS PRIESKA SOUTHWEST QUADRANT



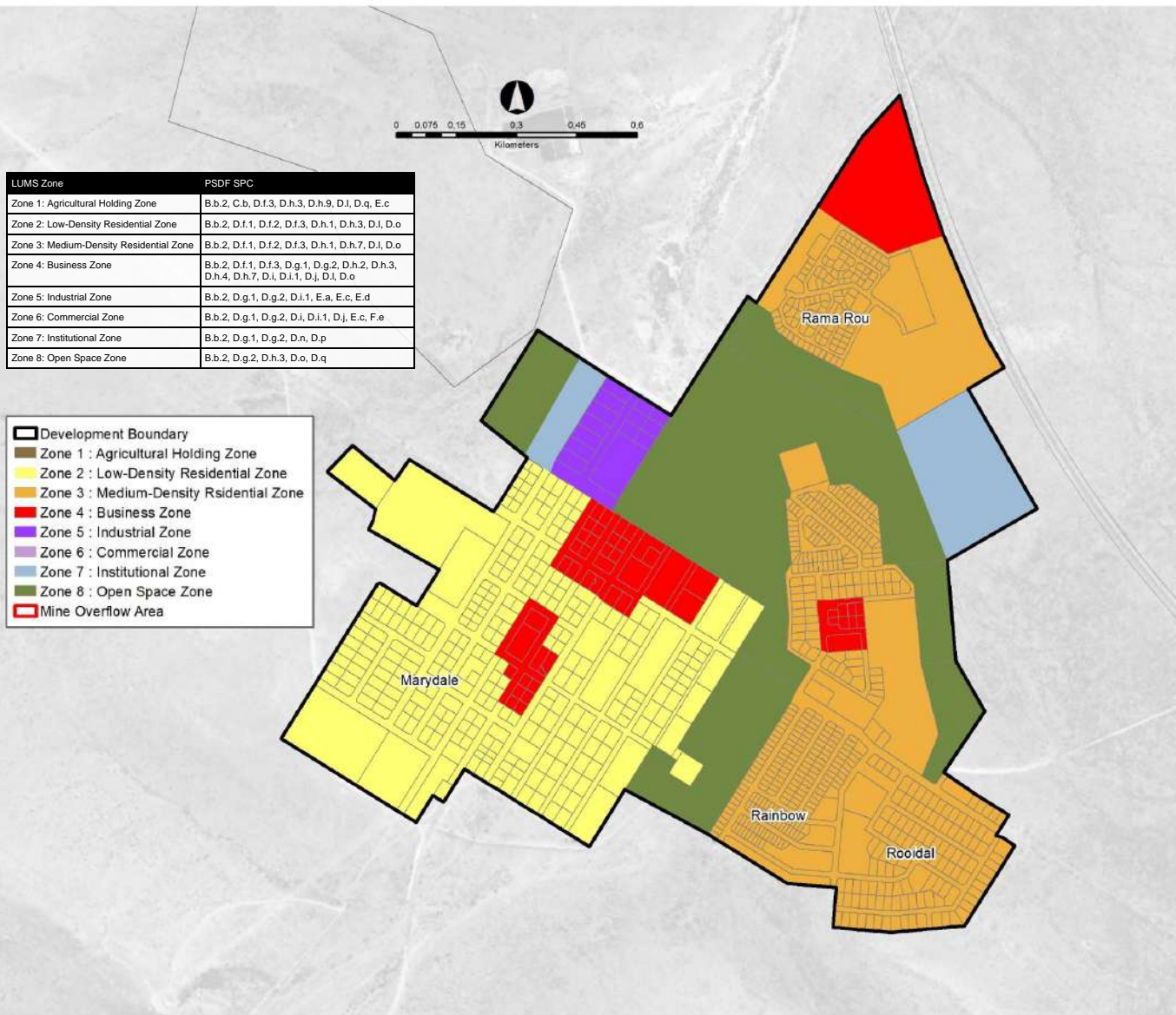


- Development Boundary
- Zone 1 : Agricultural Holding Zone
- Zone 2 : Low-Density Residential Zone
- Zone 3 : Medium-Density Residential Zone
- Zone 4 : Business Zone
- Zone 5 : Industrial Zone
- Zone 6 : Commercial Zone
- Zone 7 : Institutional Zone
- Zone 8 : Open Space Zone
- Mine Overflow Area

LUMS Zone	PSDF SPC
Zone 1: Agricultural Holding Zone	B.b.2, C.b, D.f.3, D.h.3, D.h.9, D.i, D.q, E.c
Zone 2: Low-Density Residential Zone	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.3, D.i, D.o
Zone 3: Medium-Density Residential Zone	B.b.2, D.f.1, D.f.2, D.f.3, D.h.1, D.h.7, D.i, D.o
Zone 4: Business Zone	B.b.2, D.f.1, D.f.3, D.g.1, D.g.2, D.h.2, D.h.3, D.h.4, D.h.7, D.i, D.i.1, D.j, D.i, D.o
Zone 5: Industrial Zone	B.b.2, D.g.1, D.g.2, D.i.1, E.a, E.c, E.d
Zone 6: Commercial Zone	B.b.2, D.g.1, D.g.2, D.i, D.i.1, D.j, E.c, F.e
Zone 7: Institutional Zone	B.b.2, D.g.1, D.g.2, D.n, D.p
Zone 8: Open Space Zone	B.b.2, D.g.2, D.h.3, D.o, D.q

**FIGURE 45 | LUMS PRIESKA
SOUTHEAST QUADRANT**

FIGURE 46 | LUMS MARYDALE



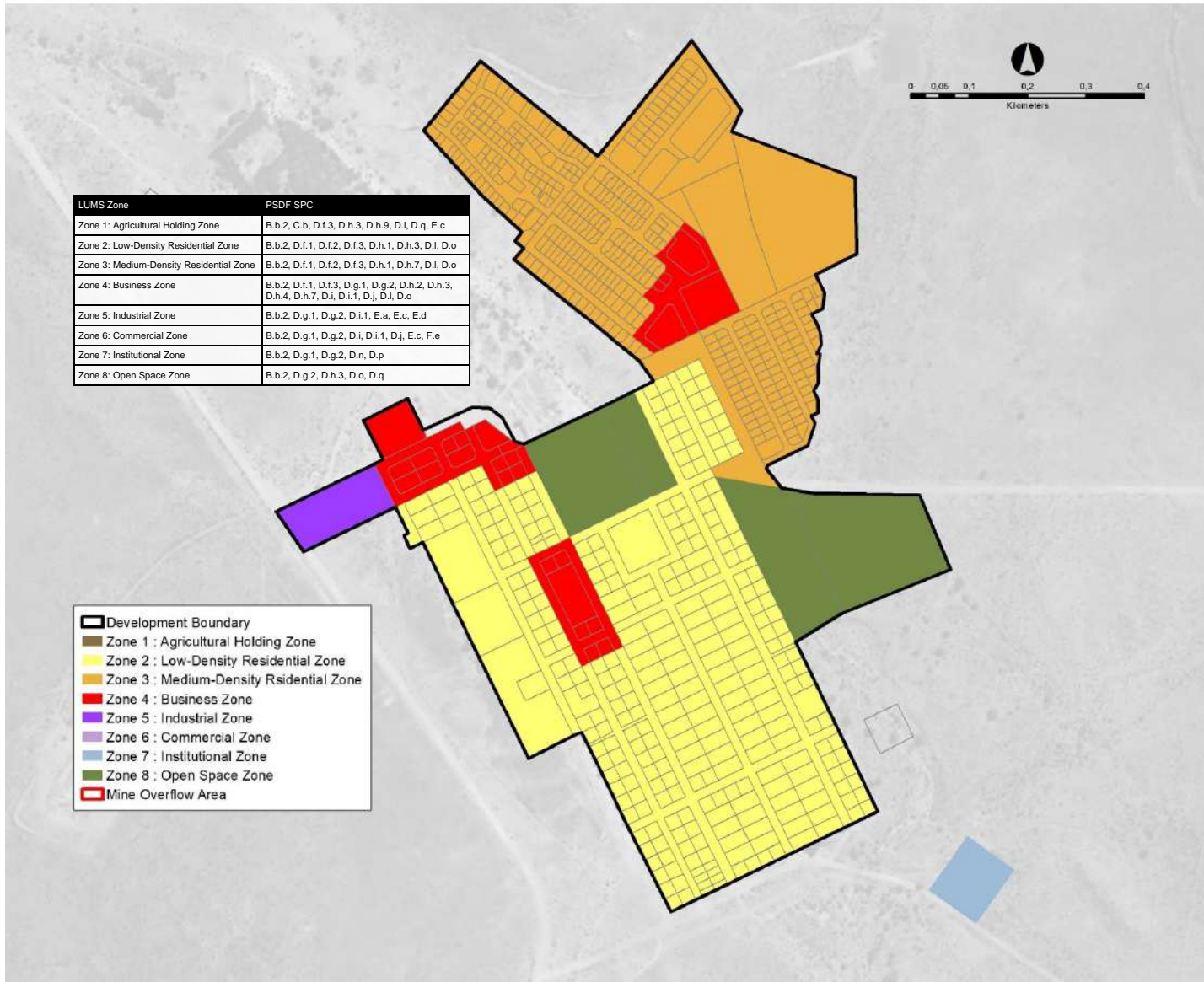


FIGURE 47 | LUMS NIEKERKSHOOP

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Zone 3: Medium-density residential zone

Zone 3 aims to encourage residential densities that allows affordable housing development to take place. A maximum residential density of 60 units per hectare are allowed within Zone 3. Such densities typically allow for the development of a range of affordable housing typologies within this zone, including row housing. Residential-supporting land uses to be accommodated within Zone 3 include educational facilities, religious facilities and social facilities. Zone 3 also allows for the establishment of micro enterprises with the aim to support and promote SMMEs within this zone.

TABLE 54: OBJECTIVES OF LAND USE ZONES

Land Use Management Zone	Aim and Objective	PSDF SPC Application
Zone 1: Agricultural holding zone	Develop smallholdings to give local residents an opportunity to establish irrigated, small-scale subsistence farming enterprises, as well as other agri-related enterprises.	B.b.2 – Rivers and riverbeds C.b – Intensive agricultural areas D.f.3 - Institution D.h.3 – Guest house D.h.9 - Smallholdings D.l – SMME incubators D.q – Resort and Tourism Related areas E.c – Light industry
Zone 2: Low-density residential zone	Maintain the historical low-density residential areas to retain the rural character of the town. Allow residential properties within these residential areas to operate guesthouses on the properties to benefit the local business tourism industry.	B.b.2 – Rivers and riverbeds D.f.1 – Place of instruction D.f.2 – Place of worship D.f.3 - Institution D.h.1 – Single residential house D.h.3 – Guest house D.l – SMME incubators D.o – Sports field and infrastructure
Zone 3: Medium-density residential zone	Encourage residential densities that allows affordable housing to be developed, as well as it associated residential supporting infrastructure, such as schools and sports fields.	B.b.2 – Rivers and riverbeds D.f.1 – Place of instruction D.f.2 – Place of worship D.f.3 - Institution D.h.1 – Single residential house

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Land Use Management Zone	Aim and Objective	PSDF SPC Application
		D.h.7 - Subsidised housing D.l - SMME incubators D.o - Sports field and infrastructure
Zone 4: Business zone	Concentrate retail, office and higher-density residential uses within the nodal areas of towns to serve as focal community places within these towns. Strengthen the Prieska CBD and the regional service centre of the local agricultural industry.	B.b.2 - Rivers and riverbeds D.f.1 - Place of instruction D.f.3 - Institution D.g.1 - Government uses D.g.2 - Municipal uses D.h.2 - Group housing D.h.3 - Guest house D.h.4 - Flats/ residential buildings D.h.7 - Subsidised housing D.i - Business area D.i.1 - Business premises D.j - Service-related business D.l - SMME incubators D.o - Sports field and infrastructure
Zone 5: Industrial zone	Provide for light industrial and heavy industrial activities associated with agri-industrial uses and renewable sector manufacturing and assembly uses. Designate this area as a Special Economic Zone (SEZ) for the promotion of the renewable energy sector.	B.b.2 - Rivers and riverbeds D.g.1 - Government uses D.g.2 - Municipal uses D.i.1 - Business premises E.a - Agricultural industry E.c - Light industry E.d - Heavy industry
Zone 6: Commercial zone	Encourage and concentrate non-polluting commercial and transport uses within this zone. In particular, aim to create a public transport and truck stop with its related uses.	B.b.2 - Rivers and riverbeds D.g.1 - Government uses D.g.2 - Municipal uses D.i - Business area D.i.1 - Business premises D.j - Service-related business E.c - Light industry F.e - Heavy vehicle overnight facilities

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Land Use Management Zone	Aim and Objective	PSDF SPC Application
Zone 7: Institutional zone	Provide for the development of specialized institutional uses associated with typical municipal functions.	B.b.2 – Rivers and riverbeds D.g.1 – Government uses D.g.2 – Municipal uses D.n - Cemeteries D.p – Airport and infrastructure
Zone 8: Open space zone	Enable the protection of environmental sensitive areas and develop parts thereof with compatible land uses related to the tourism and recreation sectors.	B.b.2 – Rivers and riverbeds D.g.2 – Municipal uses D.h.3 – Guest house D.o – Sports field and infrastructure D.q – Resort and Tourism Related areas

Source: Urban Dynamics Gauteng, 2019

Zone 4: Business Zone

The primary aim of Zone 4 is to concentrate retail, office and higher-density residential uses to serve the town and the surrounding agricultural sector. The approval of land use rights for retail and office uses within Zone 4 need to be done in accordance to the Land Use Budget to ensure the rights given are sustainable. The development of retail and office uses should not be allowed outside the boundary of a Zone 4 within a rural town. Entertainment uses can form an integral part of the land use mix of Zone 4. Businesses associated with the motor trade, i.e. filling stations, showrooms, outlets and services centres, are also to be accommodated within Zone 4. A maximum FAR of 1.8 is allowed within Zone 4.

