



Infrastructure Report[©]



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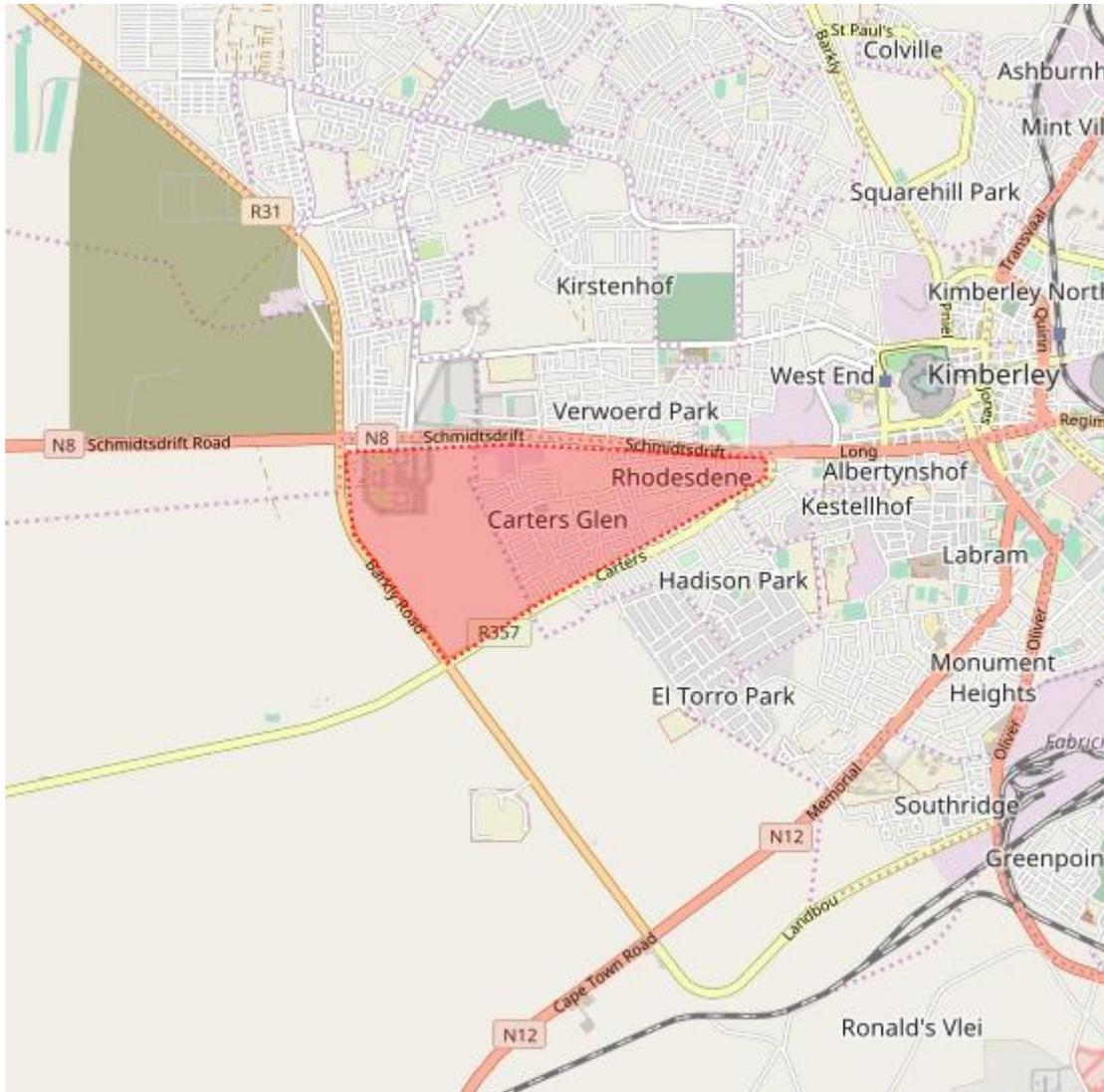


Table of content

1	Introduction	3
2	Locality.....	3
Regional Infrastructure		3
2.1	Gas and Oil Pipelines.....	3
2.2	Harbour, Border posts and Airports.....	4
2.2.1	Border post.....	4
2.2.2	Ports and Harbours.....	4
2.2.3	Airports.....	4
2.3	Rail network.....	5
2.4	The national road system	5
Service infrastructure access		6
2.5	Water and sanitation infrastructure	6
2.5.1	Regional bulk infrastructure	7
2.5.2	Water bulk infrastructure.....	7
2.5.3	Water reticulation	8
2.5.4	Water service access	8
2.5.5	Sanitation services infrastructure.....	8
2.5.6	Sanitation service access	8
2.6	Electricity services infrastructure.....	9
2.6.1	Eskom’s electricity infrastructure.....	9
2.6.2	Electricity service access.....	9
2.7	Refuse removal access.....	9