Zone 5: Industrial zone

The primary aim of Zone 5 is to provide space for heavy and noxious industrial activities. Due to the noxious nature of Zone 5, only a limited range of associated land uses are to be developed within this zone. These include commercial uses, light industries and institutional uses associated with government and municipal entities. Zone 5 is suitable for the manufacturing, assembly and storage of renewable energy infrastructure. A maximum FAR of 0.8 is allowed within Zone 5.

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TABLE 55: SIYATHEMBA SDF LAND USE MANAGEMENT SCHEDULE

Broad Land Use Category	Land Use Category	SPC	Zone 1 Agricultural holding zone	Zone 2 Low-density residential zone	Zone 3 Medium-density residential zone	Zone 4 Business Zone	Zone 5 Industrial zone	Zone 6 Commercial zone	Zone 7 Institutional zone	Zone 8 Open space zone
Residential	Very low-density	D.h.9	•							
	Low-density	D.h.1		•	•					
	Medium-density	D.h.7			•	•				
	High-density	D.h.2/4				•				
Tourism	Accommodation	D.h.3	•	•		•				
	Resort	D.q				•				•
	Tourist amenity	D.q	•			•				•
Institutional	Educational	D.f.1		•	•	•				
	Medical	D.f.3				•				
	Religious	D.f.2		•	•	•				
	Social	D.f.3	•	•	•	•				
	Cemetery	D.n							•	
Business	Retail	D.i				•		•		
	Office	D.i.1				•	•	•		
	Entertainment	D.i.1				•				
	Motor trade	D.j				•		•		
	Micro enterprise	D.l	•		•	•				
Authority	Municipal	D.g.2				•	•	•	•	•
	Government	D.g.1				•	•	•	•	
Industrial	Light	E.c	•			•	•	•		
	Heavy	E.d				•	•			
	Agri-industrial	E.a				•	•			
	Commercial	E.c	•			•	•	•		
Agriculture	Intensive agriculture	C.b	•							
Transport	Transport hub	F.e						•		
	Airfield	D.p							•	
Open space	Active	D.o		•	•	•				•
	Passive	B.b.2	•	•	•	•	•	•	•	•
Maximum FAR			n/a	n/a	n/a	1.8	0.8	0.8	n/a	n/a
Maximum Net Residential Density			1 u/ha	20 u/ha	60 u/ha	150 u/ha	n/a	n/a	n/a	n/a

Source: Urban Dynamics Gauteng, 2019

- Approval of cemetery in Zones 7 is subject to geotechnical investigation and Environmental Impact Assessment
- Approval of accommodation/ resort facilities in Zones 8 is subject to an Environmental Impact Assessment
- Micro enterprises include uses such as spaza shops, hairdressers and daycare centers, but exclude taverns and guesthouses

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Zone 6: Commercial zone

The primary aim of Zone 6 is to provide space for heavy vehicle related uses, such as heavy vehicle overnight facilities and a long-distance transit stop, and large filling station. In addition, commercial developments such as distribution centres, storage, wholesale and warehousing can be encouraged within this zone. Other land uses to be encouraged within Zone 6 include offices uses associated with the commercial uses, and institutional uses, such as Government and Municipal depots. Heavy noxious industries are excluded from this zone. A maximum FAR of 0.8 is allowed within Zone 6.

Zone 7: Institutional zone

The aim of Zone 7 is to provide for special institutional uses associated with municipal functions. In the case of Siyathemba, these uses include airfields and its associated facilities, and cemeteries. It is important to note that the approval of a cemetery in Zones 7 is subject to geotechnical investigation and Environmental Impact Assessment. All land uses associated with the primary institutional uses, such as hangers, workshops and storage facilities, are to be allowed within this zone.

Zone 8: Open space zone

The aim of Zone 8 is to protect environmental sensitive areas and geotechnically hazardous areas from settlement development. These areas are shown as a single zone, but different levels of protection and conservation can be applied to different parts of this zone, depending on the nature of the environment and its capacity to accommodate certain open space uses. It is important to note that there are portions of Zone 8 bordering rivers and tributaries that are approximated on the Land Use Management Zones maps (Figures 41-47). The establishment of townships that border these portions of Zone 8 will determine the size of the 1:100-year flood area affecting these portions of Zone 8, in so doing establishing cadastral boundaries for these portions of Zone 8.

The LUMS zones proposed aim to provide municipal planners with a tool to help assess development applications, such township establishment, rezoning or consent use applications. As far as possible, these LUMS zones have given consideration to existing land use patterns. These LUMS zones do not affect existing land use rights on properties, even if the existing rights have not been exercised or do not correspond with the land uses proposed in the relevant LUMS zone. **If there is a discrepancy between Table 55 and the written text within this section of the report, the Table must receive precedence.**

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It is important to note that the LUMS zones presented above do not overwrite the relevant Land Use Scheme, but only intends to supplement it. As such, it does not attempt to address all the issues that are contained within a Land Use Scheme, but rather addresses only those issues that are operational to the implementation of the Spatial Development Framework proposals. The LUMS zones proposed within this report can be used as a guide to review the Land Use Scheme in future. Table 55 only provides the broad land use types are allowed within each LUMS zone. More detailed land use types that fall within each of these LUMS zones are presented in Annexure A.

SECTION 7: IMPLEMENTATION FRAMEWORK

Investment in Siyathemba is essential in order to create a sustainable and equitable settlement environment and to provide the appropriate environment for non-municipal (public and private) investment in Siyathemba. Investment in Siyathemba should, amongst others, include investment in bulk municipal services infrastructure development and the provision of essential social amenities. In addition, it is important to ensure that the implementation of these projects is aligned at the different spheres of municipal government.

7.1 CAPITAL INVESTMENT FRAMEWORK

A Capital Investment Framework was prepared for the implementation of the Siyathemba SDF proposals. This Capital Investment Framework consists of a cost estimate and a development programme.

7.1.1. COST ESTIMATE

Projects to be implemented by governmental organizations and the private sector, which are needed to unlock the development potential of Siyathemba (as set out in the Siyathemba SDF), were identified. These projects were listed and a cost estimate was prepared for each of these projects. It is important to note that the cost estimated reflect currently prices and that inflationary effects will most likely increase these costs over time. This implies that the costs involved to implement the longer-term projects will be higher than presented in this report. Also, it is important to note that the cost presented in this report are only rudimentary costs and that more detailed calculations of these cost during implementation may result in significant changes in to the costs presented in this report. The key projects identified in the Siyathemba SDF are the following:

a. Land acquisition

Much of the land needed for development within the towns in Siyathemba are in the ownership of the municipality, especially where these projects have been in its planning stages for some time. However, there are land parcels that needs to be acquired for new proposals made in the Siyathemba SDF. The most significant of these is the purchasing of the land

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for the proposed agricultural holdings, to be located north of Ethembeni. In addition, vacant stands in Marydale and Niekerkshoop also need to be purchased for affordable housing purposes. To acquire these stands for subsidized housing, the Municipality can approach the owners of these stand and make them an offer, which can be funded through the housing subsidy. This will require drawing the title deeds of the properties to obtain the contact details of the owners of the properties. Tracking the owners can best be achieved through a conveyance attorney.

b. Bulk water network

Development of the residential areas in Prieska, primarily catering for the affordable housing market, is important to ensure the limited housing backlog is eradicated and houses are constructed to cater the future population within Prieska. The latter is especially important if the Copperton mine where to be reopened and the mine households located in Prieska. To cater for the above, it would most likely be necessary to extend the existing bulk water network into the areas located south of Lemnertsville and north of the Prieska industrial area. The bulk water network will also need to be extended into the proposed agricultural holdings area, located north of Ethembeni and into the proposed Prieska industrial area expansion. The abovementioned expansion areas will also require the construction of water reservoirs. Limited bulk water network expansion will be required in Marydale to cater for affordable housing development.

c. Bulk sewer network

To enable residential expansion in Prieska, it would most likely be necessary to extend the existing bulk sewer network into the planned residential areas located south of Lemnertsville and north of the Prieska industrial area. The bulk sewer network will also need to be extended into the proposed agricultural holdings area, located north of Ethembeni and into the proposed Prieska industrial area expansion. The abovementioned expansion areas may also require the expansion of waste water treatment plant at Prieska. Limited bulk sewer network expansion will be required in Marydale to cater for affordable housing development in the town.

d. Bulk electrical network

It would most likely be necessary to extend the existing bulk electrical network into the planned residential expansion areas located south of Lemnertsville and north of the Prieska industrial area to enable residential expansion in Prieska, The bulk electrical network will also need to be extended into the proposed agricultural holdings area, located north of Ethembeni and into the proposed Prieska industrial area expansion. The abovementioned expansion areas will also require the

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construction of the necessary substations to cater for these developments. Limited electrical network expansion will be required in Marydale to cater for affordable housing development.

TABLE 56: PROJECT COST ESTIMATE

Town	Project Detail	Potential Funding Sources	Municipal Expenditure					Total Expenditure
			Municipal Expenditure	District Expenditure	Provincial Expenditure	National Expenditure	Private Expenditure	
Land acquisition								R14 800 000
Prieska	Acquire land for Agricultural Holdings development	PDM/ NCP		R2 700 000				R2 700 000
Marydale	Acquire existing stands in Old Town for Subsidised Housing	PDM/ NCP		R4 650 000				R4 650 000
Niekerkshoop	Acquire existing stands in Old Town for Subsidised Housing	PDM/ NCP		R7 450 000				R7 450 000
Bulk water infrastructure								R19 520 000
Prieska	Extend bulk water pipeline network into Lemnertsville South	PDM		R1 890 000				R1 890 000
Prieska	Construct water reservoir at Lemnertsville South	PDM		R2 900 000				R2 900 000
Prieska	Extend bulk water pipeline network into Mine Township	OM					R1 260 000	R1 260 000
Prieska	Construct water reservoir at Mine Township	OM					R2 900 000	R2 900 000
Prieska	Extend bulk water pipeline network into Agricultural Holdings	PDM		R2 970 000				R2 970 000
Prieska	Construct water reservoir at Agricultural Holdings	PDM		R2 900 000				R2 900 000
Prieska	Extend bulk water pipeline network into Industrial Area Expansion	PDM		R1 260 000				R1 260 000

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Prieska	Construct water reservoir at Industrial Area	PDM	R2 900 000	R2 900 000
Marydale	Expansion Extend bulk water pipeline network into Rooival and Rama Rou	PDM	R540 000	R540 000
				R50 010 000
Prieska	Bulk sewer infrastructure Extend bulk sewer pipeline network into Lemnertsville South	PDM	R1 260 000	R1 260 000
Prieska	Extension of waste water treatment plant for Lemnertsville South	PDM	R21 000 000	R21 000 000
Prieska	Extend bulk sewer pipeline network into Mine Township	OM	R1 080 000	R1 080 000
Prieska	Extension of waste water treatment plant for Mine Township	OM	R21 000 000	R21 000 000
Prieska	Extend bulk sewer pipeline network into Agricultural Holdings	PDM	R3 870 000	R3 870 000
Prieska	Extend bulk sewer pipeline network into Industrial Area Expansion	PDM	R1 260 000	R1 260 000
Marydale	Extend bulk sewer pipeline network into Rooival and Rama Rou	PDM	R540 000	R540 000
				R12 040 000
Prieska	Bulk electricity infrastructure Extend bulk electrical network into Lemnertsville South	PDM	R1 540 000	R1 540 000
Prieska	Construct substations to serve Lemnertsville South	PDM	R700 000	R700 000
Prieska	Extend bulk electrical network into Mine Township	OM	R1 320 000	R1 320 000
Prieska	Construct substations to serve Mine Township	OM	R700 000	R700 000

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Prieska	Extend bulk electrical network into Agricultural Holdings	PDM	R4 400 000	R4 400 000
Prieska	Construct substations to serve Agricultural Holdings	PDM	R700 000	R700 000
Prieska	Extend bulk electrical network into Industrial Area Expansion	PDM	R1 320 000	R1 320 000
Prieska	Construct substations to serve Industrial Area Expansion	PDM	R700 000	R700 000
Marydale	Extend bulk electrical network into Rooidal and Rama Rou	PDM	R660 000	R660 000
Internal water infrastructure			R9 553 500	
Prieska	Construct internal water network in Lemnertsville South	DoH	R5 647 500	R5 647 500
Prieska	Construct internal water network in Mine Township	OM	R2 700 000	R2 700 000
Prieska	Construct internal water network in Agricultural Holdings	PDM	R180 000	R180 000
Prieska	Construct internal water network in Industrial Area Expansion	PDM	R324 000	R324 000
Marydale	Construct internal water network in Rooidal and Rama Rou	DoH	R702 000	R702 000
Internal sewer infrastructure			R16 559 400	
Prieska	Construct internal sewer network in Lemnertsville South	DoH	R9 789 000	R9 789 000
Prieska	Construct internal sewer network in Mine Township	OM	R4 680 000	R4 680 000

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Prieska	Construct internal sewer network in Agricultural Holdings	PDM	R312 000		R312 000
Prieska	Construct internal sewer network in Industrial Area Expansion	PDM	R561 600		R561 600
Marydale	Construct internal sewer network in Rooidal and Rama Rou	DoH		R1 216 800	R1 216 800
Internal electricity infrastructure					R5 095 200
Prieska	Construct internal electrical network in Lemnertsville South	PDM	R3 012 000		R3 012 000
Prieska	Construct internal electrical network in Mine Township	OM		R1 440 000	R1 440 000
Prieska	Construct internal electrical network in Agricultural Holdings	PDM	R96 000		R96 000
Prieska	Construct internal electrical network in Industrial Area Expansion	PDM	R172 800		R172 800
Marydale	Construct internal electrical network in Rooidal and Rama Rou	PDM	R374 400		R374 400
Irrigation infrastructure					R4 500 000
Prieska	Construct irrigation network in Agricultural Holdings	PDM	R4 000 000		R4 000 000
Prieska	Construct irrigation pump station for Agricultural Holdings	PDM	R500 000		R500 000
Transportation infrastructure					R42 400 000
Prieska	Construct collector road in Lemnertsville South	DoH		R11 660 000	R11 660 000
Prieska	Construct collector road in Mine Township	OM		R5 565 000	R5 565 000