List of tables

Table 1: Smaller towns, settlements and villages	3
Table 2: Gas and Oil Pipeline infrastructure	4
Table 3: List of border posts	4
Table 4: Harbours	4
Table 5: Airport functional details	5
Table 6: Airport technical details	5
Table 7: Details of rail types as in 2014.....	5
Table 8: List of railway stations and sidings	5
Table 9: Road services in the area	5
Table 10: Toll plaza data for the affected area	5
Table 11: Infrastructure elements reported	6
Table 12: Water management areas	6
Table 13: Dams	7
Table 14: Water schemes	7
Table 15: Weirs in the assessment area	7
Table 16: Water abstraction points	7
Table 17: Water treatment works	7
Table 18: Canals.....	7
Table 19: Access to water services 1996, 2001 and 2011	8
Table 20: Sanitation schemes	8
Table 21: Waste water treatment facilities	8
Table 22: Waste water treatment capacities (Ml/day)	8
Table 23: Access to sanitation services 1996, 2001 and 2011	9
Table 24: Access to electricity services 1996, 2001 and 2011	9
Table 25: Access to refuse removal services 1996, 2001 and 2011	10

Infrastructure Area Report[©]

1 Introduction

This report was generated by MapAble[®] and shows the infrastructure profile for the area under assessment.

The outputs of this report must always be interpreted with care. Not all the data exists at the same level of detail and the accuracy of the outputs will be affected by the size of the area assessed. One must assume that the smaller the area the less accurate figures might be when sourced from high-level national datasets.

2 Locality

The provision of infrastructure and especially services infrastructure is closely linked to municipal systems in South Africa. Even where national systems exist and where a distinction can be made between national service providers, for example, Eskom or the Department of Water Affairs, in the final analysis municipalities remain constitutionally responsible to ensure access to services. It therefore important to give a short overview of the institutional contexts of the area assessed.

Province(s) affected:	<i>Northern Cape</i>
District Municipality/ Metropolitan area(s) affected:	<i>Frances Baard</i>
Local municipality(s) affected:	<i>Sol Plaatjie</i>
Municipal ward(s) affected:	<i>NC091-24,NC091-26</i>
Area of area assessed (ha):	<i>363 Hectares</i>

The area's nearest neighbours are the following towns, settlements and places. If the results are indicated as 0 km, then it implies that the town or settlement falls within the area assessed. Distances are measured from the boundary of the area and are show as direct distance.

The nearest city:	<i>The nearest city is Kimberley which is 2.25 km away</i>
The nearest major town:	<i>The nearest major town is Kuruman which is 190.32 km away</i>
Nearest town:	<i>The nearest town Barkly West is 29.41 km away</i>

The following small towns or settlement points are in the area. The selection shows the main places, as defined in Census 2011, as proxies for small towns, settlement points, villages, and small places.

Table 1: Smaller towns, settlements and villages

Small towns/Main places	Settlement points, villages and small places
The area has 0 small town(s), namely:	The area has 0 small place(s), namely:

Regional Infrastructure

Not all infrastructure service local users or consumers. Large scale national infrastructure contributes to the broader economic development of an area. Infrastructure in this category includes gas and oil pipelines, harbours, border posts and airports and railway infrastructure. The key is that this infrastructure does not service individual users. The presence or proximity of this infrastructure is reported in this assessment although it might not be directly related to local economic development and service delivery.

2.1 Gas and Oil Pipelines

South Africa has a very limited gas and oil pipeline system mostly dedicated to transporting oil and gas between the coast and the economic heartland of the country. The main system is owned by Transnet and there also a number of non-Transnet owned pipelines. Data for these pipelines is not currently available. The pipelines assess are:

- Refined fuels pipelines (Durban to Gauteng and the Free State Goldfields)
- Crude oil pipelines (Durban to Gauteng)
- Methane rich gas pipelines (Secunda to Durban)
- There are also proposed future pipelines that might affect certain areas.

The pipelines are summed up below:

Table 2: Gas and Oil Pipeline infrastructure

Pipelines	Length in the assessment area (km)	Nearest point from the area to a pipeline (km)
Total length of Crude oil pipelines	0,00 km	370.54 km away
Total refined products pipelines	0,00 km	239.38 km away
Total gas pipelines	0,00 km	492.63 km away
Future pipelines	0,00 km	413.71 km away
All pipelines total	0,00 km	

2.2 Harbour, Border posts and Airports

Harbours, Border posts, and Airports are crucial for national and international economic development. This infrastructure includes the major ports of entry into and out of the country.