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Prieska	Construct link road between Lemnertsville and Mine Township	PDM/ OM	R3 445 000	R3 445 000	R6 890 000
Prieska	Construct collector road in Agricultural Holdings	PDM	R9 275 000		R9 275 000
Prieska	Construct collector road in Rama Rou	DoH		R530 000	R530 000
Prieska	Construct street network in Industrial Area Expansion	PDM	R8 480 000		R8 480 000
					R272 025 000
Prieska	Develop subsidized housing in Lemnertsville South	DoH		R146 835 000	R146 835 000
Prieska	Develop subsidized housing in Mining Township	OM		R70 200 000	R70 200 000
Prieska	Develop subsidized housing in Small Holdings	DoH		R4 680 000	R4 680 000
Marydale	Develop subsidized housing in Rooidal and Rama Rou	DoH		R18 252 000	R18 252 000
Marydale	Develop subsidized housing in Old Town	DoH		R10 881 000	R10 881 000
Niekerkshoop	Develop subsidized housing in Old Town 1)	DoH		R21 177 000	R21 177 000
					R278 600 000
Prieska	Develop Skills Training Centre	NCP		R267 000 000	R267 000 000
Prieska	Develop Emergency Service Centre	PDM/ NCP	R6 000 000		R6 000 000
Marydale	Develop NGO Centre	PDM/ NCP	R2 800 000		R2 800 000
Niekerkshoop	Develop NGO Centre	PDM/ NCP	R2 800 000		R2 800 000
					R1 800 000
Siyathemba	Siyathemba Land Use Scheme	PDM/ NCP	R1 000 000		R1 000 000
Prieska	Prieska Mining Overflow Area Precinct Plan	Private		R800 000	R800 000
					R10 000 000
Siyathemba	Water Masterplan	MISA	R2 000 000		R2 000 000

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Siyathemba	Water Operation and Maintenance Plan	MISA	R500 000					R500 000
Siyathemba	Roads and Stormwater Masterplan	MISA	R2 000 000					R2 000 000
Siyathemba	Roads Operation and Maintenance Plan	MISA	R500 000					R500 000
Siyathemba	Electricity Masterplan	MISA	R2 000 000					R2 000 000
Siyathemba	Electricity Operation and Maintenance Plan	MISA	R500 000					R500 000
Siyathemba	Sanitation Masterplan	MISA	R2 000 000					R2 000 000
Siyathemba	Sanitation Operation and Maintenance Plan	MISA	R500 000					R500 000
TOTAL COST			R11 000 000	R110 442 800	R267 000 000	R231 370 300	R117 090 000	R736 903 100

Abbreviations:

SLM: Siyathemba Local Municipality
PDM: Pixley Ka Seme District Municipality
NCP: Northern Cape Province
DoH: Department of Housing
OM: Orion Minerals

Notes:

- 1) Develop 32 stands as semi-detached housing

e. Internal water infrastructure

Development of the proposed residential areas in Prieska, primarily catering for the affordable housing market, as well as mine housing if the Copperton mine where to be reopened, will require the construction of internal water infrastructure to serve these developments. Internal water infrastructure will also need to be constructed for the proposed agricultural holdings area, located north of Ethembeni and into the proposed Prieska industrial area expansion. Limited internal water infrastructure will need to be constructed in Marydale to cater for affordable housing development.

f. Internal sewer infrastructure

To enable residential expansion in Prieska, it will be necessary to construct internal sewer infrastructure in the planned residential areas located south of Lemnertsville and north of the Prieska industrial area. Internal sewer infrastructure will also

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need to be constructed in the proposed agricultural holdings area, located north of Ethembeni and in the proposed Prieska industrial area expansion. Limited internal sewer infrastructure construction will be required in Marydale to cater for affordable housing development in the town.

g. Internal electrical infrastructure

It will be necessary to construct internal electrical infrastructure into the planned residential expansion areas located south of Lemnertsville and north of the Prieska industrial area to enable residential expansion in Prieska, Internal electrical infrastructure will also need to be constructed in the proposed agricultural holdings area, located north of Ethembeni and into the proposed Prieska industrial area expansion. Limited internal electrical infrastructure will be required in Marydale to cater for affordable housing development.

h. Irrigation infrastructure

Development of the proposed agricultural holdings, located north of Ethembeni next to the Orange River, is needed to give local communities access to agricultural and subsistence farming opportunities. To achieve this, it will be necessary to give these agricultural holdings access to irrigation water from the Orange River. This will require the construction of an irrigation network, as well as the irrigation pump station needed to pump the water from the Orange River into the irrigation network.

i. Transportation infrastructure

Development of the proposed residential areas in Prieska, primarily catering for the affordable housing market, as well as mine housing if the Copperton mine were to be reopened, will require the construction of collector roads to serve these residential areas. Collector roads will also need to be constructed in the proposed agricultural holdings area, located north of Ethembeni and in the proposed Prieska industrial area expansion. Limited-length collector roads will need to be constructed in Marydale to cater for residential expansion. In addition to the above, a link road needs to be constructed between Lemnertsville and the proposed mine township located north of the Prieska industrial area. This link road can be jointly developed by the mine township developer and public sector, because this road would be to the benefit of both the mine township and Prieska as a whole.

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j. Affordable housing

The development of affordable housing in Prieska is important to ensure the limited housing backlog is eradicated and houses are constructed to cater the future population within Prieska. It will also be necessary to develop affordable housing for mine households in Prieska, should the Copperton mine be reopened. A limited number of affordable housing can be constructed in the proposed agricultural holdings area, located north of Ethembeni, in Marydale, and on existing vacant stand within Niekerkshoop.

k. Socio-economic infrastructure

Four social infrastructure projects are proposed for Prieska. The first include the development of an emergency service centre to serve Siyathemba, and the second involves the development of an agri-industrial and renewable energy skills training centre. The skills training centre is a large project and should therefore be developed in phases. In addition, an NGO Centre is proposed for Marydale and Niekerkshoop respectively.

l. Spatial policy and infrastructure planning

To ensure rational and cost efficient spatial and infrastructure development, it is necessary to prepare spatial and infrastructure plans to address key development sectors within Siyathemba. On a spatial planning level, this includes preparing a Land Use Scheme for Siyathemba, which will be based in the Siyathemba SDF. It will also involve preparing a Precinct Plan for the mine overflow area, should there appear to be a need to develop this area within Prieska. On an infrastructure level, plans need to be prepared for road, water, sanitation and electricity to ensure the existing infrastructure network is maintained and the infrastructure network is extended to accommodate future township expansion.

Table 56 gives a rudimentary indication of the cost to implement the projects mentioned above. The actual costs of these projects are subject to other variables that can only be determined once each project is at the point of implementation. Variables such as inflation and unforeseen project detail can impact on the final cost of a project. Consequently, the Siyathemba SDF cannot be held accountable for the final cost incurred to implement the Siyathemba SDF projects. As depicted by Table 56, the total budget needed to implement the projects of the Siyathemba SDF amounts to approximately R730 million. These costs will be spread amongst the Local Municipality, District Municipality, Provincial Government, National Government, and the private sector.

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As depicted by Diagram 56, there are two high-cost items proposed for Siyathemba. The first item is the construction of the affordable housing units within Siyathema, which amounts to 37% of the budget. Construction of most of these housing units (approximately R200mil worth) will be funded through the National Housing Subsidy, and part thereof (approximately R70mil) will be funded by the owner of the Copperton Mine, should the mine be reopened. The other high-cost item will be the skills training centre, to be located in Prieska between Loots Boulevard and the Bill Pickard Hospital. This component occupied another 38% of the project budget of Siyathemba. It is important to note that the skills training centre can be developed in phases to spread the construction cost over a more manageable timeframe. At the same time, the viability of the skills training centre can be tested in a less-risk situation.

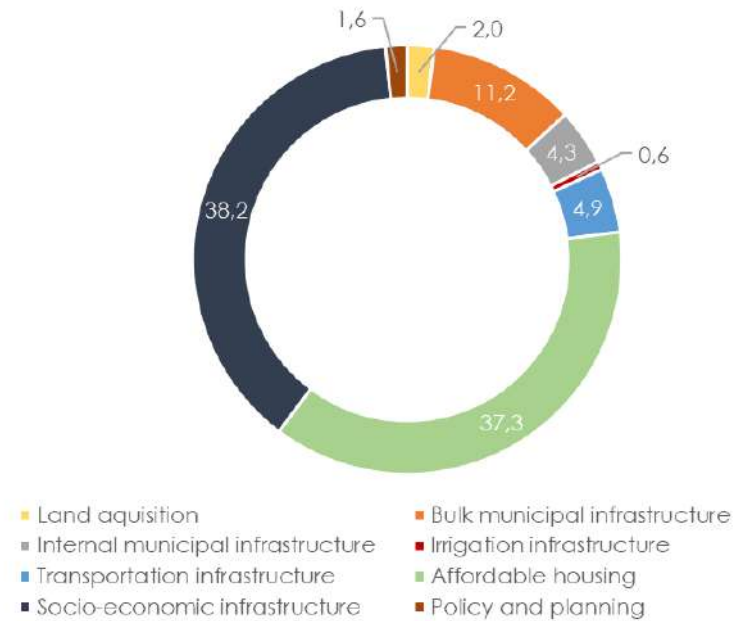


DIAGRAM 56: DISTRIBUTION OF COST PER CATEGORY

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The third highest cost item is the construction of the bulk municipal infrastructure system. The construction of the bulk municipal infrastructure system will require approximately 11% of the budget. Siyathemba will most probably need to fund this cost item through the Pixley Ka Seme District Municipality. The Department of Housing does not fund bulk municipal infrastructure for affordable/ subsidised housing projects. The upgrading of the bulk municipal infrastructure system includes the construction of bulk water lines, water reservoirs, bulk sewer lines and pump stations, electrical distribution lines and substations. The provision of bulk municipal infrastructure is a key component to unlocking development potential within Prieska in terms of housing development and industrial development.

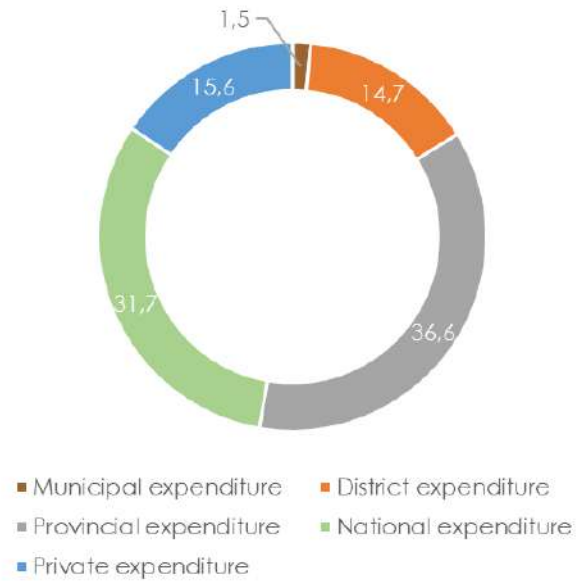


DIAGRAM 57: DISTRIBUTION OF COST PER INSTITUTION

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As depicted by Diagram 57, the Provincial Government will be responsible for most of the funding (37%) required within Siyathemba up to 2030. The budget will solely be used for the development of the proposed skills training centre. As mentioned previously, the cost expenditure on the proposed skills training centre can be managed by developing the centre in phases. This will spread the construction cost over a more manageable timeframe and allow the viability of the skills training centre to be tested at a smaller scale. Table 57 shows that the development of the first phase of the project can be limited to approximately R77mil. Note that the skills training centre will be a district facility, thus serving the entire Pixley Ka Seme District population.

TABLE 57: SKILLS TRAINING CENTRE PHASE 1 COST ESTIMATE

Project	Project Detail	Expenditure	
		Total Cost	Phase 1 Cost
Building construction	Administration block	R17 600 000	R10 500 000
	Communal food court	R7 200 000	R0
	Hostels and accommodation	R68 800 000	R9 800 000
	Conference centre	R25 000 000	0
	Skills training classrooms	R49 600 000	R12 400 000
	Skills training workshops	R72 000 000	R18 000 000
	Landscaping	Square and walkways paving	R26 400 000
	Square and walkways trees	R300 000	R300 000
TOTAL COST		R266 900 000	R77 400 000

Source: Urban Dynamics Gauteng, 2019

National Government will also carry a sizable portion (32%) of the projects budget. This is largely due to the construction of affordable housing and the internal services needed to connect these housing units. The District Municipality will also contribute to the funding of affordable housing development through land acquisition and bulk municipal infrastructure development. The District Municipality will be responsible for approximately 14% of the Siyathemba SDF project budget. The private sector (mining companies) will be responsible for the development of mine housing and its related bulk and internal municipal infrastructure. The Siyathemba Local municipality will be responsible for 2% of the budget and this will largely involve expenditure for the preparation of spatial policies and infrastructure plans.

7.1.2. DEVELOPMENT PROGRAMME

A number of projects have been identified and listed in the Cost Estimate above. Many of these projects affect the start of other projects. For example, for affordable housing to be constructed, requires the construction of bulk and internal municipal infrastructure. Consequently, the projects that are related have been grouped into project programme, which are listed in Table 58. The implementation of the project programme identified needs to be structured in such a way that certain targets can be met within certain timeframes.

The project programme proposed for the development of Siyathemba was divided over a 11-year period (2020-2030), as set out in Table 58 and depicted on Figure 48. This will ensure the logical implementation of the projects, spread implementation funds over a period to relieve funding pressures at any given time, ensure that catalyst projects are developed prior to non-catalyst project, and ensure the viable implementation and operation of each project. The individual projects have been divided into projects packages as follows to provide structure to the project programme:

Package 1: Industrial area expansion

- The Prieska industrial area will be expanded to cater for the expanding agri-industrial and the renewable energy sector in Siyathemba.
- The Prieska industrial area expansion will comprise two components. The first component will comprise an industrial area for agri-industrial and renewable energy industries, and the second component will comprise a commercial transport hub, which will be located on the intersection of the N10 and the R387.
- The expansion of Prieska industrial area will require investment in bulk infrastructure, such as extending the bulk water network into the industrial expansion area, as well as the construction of the industrial area's street network.

Package 2: Agricultural holdings development

- Land was allocated for agricultural holdings, located north of Ethembeni. These agricultural holdings will be farmed on a communal bases by local communities from neighbouring residential areas.
- A limited number of these agricultural holdings will be allocated to individual households to farm on these agricultural holdings. These agricultural holdings will therefore also have a residential function.

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- Development of the agricultural holdings will require investment in bulk infrastructure, such as extending the bulk water and electrical network into the agricultural holdings area.
- In addition, these agricultural holdings will require the construction of an irrigation network to enable the cultivation of these agricultural holdings

Package 3: Marydale/ Niekerkshoop old town infill

- The old town areas of Marydale and Niekerkshoop have large numbers of vacant residential stands that already have a municipal infrastructure network installed.
- It is proposed that these vacant stands be utilised for affordable housing development and that both towns are dealt with as a single project.
- Challenges regarding tracing the stand owners are faced in this regard and need to be addressed, most likely through a local conveyancing attorney
- Once acquired, affordable housing can be constructed on these stands. A few stands within Niekerkshoop will need to be developed a semi-detached housing to ensure all the housing need in Niekerkshoop is met on these stand up to the year 2030.

Package 4: Lemnertsville south township development

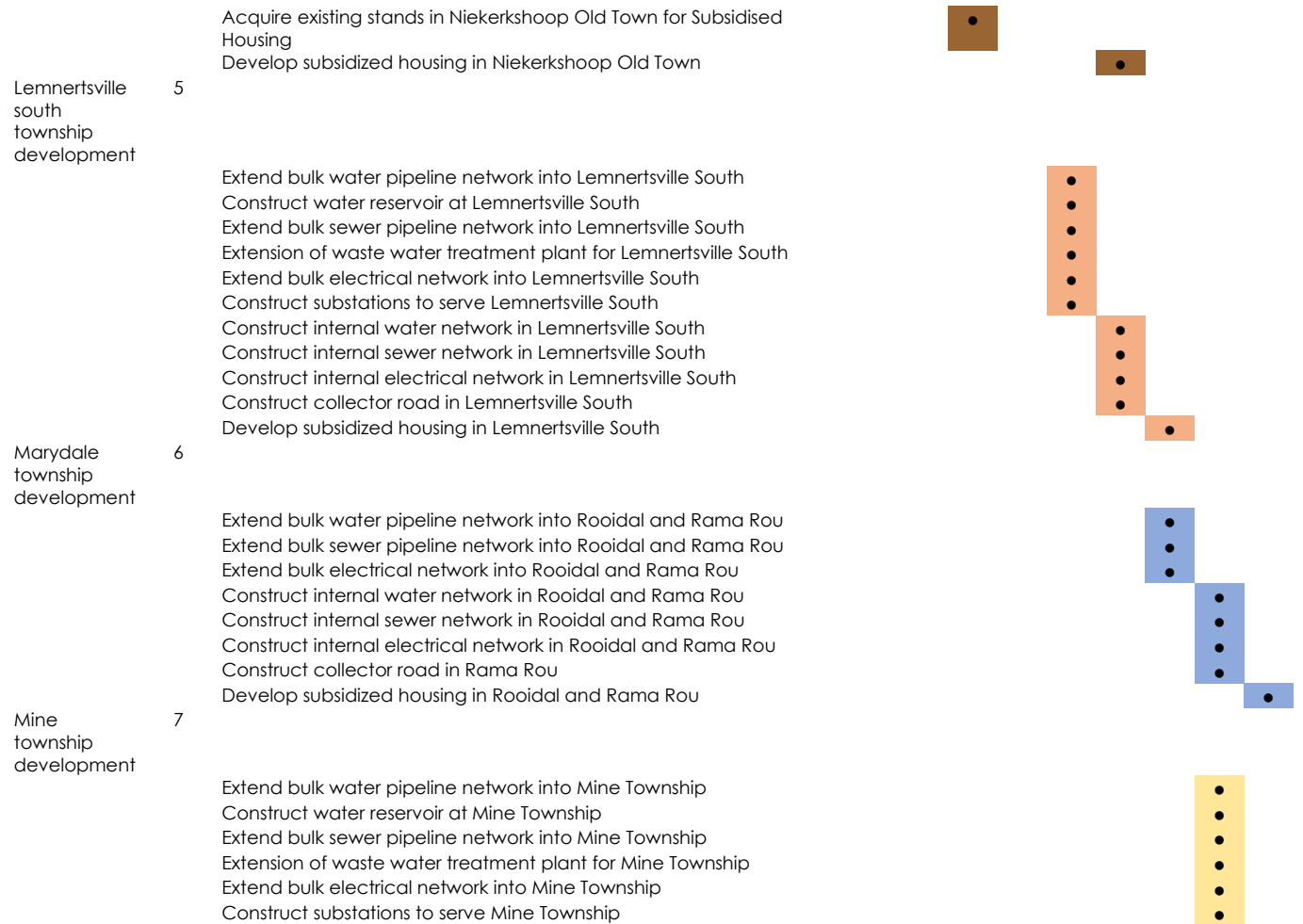
- Most of the land allocated for residential expansion has been located within Prieska, the primary town of Siyathemba.
- Land for medium-density residential expansion in Prieska was located along Upington Way, situated south of Lemnertsville. A draft township layout has already been prepared for the site.
- The development of Lemnertsville South will require all the investment in bulk infrastructure that is constructed in a typical affordable housing development. This includes tarring the collector roads within the township.
- The housing units developed in Lemnertsville South will mostly be subsidised housing funded by the National or Provincial Department of Housing.

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TABLE 58: PROJECT PACKAGING

Project	Map Ref.	Project Detail	Implementation Year																				
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030										
Industrial area expansion	1	Extend bulk water pipeline network into Industrial Area Expansion			•																		
		Construct water reservoir at Industrial Area Expansion			•																		
		Extend bulk sewer pipeline network into Industrial Area Expansion			•																		
		Extend bulk electrical network into Industrial Area Expansion			•																		
		Construct substations to serve Industrial Area Expansion			•																		
		Construct internal water network in Industrial Area Expansion					•																
		Construct internal sewer network in Industrial Area Expansion					•																
		Construct internal electrical network in Industrial Area Expansion					•																
		Construct street network in Industrial Area Expansion					•																
Agricultural holdings development	2	Acquire land for Agricultural Holdings development		•																			
		Extend bulk water pipeline network into Agricultural Holdings			•																		
		Construct water reservoir at Agricultural Holdings			•																		
		Extend bulk sewer pipeline network into Agricultural Holdings			•																		
		Extend bulk electrical network into Agricultural Holdings			•																		
		Construct substations to serve Agricultural Holdings			•																		
		Construct internal water network in Agricultural Holdings					•																
		Construct internal sewer network in Agricultural Holdings					•																
		Construct internal electrical network in Agricultural Holdings					•																
		Construct irrigation network in Agricultural Holdings					•																
		Construct irrigation pump station for Agricultural Holdings					•																
Construct collector road in Agricultural Holdings					•																		
Develop subsidized housing in Agricultural Holdings								•															
Marydale old town infill	3	Acquire existing stands in Marydale Old Town for Subsidised Housing																					
		Develop subsidized housing in Marydale Old Town																					
Niekerkshoop old town infill	4	Develop subsidized housing in Marydale Old Town																					

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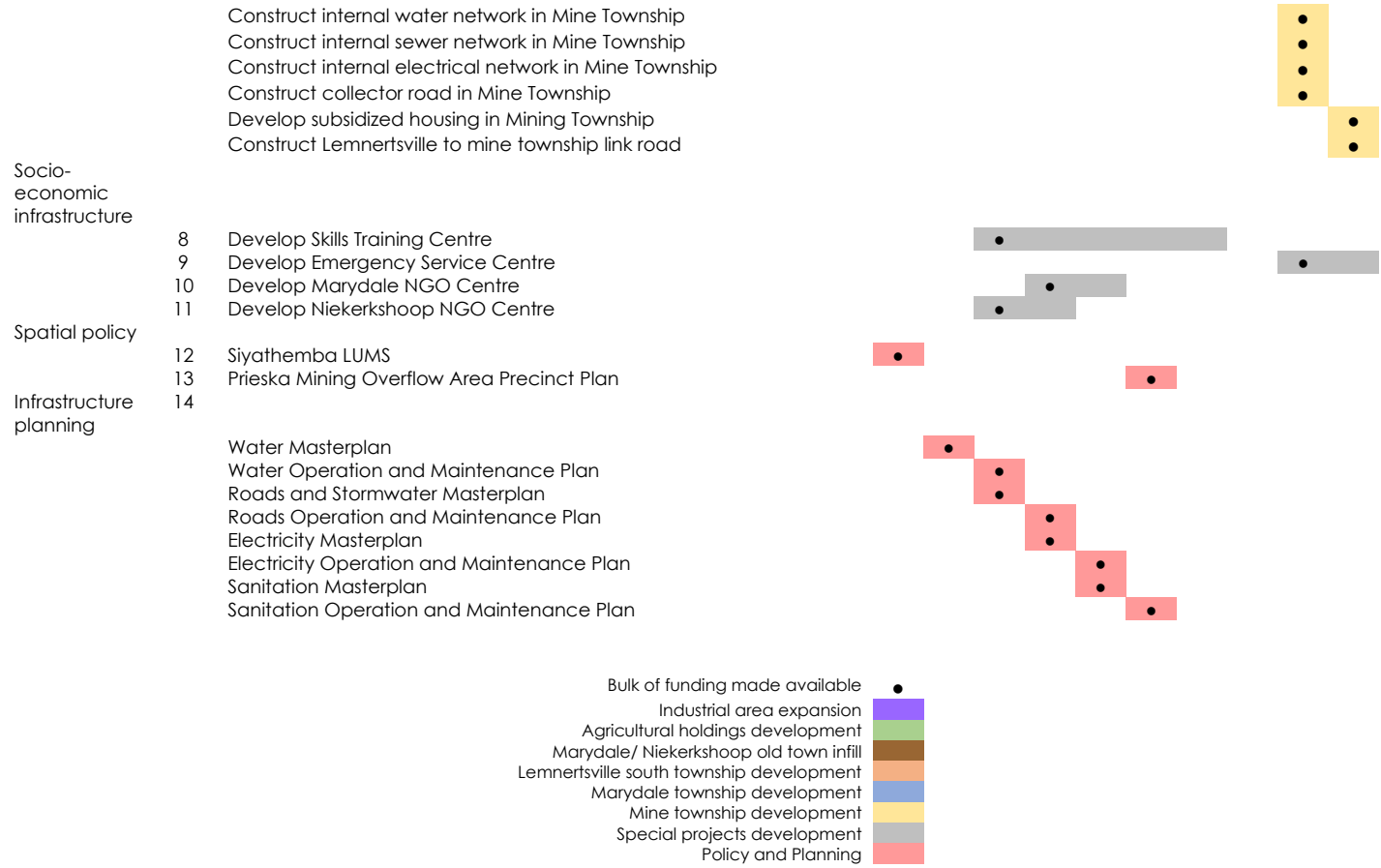
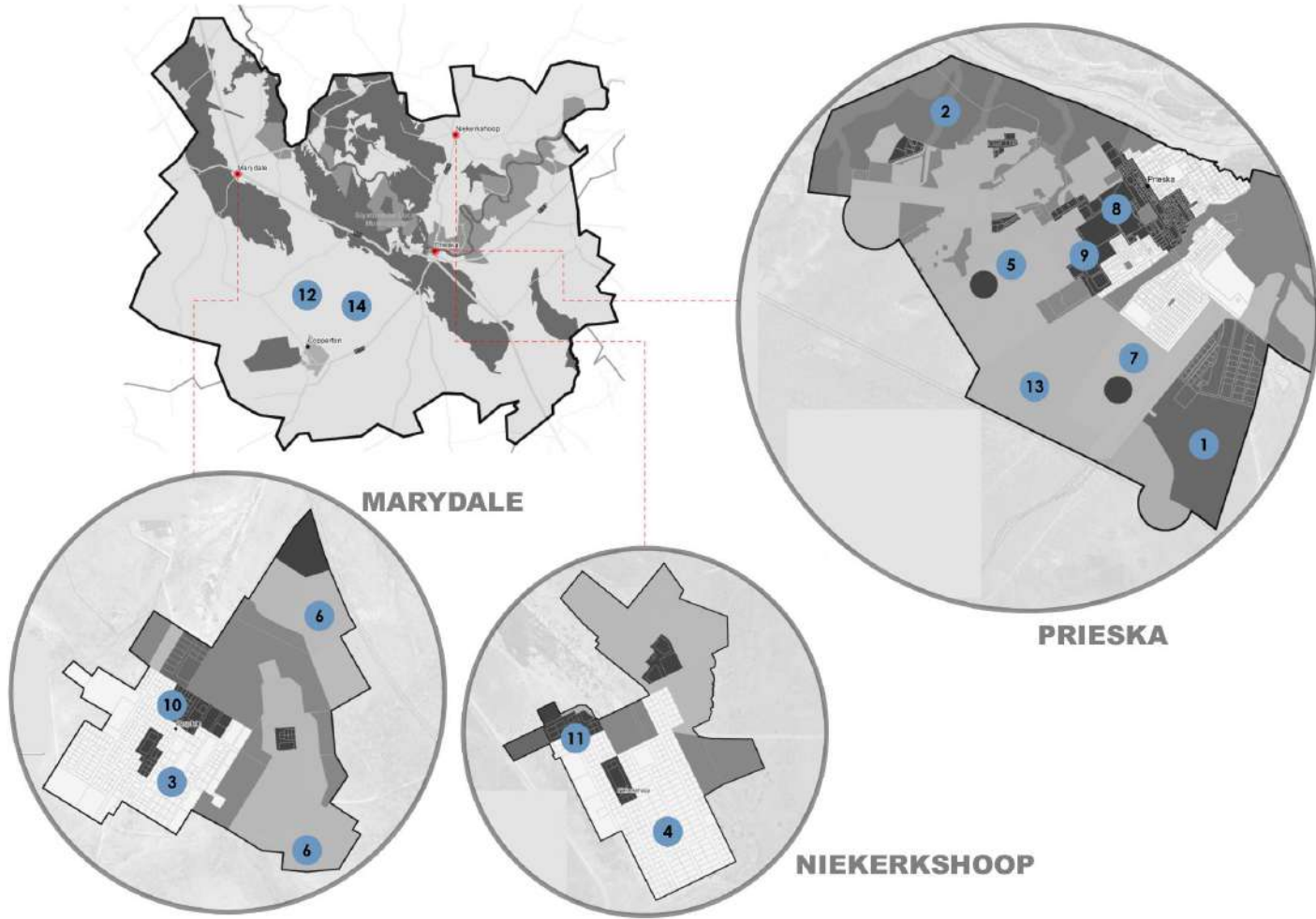