2.2.1 Border post

Border posts are the main legal land transfer points between two countries. Border posts are essential for interaction and the flow of goods and services between South Africa and its neighbours. The nearest border post to the area under assessment is Van Rooyen's Gate between South Africa and Lesotho which is 255.92 km away. The border post name on Lesotho's side is Van Rooyen's Gate. This border post operates between 06:00 - 22:00.

Should it be applicable, the following border posts are in the assessment area.

Table 3: List of border posts

Border post	Country	In in neighbouring country	Operating hours

2.2.2 Ports and Harbours

The transportation sector is a strong factor in terms of economic and regional balanced development, as well as also having a great influence on national integration to the world economic market. Ports constitute an important economic activity in coastal areas. Ports are also important for the support of economic activities in the hinterland since they act as a crucial connection between sea and land transport.

Table 4: Harbours

Nearest Harbour	East London is 560.26 km away
Harbour capacity	1 736 000,00 tons

2.2.3 Airports

Airports play an eminent role in the economic development of a region, as well as the nation as a whole. Airports facilitate the fast movement of man and materials, thereby fostering trade, commerce and tourism. From a commercial perspective, airports at the higher end of the scale (international and major regional) are freight breakpoints which, depending on its scale, attracting supporting industries in the product beneficiation value chain as well as developing logistical functions. Bigger airports are traffic generators and are also dependent on accessibility. Airports support employment generation. Direct employment opportunities include workers from the construction sector when the airport is being built. Once it is operational, personnel are required for a range of services, including airport operations and management, aircraft maintenance, storage facilities, charter services and leasing activities. International and domestic airport ports play a decisively different role in the development of a region with the later having a more local effect.

The nearest international airport is Kimberley International Airport is 6.26 km away and the nearest domestic airport is Kimberley is 6.28 km away. The following table gives details of the airports within the assessment area.

Table 5: Airport functional details

Name	Class	ICAO ¹ code	Customs	Use
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Table 6: Airport technical details

Name	Total passengers	Runway surface	Length (ft)	IFR ²
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2.3 Rail network

Rail infrastructure forms an important part of transporting both passengers and goods. The nearest railway station is 2.63 km away. The railway line infrastructure in the area is as follows:

Table 7: Details of rail types as in 2014

Rail type/class	Total (km)
Standard railway line	0,00 km
Marshalling lines	0,00 km
Station lines	0,00 km
Abandoned railway lines	0,00 km
Narrow gauge railway line	0,00 km

The following stations and sidings are in the assessment area

Table 8: List of railway stations and sidings

Railway stations and sidings

2.4 The national road system

The South African road system is the most expansive infrastructure component in South Africa comprising of 640 000km of roads. Access to road services is not recorded in the censuses. The next table shows the available roads data for the area under assessment. The data does not give an indication of road surfaces.

Table 9: Road services in the area

Road type/class	Total (km)
National	0,00 km
Arterial	0,00 km
Secondary	0,00 km
Tertiary	0,00 km
Main (Urban)	0,00 km
Streets (Urban)	21,61 km

South Africa has a developing toll road system. The nearest toll plaza to the area is Verkeerdevlei is 190.4 km away which is on the N1 route. If applicable, the following toll plazas are in the assessment area.

Table 10: Toll plaza data for the affected area

Toll plaza name	Class	Control centre name	Road number
-----------------	-------	---------------------	-------------

¹ International Civil Aviation Organization code

² Instrument flight rules

Service infrastructure access

Access to infrastructure services is a driving force for the betterment of all communities in South Africa. It is a core function of government and since 1994 access to services for previously disadvantaged communities was emphasised to the extent that it became central to most delivery policies. Initial approaches were to meet the health requirements of the World Health Organisation and hence the adoptions of the so-called RDP standards, later referred to as access to basic services. However, these policies have evolved over time for many reasons to the extent that many of the services currently contemplated by the government at all levels exceed the initial norms and standards.

The extent of service delivery systems varies from large scale integrated national systems, such as the electricity supply systems, to localised systems such as a borehole, providing access to water to one or a few houses. However, irrespective of size, the aim of these systems, in the final analysis, is to provide the end user with access to services in a way that meet supply policy and delivery criteria.