FIGURE 48 | CAPITAL PROJECTS



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Package 5: Marydale township development

- Relatively small parcels of land have been allocated for medium residential density expansion in Marydale; one involving the extension of Rooidal and the other involving the extension of Rama Rou.
- Both expansions are small and will only require short bulk infrastructure extensions. Internal municipal services infrastructure will need to be constructed to connect the stands to the bulk infrastructure.

Package 6: Mine township development

- Plans to reopen the Copperton Mine will necessitate the development of housing units for the influx of mineworkers into Siyathemba.
- To ensure settlement consolidation and long-term viability, these housing units are earmarked for Prieska. This residential township will be located along Arbeck Street, situated north of the Prieska industrial area.
- Development of the mine township will require investment in bulk infrastructure, such as extending the bulk water, sanitation and electrical network to serve the township. It will also involve construction of the necessary internal municipal services.
- Development of the housing units, as well as the bulk and internal municipal services, will be the responsibility, and will be funded, by the mine owner.
- Construct a link road between the mine township and Lemnertsville. This link road can be jointly funded by the mine owner and public sector, because this road would be to the benefit of both the mine township and Prieska as a whole.

Package 7: Special projects development

- Special projects development includes the proposed Skills Training Centre, to be located in Prieska between Loots Boulevard and the Bill Pickard Hospital, an emergency service centre, also to be located within Prieska, and two NGO centres to be located in Marydale and Niekerkshoop respectively.

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- Both the emergency service centre, but in particular the skills training centre, will need to be funded by the district or province due to the substantial costs involved in constructing these facilities.
- It is important to note that the skills training centre can be developed in phases to spread the construction cost over a more manageable timeframe. As the same time, the viability of the skills training centre can be tested in a less-risk situation.

Package 8: Policy and planning

- Spatial and infrastructure plans need to be prepared to ensure rational and cost efficient spatial and infrastructure development and maintenance.
- On a spatial planning level, this includes preparing a Land Use Scheme for Siyathemba, which will be based in the Siyathemba SDF.
- Spatial planning will also involve preparing a Precinct Plan for the mine overflow area, should there appear to be a need to develop this area within Prieska.
- On an infrastructure level, plans need to be prepared for road, water, sanitation and electricity to ensure the existing infrastructure network is maintained and the infrastructure network is extended to accommodate future township expansion.

It has to be noted that the implementation of the project programme mentioned above, as well as the other proposals made in the Siyathemba SDF, will be a dynamic process that may change as the implementation process dictates at the time of implementation.

7.2. INSTITUTIONAL ARRANGEMENTS

A key issue regarding the implementation of the Siyathemba SDF will be how to ensure that the implementation of the Siyathemba SDF proposals is aligned at the different spheres of government (Municipal, District, Provincial and National). This will require an implementation process that will enable alignment, but it will also require the different spheres of government to manage their interrelationships effectively. An effective process requires that resource allocation is aligned with strategic development priorities, as is set out in the Siyathemba SDF. This can largely be done by absorbing the Siyathemba SDF proposals into the Integrated

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Development Plan (IDP). Based on the above, the following guidelines need to be adhered to in order to manage the relationships between the different spheres of government with regard to the implementation of the Siyathemba SDF proposals:

- All spheres of government must support coordinated and integrated planning
- All spheres of government and other stakeholders must reach a shared understanding and agreement on the tasks required to implement the Siyathemba SDF
- Each sphere of government needs to take responsibility for its own planning-related task of the Siyathemba SDF
- Alignment between spheres of government will require cooperation, whereby the plans of one sphere supports the plans of another
- All spheres of government and other stakeholders must commit to the prioritization and an implementation schedule for the implementation of the Siyathemba SDF proposals
- The projects proposed within the Siyathemba SDF must be absorbed into the IDP and into each update of the IDP document
- A mutual assessment framework must be used to monitor the extent to which the Siyathemba SDF proposal are implemented by each sphere of government

7.2.1. SECTOR INTEGRATION

The Siyathemba SDF bridges the gap between the developmental issues facing Siyathemba and the allocation of a budget to address these developmental issues. The Siyathemba SDF also facilitates integration and coordination between the different spheres of government to address these development issues. Table 59 illustrates how the Siyathemba SDF aligns the responsibilities of the different spheres of government to addresses the developmental issues facing Siyathemba.

Recognition must be given to the fact that the different spheres of government will each play a vital role in achieving the overall strategic objectives of the Siyathemba SDF. This will include putting in place processes to implement the Siyathemba SDF proposals, allocating the appropriate human resources and skills to implement the proposals, alignment all actions with other spheres of government, and diligently monitoring performance in order to ensure projects are realized.

In addition to the above, the implementation of the Siyathemba SDF will most likely require participation and partnership building amongst the different spheres of government, the Siyathemba community and private business. Such partnerships are needed to address the variety of spatial, environmental, social and economic issues that are faced within Siyathemba. This collaboration between these parties must be a deliberate action by all parties involved.

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TABLE 59: SECTOR ALIGNMENT AND INTEGRATION

Spatial Guidelines	National and Provincial housing Departments, such as COGHSTA	Local Municipality departments, such as Water and sanitation	Local Municipality departments, such as roads and stormwater	Provincial Environmental departments, such as DENC	Provincial economic Departments, such as DEDAT	Provincial Health and Education Departments, such as NCDOE	Issues
Settlement and housing	•	•	•	•		•	<ul style="list-style-type: none"> ○ Decent affordable housing must be provided to households that cannot afford formal housing ○ Alternative housing options ought to be investigated ○ Municipal service of a sufficient quality must be provided to settlements ○ Development should be sustainable by addressing needs relating to health, education and recreation ○ Pedestrian accessibility needs to influence the planning and design of settlements ○ Settlement development must not degrade environmental sensitive areas
Social services	•		•			•	<ul style="list-style-type: none"> ○ All households must have reasonable access to health and educational facilities ○ Communities must have easy access the health and educational facilities ○ Avoid the duplication of community facilities or the oversupply of community facilities through proper planning
Municipal infrastructure	•	•	•				<ul style="list-style-type: none"> ○ Municipal service infrastructure investment must be provided to enable the expansion of settlements, but must not encourage sprawl or leapfrogging ○ Municipal service infrastructure investment must support and be aligned with the Development Edge

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Spatial Guidelines	National and Provincial housing Departments, such as COGHSTA	Local Municipality departments, such as Water and sanitation	Local Municipality departments, such as roads and stormwater	Provincial Environmental departments, such as DENC	Provincial economic Departments, such as DEDAT	Provincial Health and Education Departments, such as NCDOE	Issues
Economic development	•		•		•		<ul style="list-style-type: none"> ○ Service provision should be geared towards the development of the nodal areas ○ Nodal areas must to be served by a well-planned and maintained road network that connects the nodes to surrounding communities ○ Encourage the development of retail facilities in accordance with the economic carrying capacity of the local population ○ Enable the development of industrial and commercial areas that provide for the varied and specific needs of different business sectors
Agriculture and open space conservation	•	•		•			<ul style="list-style-type: none"> ○ High-potential agricultural soils need to be protected at all costs. ○ Protect the environmental sensitive areas and water bodies against degradation and pollution. ○ Settlements must have access the full municipal services infrastructure to avoid pollution of water sources ○ Settlement expansion and development must adhere to clear environmental management guidelines

Source: Urban Dynamics Gauteng, 2019

Abbreviations: COGHSTA Co-operative Governance, Human Settlements and Traditional Affairs
DENC Department of Environment and Nature Conservation
DEDAT Department of Economic Development and Tourism
DOE Department of Education

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7.2.2. EVALUATION AND MONITORING

The performance of the implementation process, whereby the Siyathemba SDF proposals are implemented, needs to be measured against a clear and comprehensive set of indicators. Table 60 provides possible indicators that can be used to measure the Siyathemba SDF implementation process.

TABLE 60: EVALUATION AND MONITORING

Theme	Outcome	Indicators
Economic	To encourage sustainable economic development	<ul style="list-style-type: none"> • Establishment of nodal areas and retail development • Establishment of industrial and commercial activities • Protection of high-potential agricultural soils
Housing	To develop sufficient and suitable housing	<ul style="list-style-type: none"> • Number of informal housing units • Number of affordable housing units • Range of housing typologies applied
Social	To ensure all households have access to basic health and education opportunities	<ul style="list-style-type: none"> • School to population ratio • Clinic to population ratio • Physical access to health facilities
Recreation	To ensure that adequate space is provided for recreational purposes	<ul style="list-style-type: none"> • Provision of suitable recreational facilities • Physical access to recreational facilities or parks • Use of landscaping in nodal areas
Environment	To promote a sustainable natural environment	<ul style="list-style-type: none"> • Conservation of watercourses and environmentally sensitive areas • Levels of water, air and visual pollution
Access	To ensure accessibility and choice of travel modes	<ul style="list-style-type: none"> • Distance to walk to social amenities and economic opportunities • Use of private vehicles to access social amenities and economic opportunities • Ability to access long-distance (regional) public transport systems

Source: Urban Dynamics Gauteng, 2019

A key performance indicator is the level of access to quality social and economic facilities. This information can be obtained by simply counting the number of facilities constructed in comparison to the number of housing units that are developed within a particular part of Siyathemba. Counting the number of affordable housing units developed and counting the reduction in the

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number of informal shacks for satellite photography, is a means of determining progress in housing development. Other information, such as the use of walking as a means to access social facilities, can be obtained from aerial photography measurements. Information not available from ready sources can be collected using community surveys or having consultative meeting with key community stakeholders. Ensuring that the collection of information is accurate and well maintained will be essential. This is not only relevant for land use data, but also for information pertaining to transportation, infrastructure and municipal services provision.

ANNEXURE A
LAND USE DEFINITIONS

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Broad Land Use Category	Land Use Category	Land Use Definition	Typical Land Uses
Residential	Very low-density	Land use allowing rural living on agricultural holdings using single dwelling units	Single dwelling unit
	Low-density	Land use allowing traditional residential living using single dwelling units	Single dwelling unit
	Medium-density	Land use allowing the horizontal and vertical grouping of dwelling units up to 3 storeys in height	Group housing Second dwelling unit Backyard rental unit Semi-detached housing Commune Retirement village Children's home
	High-density	Land use allowing the horizontal and vertical grouping of dwelling units up to 4 storeys in height	Row housing Walk-up apartments Flats
Tourism	Accommodation	Land use for the purpose of letting individual rooms for residential accommodation	Boarding house Guest house Hostel
	Resort	Land use for the purpose of residential accommodation and recreation	Resort Hotel
	Tourist amenity	Land use for the purpose of providing tourist and recreation amenities	Historical building Historical site Museum
Community	Educational	Land use where child-care service are provided and where children, adolescence and adults receive formal education	Crèche Pre-primary school Primary school Secondary school Technical school Technical college Skills training centre Satellite campus Adult education centre
			Medical
	Religious	Place of worship and religious education	Church Mosque Temple

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Broad Land Use Category	Land Use Category	Land Use Definition	Typical Land Uses
Business	Social	Land use that provides municipal or social services to local communities	Community hall Library Post office Pension pay-point Customer care centre Police station Fire brigade Emergency services
	Cemetery	Land use that allows burial of human remains	Cemetery
	Retail	Land use that allows the trading of retail goods	Hypermarket Supermarket Specialist retailers (e.g. clothing and furniture) Banking branches
	Entertainment	Place of entertainment that is usually associated with the retail industry	Entertainment centre Restaurant Fast food outlet Tavern
	Motor trade	Land use that allows the retail, repair and maintenance of motor vehicles	Filling station Vehicle service centre Vehicle showrooms
Institutional	Micro enterprise	Business or enterprise attached to and supplementing a residential component. The residential component remains the primary land use associated with the property.	Home office Home-based medical consulting room Non-disturbing home enterprise (e.g. spaza shop, hair dresser or day care centre) Farm stall
	Municipal	Land use associated with the daily operation and functioning of the municipality	Administrative offices Parking garage Minibus taxi holding and or parking area Municipal training facilities Bus depot Electrical purpose Equipment stores
	Government	Land use associated with the daily operation and functioning of the national or provincial government	Administrative office Railway reserves and stations Telecommunication
Industrial	Light	Land use for <u>non</u> -pollution industries used for manufacturing purposes	Non-noxious factories Maintenance and repair workshops Engineering works Builders yard

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Broad Land Use Category	Land Use Category	Land Use Definition	Typical Land Uses
Transport	Heavy	Land use for pollution industries used for manufacturing purposes	Noxious and polluting factories Scrap yard
	Commercial	Land use for the handling and storage of cargo and the wholesale of goods	Distribution centre Wholesale trade Warehousing Cartage and transport services
	Transport hub	Land use for public transport and heavy vehicle parking and overnight facilities	Public transport stop Truck stop Large filling station Motel Restaurant Small retail outlet Warehousing Vehicle and truck repair workshops
	Airfield	Land use for and airfield, its infrastructure and the services associated with airfields	Runway Control tower Terminal buildings Hangers Storage facilities
Open space	Active	Open space that has a recreational function linked to it	Public park Play ground Sports field Sports club Cultural heritage site Amusement park Recreation area
	Passive	Open space that has a hazard avoidance or natural resource conservation function	Private open space Conservancy Protected area River flood areas Geological unsuitable land Topographically unsuitable land Hazardous zones (e.g. pollutions areas)

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Broad Land Use Category	Land Use Category	Land Use Definition	Typical Land Uses
Agriculture	Intensive agriculture	Land use that is intended of subsistence or small-scale commercial farming purposes	Communal farming Broilers and livestock farming Hydroponics Forestry Storage Agri-processing Equipment hire and sales Camping and water sports Skills training and research

Source: Urban Dynamics Gauteng, 2019

ANNEXURE B
PSDF SPATIAL PLANNING CATEGORIES

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A		CORE	
	A.a	Statutory Protected Areas	<ul style="list-style-type: none"> • Areas designated in terms of legislation for biodiversity conservation, defined categories of outdoor recreation and non- consumptive resource use. • Conservation purposes pertains to, the use of land for the protection of the natural and/or built environment, including the protection of the physical, ecological, cultural and historical characteristics of land against undesirable change as set out in Section 24(2(a)).
	A.a.1	Wilderness Areas (declared in terms of NEMPA2 57 of 2003)	<ul style="list-style-type: none"> • Areas characterised by their intrinsically wild and pristine appearance and character, or that are capable of being restored to such, and which are undeveloped, without permanent improvements or human habitation. Such areas are declared to: <ul style="list-style-type: none"> ○ protect and maintain the natural character of the environment, biodiversity resources, associated natural and cultural resources; ○ provide environmental goods and services; ○ provide outstanding opportunities for solitude and primitive outdoor experiences; and ○ provide controlled access to those who understand and appreciate wilderness, and those who wish to develop such an understanding.
	A.a.2	Special Nature Reserves (declared in terms of NEMPA 57 of 2003)	<ul style="list-style-type: none"> • Areas characterised by sensitive, ecologically outstanding ecosystems or natural habitats, natural communities, populations or species, or unique geological or biophysical features conserved primarily for scientific research, educational and limited nature-based recreational purposes.
	A.a.3	National Parks (declared in terms of NEMPA 57 of 2003)	<ul style="list-style-type: none"> • Designated to protect areas of national or international biodiversity importance; or containing a representative sample of South Africa's natural systems, scenic areas or cultural heritage sites; or the ecological integrity of one or more ecosystems. National parks provide spiritual, scientific, educational, recreational and tourism-related opportunities which are

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			mutually and environmentally compatible and can contribute to local and regional economic development.
		A.a.4	<p>Nature Reserves, including provincial, local authority and registered private nature reserves (declared in terms of NEMPA 57 of 2003)</p> <ul style="list-style-type: none"> • Areas of significant ecological, biophysical, historical, or archaeological interest or that are in need of long-term protection for the maintenance of its biodiversity or for the provision of environmental goods and services. Nature reserves are declared to: <ul style="list-style-type: none"> ○ supplement the systems of wilderness areas and national parks in South Africa; ○ sustainably provide natural products and services to local communities; ○ enable the continuation of traditional resource uses; and ○ provide nature-based recreational and tourism opportunities.
		A.a.5	<p>Protected Environments (declared in terms of NEMPA 57 of 2003)</p> <ul style="list-style-type: none"> • Areas may be declared as a protected environment to: <ul style="list-style-type: none"> ○ Conserve the area as a buffer zone for the protection of a wilderness area, special natural reserve, national park, world heritage site or nature reserve. ○ Enable owners of land to take collective action to conserve biodiversity on their land and to seek legal recognition for such actions. ○ Protect the area if it is sensitive to development due to its – ○ Biological diversity; Natural, cultural, historical, archaeological or geological value; Scenic and landscape value; or ○ Provision of environmental goods and services. ○ Protect a specific ecosystem outside of a wilderness area, special nature reserve, national park, world heritage site. ○ Ensure that the use of natural resources is sustainable. • Control change in land-use if the area is earmarked for declaration as, or inclusion in, a wilderness area, national park or nature reserve
		A.a.6	<p>Forest Wilderness Areas/ Forest Nature Reserves (in terms of Section</p> <ul style="list-style-type: none"> • Declared forest wilderness areas and forest nature reserves include: <ul style="list-style-type: none"> ○ natural forests, i.e. tract of indigenous trees whose crowns are largely contiguous

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			8[1] of National Forests Act 84 of 1998)	<ul style="list-style-type: none"> ○ and which comprise all other floral and faunal forest elements; ○ woodlands, i.e. a group of indigenous trees which are not a natural forest, but whose crowns cover more than 5% of the area bounded by the trees forming the perimeter of the group; and ○ natural habitats or ecosystem components.
		A.a.7	Marine Protected Areas (declared in terms of Marine Living Resources Act 18 of 1998)	<ul style="list-style-type: none"> • Areas declared as a marine protected area: <ul style="list-style-type: none"> ○ For the protection of communities, populations or species of fauna and the biophysical features on which they depend; ○ To facilitate fishery management by protecting spawning stock, allowing stock recovery, enhancing stock abundance in adjacent areas, and providing pristine communities for research; or ○ To mitigate any conflict that may arise from competing uses in that area.
		A.a.8	World Heritage Sites (declared in terms of the World Heritage Convention Act 49 of 1999)	<ul style="list-style-type: none"> • Cultural or natural areas that has been: <ul style="list-style-type: none"> ○ Included on the World Heritage List, or the tentative list of the Republic, and has been proclaimed as a World Heritage Site, or ○ Proclaimed to be a special heritage site for management in accordance with the Act (such areas cannot be referred to as a World Heritage Site).
		A.a.9	Mountain Catchment Areas (declared in terms of the Mountain Catchment Areas Act 63 of 1970)	<ul style="list-style-type: none"> • Areas declared as mountain catchment areas that provide for the conservation, use, management and control of such land.
B			BUFFER	
	B.a		Non-Statutory Conservation Areas	<ul style="list-style-type: none"> • Areas voluntarily set aside by land owners and managed for conservation purposes in terms of the legislation applicable to the current zoning of such land and not in terms of dedicated conservation legislation.
		B.a.1	Contractual Conservation Areas	<ul style="list-style-type: none"> • Areas designated for conservation purposes in terms of an agreement with a conservation agency, or between landowners, a lease agreement, or a

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				servitude. This category includes conservancies and biodiversity stewardship sites.
		B.a.2	Private conservation areas	<ul style="list-style-type: none"> • Areas zoned as private open space for the primary use of conservation. Also, areas unofficially designated and managed for conservation purposes by the relevant land owner.
	B.b		Ecological Corridors	<ul style="list-style-type: none"> • Linkages between natural habitats or ecosystems that contribute to the connectivity of the latter and to the maintenance of associated natural processes
		B.b.1	Freshwater Ecosystem Priority Areas (FEPA) (in terms of National Freshwater Ecosystem Priority Areas Project)	<ul style="list-style-type: none"> • Identified river and wetland FEPA's and fish support areas, including a generic buffer of 100m, measured from the top of bank of the river or the delineated riparian areas, whichever is larger, and measured from the outside edge of the wetland (Implementation Manual for Freshwater Ecosystem Priority Areas, Aug 2011).
		B.b.2	Rivers or riverbeds (incl. 32 m buffer) (in terms of NEMA)	<ul style="list-style-type: none"> • All other perennial and non-perennial rivers and wetlands, including a buffer of 32m based on the generic buffer width used for aquatic features in the Listing Notices of the Environmental Impact Assessment Regulations, 2010 (GN R544, GN R545 and GN R546).
		B.b.3	Other Natural Areas	<ul style="list-style-type: none"> • Sensitive Coastal Areas. • Tracts of natural vegetation that form part of, or link ecosystem components (i.e. tracts of natural vegetation acting as a buffer zone between rivers located in FEPA Fish Support Areas and Fish Sanctuaries, and Category C and D areas). • Any other natural areas that are conservation-worthy and which form linkages to natural areas within Category C and D areas.
	B.c		Urban Green Areas	<ul style="list-style-type: none"> • Municipal open spaces that form in integral part of the urban structure.

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		B.c.1	Public Park	<ul style="list-style-type: none"> Public Park
		B.c.2	Landscaped Areas	<ul style="list-style-type: none"> Landscaped Areas
C			AGRICULTURAL AREAS	
	C.a		Extensive agricultural areas	<ul style="list-style-type: none"> Agricultural areas covered with natural vegetation, used for extensive agricultural enterprises, e.g. indigenous plant harvesting, extensive stock-farming, game- farming, eco-tourism.
		C.a.1	Bona-fide Game Farms	<ul style="list-style-type: none"> Bona-fide Game Farms
		C.a.2	Extensive Stock Farms	<ul style="list-style-type: none"> Extensive Stock Farms
	C.b		Intensive agricultural areas	<ul style="list-style-type: none"> Agricultural areas covered with natural vegetation, used for extensive agricultural enterprises, e.g. indigenous plant harvesting, extensive stock-farming, game- farming, eco-tourism.
		C.b.1	Cultivated Areas	<ul style="list-style-type: none"> Cultivated Areas
		C.b.2	Plantations and Woodlots	<ul style="list-style-type: none"> Plantations i.e. group of trees cultivated for exploitation of the wood, bark, leaves or essential oils in the trees; forest produce, i.e. anything which appears or grows in such plantation including any living organisms and any product of it.
	C.c		Other agricultural areas	<ul style="list-style-type: none"> Agricultural areas used for intensive agricultural practices that are water based, e.g. abalone, finfish, crayfish and freshwater fishing.
		C.c.1	Aquaculture	<ul style="list-style-type: none"> Aquaculture

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		C.c.2	Mariculture	<ul style="list-style-type: none"> • Mariculture
		C.c.3	Urban Agriculture	<ul style="list-style-type: none"> • Urban Agriculture
D			URBAN RELATED	
	D.a		Main Town	<ul style="list-style-type: none"> • Towns accommodating Category A Municipalities (i.e. metropolitan areas) and the seat (capital town) of Category C Municipalities (District Municipalities).
	D.b		Local Town	<ul style="list-style-type: none"> • Towns accommodating the seat (capital town) of Category B Municipalities (Local Municipalities).
	D.c		Rural Settlements	<ul style="list-style-type: none"> • Smaller towns and rural settlements that fall under the jurisdiction of Category B Municipalities (i.e. towns and rural settlements forming part of a Local Municipality).
	D.d		Tribal Authority Settlements	<ul style="list-style-type: none"> • Formal and informal residential areas under the ownership of tribal authorities, e.g. Kamden, Ga-Sehunelo Ward 1, Gamorona, Heuningvlei, Kleineira, Segwaneng, Cassel, Deurward, etc.
	D.e		Communal Settlements	<ul style="list-style-type: none"> • Settlements that have been planned, classified and subdivided in terms of the former Rural Areas Act 9 of 1987 and which, in terms of the Transformation of Certain Rural Areas Act 94 of 1998, can be transferred to a legal entity of the community's choice, e.g. Pella, Concordia, Richtersveld, Steinkopf and Leliefontein.
	D.f		Institutional Areas	<ul style="list-style-type: none"> • Areas designated for schools, colleges, churches and mosques and other institutional purposes.
		D.f.1	Place of Instruction	<ul style="list-style-type: none"> • Place of Instruction

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		D.f.2	Place of Worship	<ul style="list-style-type: none"> Place of Worship
		D.f.3	Institution	<ul style="list-style-type: none"> Institution
	D.g		Authority Areas	<ul style="list-style-type: none"> Areas designated for governmental purposes and other official uses, e.g. municipal offices, offices of parastatals (Telkom, Eskom) (areas zoned for authority purposes).
		D.g.1	Government Uses	<ul style="list-style-type: none"> Government Uses
		D.g.2	Municipal Uses	<ul style="list-style-type: none"> Municipal Uses
	D.h		Residential Areas	<ul style="list-style-type: none"> Areas designated for residential purposes, e.g. single title erven, group housing, estates, 'GAP housing' and residential smallholdings.
		D.h.1	Single Residential House	<ul style="list-style-type: none"> Single Residential House
		D.h.2	Group Housing	<ul style="list-style-type: none"> Group Housing
		D.h.3	Guest House	<ul style="list-style-type: none"> Guest House
		D.h.4	Flats/Residential Building	<ul style="list-style-type: none"> Flats/Residential Building
		D.h.5	Mixed Density Residential Area	<ul style="list-style-type: none"> Mixed Density Residential Area
		D.h.6	GAP Housing	<ul style="list-style-type: none"> GAP Housing