This report deals with services infrastructure in terms of the infrastructure itself and in terms of access to infrastructure. The first component is drawn from sector specific sources such as Eskom and the Department of Water and Sanitation. The report is based on national data sets and does not report on local data. It implies that where individual service providers are responsible for service delivery and their data is not included in either Eskom's data or that of the Department of Water and Sanitation, no results will be displayed.

The infrastructure component, with the exception of roads and refuse removal services, reports on the following:

Table 11: Infrastructure elements reported

	Water	Sanitation	Electricity	Refuse
Resource development	Water management areas Dams and reservoirs Weirs Water scheme	Sanitation scheme	Generation	
Bulk and connector infrastructure	Abstraction works Canals Water treatment works Bulk pipelines Pump stations	Waste water treatment works	High voltage lines Substation 2WD TRFR Substation 3WD TRFR Substation HV	Land fill sites (Currently no data)
Internal infrastructure	Reticulation	Reticulation	MV Lines LV Lines Substation MV	No data available

Access information comes from the previous three censuses in 1996, 2001 and 2011. The way that access to services was presented in the three available censuses varies from each other. Annexure B gives a summary of how the different services have been categorised into basic, intermediate, and full services to allow for comparison between the censuses.

2.5 Water and sanitation infrastructure

Water and sanitation services is a system and can be described in terms of water cycle starting from a source (river, dam, spring, or borehole) that are treated and distributed from consumption up to the point where treated waste water discharged.

At a macro scale, water sources are managed as a part of a national system to optimise access and to meet long-term water demand. The scale of water schemes also differs, ranging from large subnational schemes or small, isolated, local schemes in small towns or settlements. When reporting on high-level water infrastructure it is only possible to report on the proximity of facilities such as dams, canals, weirs and abstraction points. It therefore, does not imply that the area under assessment necessarily have access to or are dependent on the reported bulk regional infrastructure. Reported results should therefore be used with caution.

Water and sanitation services are managed in terms of the National Water Act of 1998 (Act 36 of 1998). The Act makes provision for water management areas based on the major drainage basins in South Africa and then usually under the control of a water board. There are 21 water management areas in South Africa. The area under assessment is affected by the following water management areas:

Table 12: Water management areas

Water management area	Major river(s) in the management area
Lower Vaal	Harts, Molopa and Vaal



2.5.1 Regional bulk infrastructure

The nearest dam to the area is Scholtzburg is 30.58 km away dam. The dam is in the Modder which forms part of the Orange Basin within the Riet sub-basin. Should any dams fall directly in the area, the details of the dam(s) are the following:

Table 13: Dams

Dam	River	Basin	Sub-basin	Completion date	Capacity	Used for irrigation

The nearest water scheme to the assessment area is Kimberley. Where applicable, the following water schemes affect the assessment area:

Table 14: Water schemes

Scheme name	Scheme number	Class	Owner type	Owner
Kimberley	S03C91E013	Internal Bulk	Local Municipality	Sol Plaatje
Riverton To Kimberley	NCBULK 6	Regional Bulk	Local Municipality	Sol Plaatje

2.5.2 Water bulk infrastructure

Bulk water infrastructure consists and are influenced by both natural and man-made elements such as rivers, dams and water facilities. There are number of elements that forms part of the bulk infrastructure component generally it includes abstraction points, bulk pipelines, water treatment works and main reservoirs. This section provides the available data regarding these components.

Where applicable the following weirs serve the area:

Table 15: Weirs in the assessment area

Weir name	Weir number	Scheme names	Scheme number	Class

The nearest water abstraction point is KY001 is 1.87 km away. However, this does not imply that the area gets water from this point. The abstraction points that apply to area are listed below:

Table 16: Water abstraction points

Scheme name	Scheme number	Abstraction point name	Number	Condition/Status	Capacity (Ml/day)

Riverton WTW is 24.97 km away. The following water treatment works are within the assessment area.

Table 17: Water treatment works

WTW name	WTW number	WTW Class	Capacity (Ml/day)

The total length of bulk water pipelines in the assessed area is 1,67 km.

Canals also forms part of the bulk network but are normally associated with agricultural activities. Where applicable the following exists in the area of assessment:

Table 18: Canals

Scheme name	Scheme number	Bulk class	Description	Length (m)

Pump stations are an integral part of the water delivery system. Pump stations apply to both regional bulk, bulk and connector and reticulated networks. The total amount of pump stations in the assessed area is 0,00. A detailed overview of pump stations is available in Annexure A.

2.5.3 Water reticulation

Water reticulation is the last element in the system that brings water to the end user. The total length of the local water reticulation network in the area is 22,60 km.