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	D.h.7	Subsidised Housing	<ul style="list-style-type: none"> Subsidised Housing
	D.h.8	Informal Housing	<ul style="list-style-type: none"> Informal Housing
	D.h.9	Small Holdings	<ul style="list-style-type: none"> Small Holdings
	D.h.10	Residential Estate	<ul style="list-style-type: none"> Residential Estate
D.i		Business Areas	<ul style="list-style-type: none"> Business Areas
	D.i.1	Business Premise	<ul style="list-style-type: none"> Business Premise
	D.i.2	Shop	<ul style="list-style-type: none"> Shop
D.j		Service-Related Business	<ul style="list-style-type: none"> Areas designated for other business activities associated with service trade industries, e.g. launderettes and light manufacturing industries; and industries associated with motor vehicle sales and repairs.
	D.j.1	Service Trade Industry	<ul style="list-style-type: none"> Service Trade Industry
	D.j.2	Service Station	<ul style="list-style-type: none"> Service Station
D.k		Special Business	<ul style="list-style-type: none"> Areas designated for special business activities associated with casinos and gambling houses and areas identified for adult entertainment.
	D.k.1	Casino	<ul style="list-style-type: none"> Casino
	D.k.2	Adult Entertainment	<ul style="list-style-type: none"> Adult Entertainment

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	D.i		SMME Incubators	<ul style="list-style-type: none"> • Areas designated for Small Medium and Micro Enterprises (SMME's) and associated infrastructure and services focused on community-based service trade and retail.
	D.m		Mixed-Use Development Areas	<ul style="list-style-type: none"> • Areas designated for innovative combinations of land-use, e.g. residential/light business; light industry/light business (in terms of various municipal zonings).
	D.n		Cemeteries	<ul style="list-style-type: none"> • Cemeteries and formal burial parks, excluding crematoriums.
	D.o		Sports fields & Infrastructure	<ul style="list-style-type: none"> • Dedicated sports fields together with the associated infrastructure, parking areas, and services.
	D.p		Airport and Infrastructure	<ul style="list-style-type: none"> • Area designated as airport together with the infrastructure and services associated with the airport and its activities.
	D.q		Resorts & Tourism Related Areas	<ul style="list-style-type: none"> • Resorts and tourism-related nodes and amenities that form part of a designated Hospitality Corridor.
	D.r		Farmsteads & Outbuildings	<ul style="list-style-type: none"> • Main farmsteads, including on-farm infrastructure required for farm logistics, e.g. houses, sheds, packing facilities, etc.
E			INDUSTRIAL AREAS	
	E.a		Agricultural industry	<ul style="list-style-type: none"> • Agriculture-related industrial development, e.g. silos, wine cellars, packing facilities, excluding abattoirs.
	E.b		Industrial Development Zone	<ul style="list-style-type: none"> • Dedicated industrial estate ideally linked to an international, or national, port that leverages fixed direct investments in value-added and export-orientated manufacturing industries.

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	E.c		Light industry	<ul style="list-style-type: none"> • Areas designated for light industrial activities associated with the service industry (e.g. repair of motor vehicles) including warehouses and service stations.
	E.d		Heavy industry	<ul style="list-style-type: none"> • Areas designated for robust industrial activities, e.g. chemical works, brewery, processing of hides, abattoirs, stone crushing, and crematoriums.
	E.e		Extractive industry	<ul style="list-style-type: none"> • Settlements and infrastructure associated with multiple consumptive resource extraction, e.g. mining/fracking.
	E.f		Urban agriculture	<ul style="list-style-type: none"> • Repurpose of industrial structures within settlement areas for urban agriculture uses.
F			SURFACE INFRASTRUCTURE AND BUILDINGS	
	F.a		National roads	<ul style="list-style-type: none"> • National roads proclaimed in terms of the National Roads Act 7 of 1998.
	F.b		Main roads	<ul style="list-style-type: none"> • Provincial and regional roads proclaimed in terms of the Roads Ordinance 19 of 1976.
	F.c		Minor roads	<ul style="list-style-type: none"> • Regional and local roads proclaimed in terms of the Roads Ordinance 19 of 1976.
	F.d		Public Streets	<ul style="list-style-type: none"> • Public streets and parking areas within main town and rural settlements.
	F.e		Heavy Vehicle Overnight Facilities	<ul style="list-style-type: none"> • Areas designated for heavy vehicle parking and overnight facilities.

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F.f	Railway lines	<ul style="list-style-type: none"> Railway lines and associated infrastructure.
F.g	Power lines	<ul style="list-style-type: none"> Power lines and associated sub-stations and infrastructure. Transmission Development Plan 2018 - 2027
F.h	Tele-communication infrastructure	<ul style="list-style-type: none"> Any part of the infrastructure of a telecommunication network for radio/wireless communication including, voice, data and video telecommunications, which may include antennae, any support structure, equipment room, radio equipment and optical communications equipment provided by cellular network operators, or any other telecommunication providers, and all ancillary structures needed for the operation of telecommunication infrastructure. Electronic Communications Act 36 of 2005
F.i	Renewable energy structures	<ul style="list-style-type: none"> Any wind turbine or solar voltaic apparatus, or grouping thereof, which captures and converts wind or solar radiation into energy for commercial gain irrespective of whether it feeds onto an electricity grid or not. It includes any appurtenant structure or any test facility which may lead to the generation of energy on a commercial basis. National Energy Act 34 Of 2008 Energy Efficiency Strategy of The Republic of South Africa
F.j	Dams & Reservoirs	<ul style="list-style-type: none"> Major dams and reservoirs. National Water Act (Act 36 of 1998)
F.k	Canals	<ul style="list-style-type: none"> Constructed permanent waterways, e.g. irrigation canals and stormwater trenches. National Water Act (Act 36 of 1998)
F.l	Sewerage Plants and Refuse Areas	<ul style="list-style-type: none"> Areas designated as municipal and private sewerage treatment plants and refuse areas. National Environmental Management: Waste Act, 2008 (Act 59 of 2008)

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				<ul style="list-style-type: none"> National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)
	F.m		Science and Technology Structures	<ul style="list-style-type: none"> Any areas associated with the science and technology sector, with specific reference to the SRAO and the designated astronomy reserve. These areas are regulated by the Astronomy Geographic Advantage Act of 2007.

Source: Northern Cape PSDF, 2018

ANNEXURE C
STAKEHOLDER PARTICIPATION REPORT

1. INTRODUCTION

As indicated in the Guidelines for the Development of Provincial, Regional and Municipal Spatial Development Frameworks and Precinct Plans (DRDLR, 2017) and required by SPLUMA (Section 20), public and stakeholder engagement forms an integral part of the SDF development process. During the development of the Siyathemba SDF, it was considered essential to obtain stakeholder buy-in into the Siyathemba SDF. To achieve this, Urban Dynamics Gauteng prepared the Siyathemba SDF through an inclusive stakeholder participation process. The stakeholder meetings were held at key stages of the project to ensure buy-in into the work done at that stage, before proceeding to the next stage of the project. Alternatively, public participation and meetings were also scheduled to ensure proper engagement of the SDF by all role-players. The section below provides a summary of the detailed stakeholder participation process followed.

2. PROVINCIAL GAZETTE NOTICES AND MEDIA ADVERTISEMENTS

Notice was given that the Siyathemba Local Municipality was in the process of preparing a Spatial Development Framework (SDF) for Siyathemba Municipality in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013), commonly known as 'SPLUMA'. The notice was placed in the Government Gazette on 13 May 2019, and in the Noordwester Newspaper on 14 February 2019 (see copies attached). The Notice stated that a stakeholder engagement process will be initiated and SDF documentation will be made available to the general public during the process for inputs and comments.

In addition to the above, once the Draft Siyathemba SDF was completed, it was a notice was placed in the Government Gazette on 25 November 2019, and in the Noordwester Newspaper on 25 November (see copies attached). The notice stated that public comment was being sought on the Draft Siyathemba SDF and that copies of the Draft SDF was placed at libraries in Prieska, Marydale and Niekerkshoop for inspection.

Commented [g1]: (PLEASE ALSO INCLUDE THE FINAL LOCAL NEWSPAPER ADVERTISEMENTS AND FINAL NOTICE IN THE PROVINCIAL GAZETTE IN THIS SECTION)

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

PROVINSIALE KOERANT, 13 MEI 2019 No. 2264 13

NOTICE 44 OF 2019

SIYATHEMBA LOCAL MUNICIPALITY

Preparation of a Spatial Development Framework for the Siyathemba Municipality

Notice is hereby given that the Siyathemba Local Municipality is in the process of preparing a **Spatial Development Framework (SDF)** for Siyathemba Municipality in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013), commonly known as 'SPLUMA'.

The SDF is a strategic document that sets out the objectives that reflect the desired spatial form of the municipality. It will also identify strategies and policies through which to achieve these objectives. The process of preparing the SDF is a core component of the Integrated Development Plan (IDP).

A stakeholder engagement process will be initiated and SDF documentation will be made available to the general public during the process for inputs and comments. The Town and Regional Planning Firm, Urban Dynamics Gauteng, has been appointed to prepare and complete the Siyathemba SDF.

Further details regarding the process may be obtained from Siyathemba Local Municipality during normal office hours. The contact person is Mr Kabelo Mochworo at (053) 3535300.

Notice No. 02 / 2019

The Municipal Manager
PO Box 16
Prieska
8940

Date: 13 May 2019

VRYDAG 15 FEBRUARIE 2019

ADVERTENSIE TABEL

NOORDWESTER
CALVINIA
JARETTA
027 341 0226

OSWALTUIS
PRIESKA
BETS DU PRINS
053 652 7024

MESSINGER
VICTORIA-WES
ALRED
TEL. 053 651 0345

AKKOMMODASIE
DELLER/LEKKAARSTAD
NIEVINS
advisering wesenste in velle koo-
pates. Kontak: 053 251 9981
www.lakkommodasie.co.za

AKKOMMODASIE
KRAAPSTAD: advisering wesenste,
wesevle. Kontak: 053 251 9981
www.lakkommodasie.co.za

WINKKOPPE
4 BARKERARDE, 2757018
Barkardam, Prieska, 8940
Kontak: 053 210 000. Naam: 12
www.winkkoppe.co.za
Staat: 053 210 000

BARNARION
BOUKON TRAKTORE
GARIBOLDI, 1188010, 1188010, 1188010
Kontak: 053 210 000. Naam: 12
www.winkkoppe.co.za
Staat: 053 210 000

TE KOOP GEVRA
GARIBOLDI, 1188010, 1188010, 1188010
Kontak: 053 210 000. Naam: 12
www.winkkoppe.co.za
Staat: 053 210 000

GRONDEWAL
SIYATHEMBA
TE MOOR
CALVINIA: Rm 1 deponse-
mentel met groot oppervlakte. Slegs
Jansburg. Kontak: 053 210 000.
CALVINIA: Rm 1 deponse-
mentel met groot oppervlakte.

TATA & MAMA AFRICA
BETAAL NA WERK, GEDOEN IS.
Dankie, Tata en Mama Africa

BEL: TATA & MAMA AFRICA
083 684 1337

SIYATHEMBA LOCAL MUNICIPALITY
Preparation of
a Spatial Development Framework
for the Siyathemba Municipality

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Notice No. 02 / 2019
The Municipal Manager
Date: 13 February 2019

PO Box 16 Prieska 8940

LYNX security services

25 Jaar gelede
DIE NOORDWES (1.4): 29 April 1994. Met die stigting van die koshuis op Nieuwoudtville het die eendomsing daarvan aan die NG Kerk Nieuwoudtville oorgegaan en moes die kerkraad besluit vir water doel die gebou aangevaal moet word. Na vele tek en seep te besluit om die gebou te renou in 'n woonstelsel wat as die koshuis te gebruik sal word.

ONS IS OP CALVINIA
• Ons bou die oudste grondegebou.
• Ons installeer alarmstelsels.

HANTAM MUNICIPALITY
(Notice No. 11/2019)
TOWN PLANNING SCHEME: PROPOSED
SUBDIVISION OF ERF 1941 LADIESMANTLE

TRANSVAAL LANDBOU

Landbouer minagting

PRETORIA – Die werkhoudende landbouers het hulle protes teen die regering se "verrigte" landbouer minagting uitgespreek. Die regering se "verrigte" landbouer minagting is 'n groot klap op die landbou se selfvertroue. Die regering se "verrigte" landbouer minagting is 'n groot klap op die landbou se selfvertroue. Die regering se "verrigte" landbouer minagting is 'n groot klap op die landbou se selfvertroue.

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SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

14 No. 2309

PROVINCIAL GAZETTE, 25 NOVEMBER 2019

GENERAL NOTICES • ALGEMENE KENNISGEWINGS

NOTICE 128 OF 2019

Notice 37 of 2019

SIYATHEMBA LOCAL MUNICIPALITY Draft Spatial Development Framework for Siyathemba Municipality

Notice is hereby given that the Siyathemba Local Municipality has prepared a Draft Spatial Development Framework (SDF) for Siyathemba Municipality in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013), commonly known as 'SPLUMA'.

The Draft SDF is a strategic document that sets out the objectives that reflect the desired spatial form of the municipality. It also identifies strategies and policies through which to achieve these objectives. The process of preparing the SDF is a core component of the Integrated Development Plan (IDP). The Draft SDF will be adopted as a Siyathemba Local Municipality policy once approved by Council.

Public comment is being sought on the Draft SDF for Siyathemba Municipality. Copies of the Draft SDF will be open for inspection during normal office hours for 60 days from date of publication of this notice at the Elizabeth Vermeulen Library, 255 Stewart Street, Prieska, the Oagbreek Library, 331 Beukes Street, Marydale, and the Niekerkshoop Library, 116 Kerk Street, Niekerkshoop.

Any comment or representation or objection in respect of the Draft SDF for Siyathemba Municipality may be submitted in writing for the attention of Kabelo Mochiwaro by hand at the Siyathemba Local Municipality's reception (Siyathemba Local Municipality, Victoria Street, Prieska), or by email (kabelomochiwaro@gmail.com), within 60 days from date of publication of this notice. Any enquiries may also be directed to the above person.

This gazette is also available free online at www.govonline.co.za

BLAD: VIER
NOORDWESER / MESSENGER
WYDAG: 22 NOVEMBER 2019

IS SAE DRAMA DIE DRAAIPUNT?

Die SAE is 'n drama wat die lewens van 'n groep mense in 'n klein dorp in die Oos-Kaap toon. Die drama is 'n verhaal van 'n groep mense wat in 'n klein dorp in die Oos-Kaap woon. Die drama is 'n verhaal van 'n groep mense wat in 'n klein dorp in die Oos-Kaap woon.



WOLFRYS BOTJE OP DIE VEELIJS

Skoonprys R174 by Cape Wools

Die skoonprys R174 by Cape Wools is 'n skoonprys wat deur Cape Wools aangebied word. Dit is 'n skoonprys wat deur Cape Wools aangebied word.

MATZIKAMA SPOEK BY DIE DA

Die Matzikama is 'n dorp in die Oos-Kaap. Dit is 'n dorp wat baie mooi is. Dit is 'n dorp wat baie mooi is.

Letter WLV

Die Letter WLV is 'n tydskrif wat deur die WLV uitgegee word. Dit is 'n tydskrif wat deur die WLV uitgegee word.

HANTAM MUNISIPALITEIT

KENNISGEWING NR. 6/2019
KENNIS GEKOEK HEWWE
DAT DIE HANTAM MUNISIPALE RAAD SE
RAADSVERGADERING
GEHOUL SAL WORD OP
10.00 DONDERDAG, 28 NOVEMBER 2019 IN DIE RAADSAAL,
KOMMANDO KANTORE, DORPSTRAAT, CALVINA

SIYATHEMBA LOCAL MUNICIPALITY

Draft Spatial Development Framework for Siyathemba Municipality

Notice is hereby given that the Siyathemba Local Municipality has prepared a Draft Spatial Development Framework (SDF) for Siyathemba Municipality in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013), commonly known as 'SPLUMA'.

3. STAKEHOLDERS

A number of stakeholder groups were identified and liaised with. Apart from the public, the consultation process focused on stakeholder that could provide specific information and relevant inputs with regard to the preparation of the Siyathemba SDF. These stakeholders provided inputs into the formulation of the Situational Analysis, the Proposals and the Implementation Framework of the Siyathemba SDF. Consultation was conducted with the following stakeholders:

a. MISA Project Manager

Monthly progress reports were submitted to the Municipal Infrastructure Support Agent (MISA) project manager responsible for the management of the Siyathemba SDF. This enabled the MISA project manager to keep up to date with the progress of the project.

b. Technical Steering Committee

Urban Dynamics Gauteng consulted with key MISA, Provincial and Municipal technical officials at Technical Steering Committee meeting regarding the Siyathemba SDF Situational Analysis, Proposals and Implementation Framework. These meetings included the Municipal Infrastructure Support Agent (MISA) project managers, officials from the Department of Agriculture, Land Reform and Rural Development (DALRRD), officials from the Cooperative Governance, Human Settlements and Traditional Affairs (COGHSTA), officials from the Department of Economic Development and Tourism (DEDAT), officials from the Department of Transport, Safety and Liaison (DTSL), officials from the Northern Cape Environment and Nature Conservation (DENC), officials from the Northern Cape Provincial Treasury (NCPT), officials from the Northern Cape Department of Education (NCDOE), officials from the Pixley Ka Seme District Municipality, and officials from the Siyathemba Local Municipality. The Technical Steering Committee preapproved the relevant sections of Siyathemba SDF (usually subject to amendments being made to the SDF), before proceeding to the Project Steering Committee.

c. Project Steering Committee

Urban Dynamics Gauteng consulted with non-technical Municipal stakeholders at the Project Steering Committee meetings, who have an interest in the Siyathemba SDF. These meetings included the sector departments, which included officials from the Department of Agriculture, Land Reform and Rural Development (DALRRD), officials from the Cooperative Governance, Human Settlements and Traditional Affairs (COGHSTA), officials from the Department of Economic Development and Tourism (DEDAT), officials from the Department of Transport, Safety and Liaison (DTSI), officials from the Northern Cape Environment and Nature Conservation (DENC), officials from the Northern Cape Provincial Treasury (NCPT), officials from the Northern Cape Department of Education (NCDOE), and officials from the Pixley Ka Seme District Municipality. These meetings also included members of the Siyathemba Town Council. The Councilors and Ward members were instrumental in their involvement in preparing the Draft SDF for Siyathemba and ensuring public participation at public meetings. In addition, SDF progress and feedback was a standing item on Council meetings during the SDF development, as agreed in the inception meeting.

d. General Public

Urban Dynamics Gauteng gave presentations to the general public on the Situational Analysis, Vision and Proposals made in the Siyathemba SDF. Three meetings were held with the public at Prieska, Marydale and Niekerkshoop. These meetings were all well-attended. The General Public gave inputs into the Siyathemba SDF, which were then absorbed into the SDF. Apart from the public participation meetings, the general public was also invited for final comments and inputs in the Draft Siyathemba SDF, as required by SPLUMA (see local newspaper advertisement and provincial Gazette notice)

4. CONSULTATION PROCESS

Table A lists all the meetings held as part of the Siyathemba SDF stakeholder participation process. Two Inception Meetings were held with the Siyathemba Local Municipality and the Project Steering Committee to clarify the goals and work process of the Siyathemba SDF. Two Situational Analysis Meetings were held to present the Situational Analysis

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

to the Technical Steering Committee and the Project Steering Committee. Five meetings were held the present the proposals of the Siyathemba SDF. These meetings addressed the Technical Steering Committee, Project Steering Committee, the Prieska General Public, the Marydale General Public, and the Niekerkshoop General Public. To complete the stakeholder participation process, two Implementation Meetings were held to present the Implementation Framework to the Technical Steering Committee and the Project Steering Committee.

TABLE A: STAKEHOLDER MEETINGS

Type	Stakeholder	Date	Location
Inception Meeting	Siyathemba Local Municipality	6 February 2019	Prieska
Inception Meeting	Project Steering Committee	22 January 2019	Prieska
Situational Analysis Meeting	Technical Steering Committee	25 March 2019	Kimberley
Situational Analysis Meeting	Project Steering Committee	03 April 2019	Prieska
Proposals Meeting	Technical Steering Committee	21 August 2019	Kimberley
Proposals Meeting	Project Steering Committee	26 August 2019	Prieska
Proposals Meeting	Public in Prieska	26 September 2019	Prieska
Proposals Meeting	Public in Marydale and Niekerkshoops	27 September 2019	Marydale and Niekerkshoops
Implementation Meeting	Technical Steering Committee	15 October 2019	Kimberley
Implementation Meeting	Project Steering Committee	29 October 2019	Prieska

Source: Urban Dynamics Gauteng, 2019

Once each section (Situational Analysis, Proposals, Implementation Framework) of Siyathemba SDF was presented to the relevant stakeholder groups, as set out above, the comments and proposals made by these stakeholders were incorporated into the Siyathemba SDF. Of note is the fact that the Technical Steering Committee preapproved the relevant sections of the Siyathemba SDF (usually subject to amendments being made to the SDF), before proceeding

to the Project Steering Committee. By doing this, that particular section of the SDF was deemed technically sound and in line with the requirements of the Technical Steering Committee, before presenting to the Project Steering Committee.

5. CONTENT AND RESPONSES

The Siyathemba SDF was presented to the Technical Steering Committee, the Project Steering Committee, and the General Public. During this stakeholder participation process, robust engagement took place at the inception meetings, and the meetings presenting the Status Quo Analysis, Proposals, and Implementation Framework. A number of comments were made at these meetings with regard to the project, which were then incorporated into the Draft Siyathemba SDF. The key comments that were made are as follows:

a. Policy alignment

Stakeholders requested that a clear link be drawn between the Siyathemba SDF and National and Provincial policy documents. For example, it was pointed out that the Provincial SDF contains 5 growth and development strategies for towns in the Northern Cape and that it is important to show how the Siyathemba SDF adheres to these strategies.

b. Statistical sources

Stakeholders asked whether the latest statistics were used in the analysis of Siyathemba. Urban Dynamics Gauteng responded by saying that Census 2011 was the latest statistics available for most of the variables used in the SDF. However, the 2016 Community Survey statistics was used were available for some variables used in the SDF.

c. Regional road link

Stakeholders asked that the existing municipal initiative to develop a tar road from Kathu via Niekerkshoop to Prieska/N10 be incorporated in the SDF, which Urban Dynamics complied with.

Commented [g2]: Mention that robust engagement took place at the inception meeting, Status quo analysis, Proposals; Land Use Management and Implementation Framework.

d. Special Economic Zone (SEZ)

Stakeholders said the existing industrial area in Prieska is running out of available stands and that additional stands are needed for the mining and renewable energy sector within the industrial area. They mentioned that the Provincial SDF stated that Siyathemba was suitable for the small SEZ that focusses on the renewable energy sector. The proposal to develop a SEZ at the Prieska industrial area was consequently proposed in the Siyathemba SDF.

e. Copperton airport

Stakeholders objected to the SDF proposal to develop the Copperton Airport as a single airport for Siyathemba, thus closing the Prieska Airport. Stakeholders believed it would create the potential for town development in the vicinity of the Copperton Airport, which is not in line with the PSDF proposal to focus development at existing towns. The Copperton Airport proposal was removed from the document.

f. Housing development

Stakeholder asked whether proposed residential townships are located near amenities to support SPLUMA principles. Urban Dynamics Gauteng pointed out that all proposed residential townships are located within a 20min walk of a town's primary business node, containing retail and community facilities, thus supporting the SPLUMA principles.

g. Retail centre

Stakeholder stated that a small retail centre is being planned along Loots Boulevard in Prieska. Urban Dynamics Gauteng made sure this retail centre could be accommodated in the Siyathemba SDF.

SIYATHEMBA SPATIAL DEVELOPMENT FRAMEWORK 2030

h. Renewable energy guidelines

Stakeholders pointed out that the SDF needed to contain guidelines for the location and development of renewable energy projects in Siyathemba. Urban Dynamics Gauteng agreed to include such guidelines in the SDF.

i. SDF mapping

A number of improvements to the SDF maps were requested by stakeholders. These included the following:

- The maps are difficult to interpret and aerial photograph must be used as a backdrop on the maps to provide greater clarity and orientation;
- A Development Boundary (Urban Edge) must be drawn around each town to contain growth;
- Suburb names must be placed on the maps to increase the legibility of the maps when reading it with the document text;
- That the Prieska LUMS map be zoomed in and split into 4 maps to make the cadastral stands more legible; and
- That cadastral boundaries be made a darker shade to be more visible.

j. Spatial Planning Categories (SPC)

Stakeholders indicated that the Northern Cape PSDF contains specific Spatial Planning Categories (SPCs) and requested that the SDF proposals are drawn in line with these. Stakeholders said that the SPCs of the approved PSDF of 2019 must be used in the Siyathemba SDF to guide the SDF land use management system in particular. Stakeholder asked that the Development Framework Maps also be linked to the SPCs.

k. Development boundary

Stakeholders proposed that the concept of an urban edge (or development boundary) must be introduced in the SDF. In the absence of the urban edge (or development boundary) development cannot be contained and the implementation of SPLUMA principles would be difficult.

I. Engineering projects

Stakeholders asked that the SDF address the issue of the location and requirements of engineering infrastructure for future development needs, which was not covered in spatial proposals. In turn, the SDF section on engineering infrastructure requirements can influence the preparation of engineering infrastructure master plans by proposing these in the SDF Capital Expenditure Framework. Urban Dynamics Gauteng complied with this request.

m. Agricultural mapping

Stakeholder said that DAFF is busy with the protection of High Potential Agricultural Land and that this spatial GIS layer needs to be used to identify the protected areas in Siyathemba and make sure the SDF agricultural protection areas comply with these. This was confirmed by Urban Dynamics Gauteng.

n. Prieska collector road

Stakeholders presented a proposal to link the northern residential township of Prieska to the Prieska industrial area via two collector roads. Such a linkage was illustrated on the Siyathemba SDF framework map.

o. Mineworker housing

Stakeholders commented that the parcel of land in Prieska next to the N10 freeways should be made available for residential development. Urban Dynamics Gauteng pointed out that the Land Use Budget did not indicate a need for any additional land for residential expansion up to the year 2030. However, Urban Dynamics Gauteng said that should the Copperton mine be reopened, it could result in an unpredictable influx of workers seeking work at the mine, and that this area could absorb this unpredicted population growth. Urban Dynamics Gauteng therefor agreed to indicated this land be earmarked as a 'mine overflow area' and that the SDF stresses that this land can only be used if the influx of workers exceed the current estimates of the mine.

p. Smallholdings development

Stakeholder stated that they were in favour of the SDF proposal to develop smallholdings north of Prieska and the economic opportunities it will create for local communities. However, stakeholders asked that the SDF proposal to develop smallholdings north of Prieska be link to the one-hectare, one household strategy of the Pixley Ka Seme District Rural Development Plan in the Siyathemba SDF. Urban Dynamics Gauteng complied with this request.

q. Municipal expenditure

Stakeholders requested that a list of outstanding planning documents be added as part of the Siyathemba Local Municipality expenditure list on the Capital Investment Framework. Stakeholders also asked that the capital projects be illustrated spatially.

6. CONCLUSION

The stakeholder participation process was conducted extensively and comprehensively, including all relevant stakeholders from government, the Siyathemba Local Municipality and the general public. In total, 10 meetings were held with these stakeholder groups and all meetings were well attended. Relevant comments were made by the stakeholders regarding the Siyathemba SDF Situations Analysis, Proposals, and Implementation Framework. These comments were all addressed in the SDF to the approval of the stakeholders.