2.5.4 Water service access

Water services have been a very high priority in services delivery strategies over the past two decades. It is one of the key Millennium Goals adopted in 2000 which stated that countries should aim to halve the proportion of people without access to safe drinking water and basic sanitation by 2015. In terms of these goals at least 50% of households should have access to at least basic services. South Africa, on the contrary, had objectives to have universal access to basic water by 2014.

The table below shows the access to water has changed between 1996 and 2011:

Table 19: Access to water services 1996, 2001 and 2011

		Full	Intermediate	Basic	Below Basic	None	Total
1996	Total	982	3	2	1	3	990
	%	99,21 %	0,28 %	0,16 %	0,08 %	0,28%	100 %
2001	Total	822	4	1	10	3	837
	%	98,18 %	0,48 %	0,17 %	1,16 %	0,01 %	100 %
2011	Total	986	13	0	1	0	999
	%	98,65 %	1,26 %	0,00 %	0,09 %	0,00 %	100 %

2.5.5 Sanitation services infrastructure

Sanitation infrastructure forms part of the basic services that has a large impact on the health of a community. A sanitation scheme is the basis of local sanitation provision that links households to waste water treatment works.

The area under assessment is affected by the following sanitation schemes:

Table 20: Sanitation schemes

Scheme name	Scheme number	Scheme class	Owner type	Scheme owner

The following wastewater treatment plants are located in the area of assessment:

Table 21: Waste water treatment facilities

Facility name	Facility number	Owner	Operator	Type
				Activated sludge

The affected facilities have the following capacities:

Table 22: Waste water treatment capacities (Ml/day)

Facility name	Type	Capacity	Use
	Activated sludge		

2.5.6 Sanitation service access

Access to appropriate sanitation services is a very high health priority. Although sanitation services received a high priority from government, there are always challenges and this service did not achieve the same level of success as improved access to water services. This section shows the sanitation position for the area.

Table 23: Access to sanitation services 1996, 2001 and 2011

		Full	Intermediate	Basic	Below Basic	None	Total
1996	Total	987	0	0	1	0	992
	%	99,56 %	0,00 %	0,00 %	0,08 %	0,36 %	100 %
2001	Total	832	0	0	2	2	836
	%	99,50 %	0,00 %	0,00 %	0,25 %	0,24 %	100 %
2011	Total	995	0	0	0	6	1 000
	%	99,43 %	0,00 %	0,00 %	0,01 %	0,56 %	100 %

2.6 Electricity services infrastructure

The report only reflects Eskom electricity infrastructure. The supply areas of municipalities are not included.

2.6.1 Eskom's electricity infrastructure

Electricity infrastructure is normally classified into generation, transmission and distribution. The links between these components are usually transformers in substations that steps the current down to appropriate levels for the subsequent element in the system. This report provides information on the lines (transmission) and substations in the network. There is currently no data on generation facilities.

2.6.1.1 Substations and transformers

Description of infrastructure	Total amount of infrastructure type in assessment area
Substations with three winding transformers (3W)	0,00
Substations with two winding transformers (2W)	0,00
High voltage substations	0,00
Medium voltage substations	0,00
Line 2WD transformers	0,00

2.6.1.2 Transmission

The following transmission lines are within the area.

Description of infrastructure	Total length of infrastructure type in assessment area
High voltage lines	0,00 km
Medium voltage lines	0,00 km

2.6.2 Electricity service access

Although electricity does not have same implications for health as water and sanitation, access to electricity is very important for general development and especially education. Access to electricity was therefore always a high priority. The table below shows how access to electricity has changed since 1996 and is based on access to electricity for lighting.

Table 24: Access to electricity services 1996, 2001 and 2011

		Full access	No access	Total
1996	Total	987	4	991
	%	99,64 %	0,36 %	100 %
2001	Total	836	7	844
	%	99,16 %	0,84 %	100 %
2011	Total	1 002	0	991
	%	100,00 %	0,00 %	100 %

2.7 Refuse removal access

Solid waste management and refuse removal are important for health and environmental considerations. The table below shows how access to refuse removal services was reported in the previous three censuses.



Table 25: Access to refuse removal services 1996, 2001 and 2011

		Full	Intermediate	Basic	Below Basic	None	Total
1996	Total	967	4	0	1	20	992
	%	97,47 %	0,38 %	0,00 %	0,08 %	1,97 %	100 %
2001	Total	836	0	0	4	4	843
	%	99,09 %	0,00 %	0,04 %	0,44 %	0,42 %	100 %
2011	Total	970	32	0	3	2	1 007
	%	96,28 %	3,20 %	0,00 %	0,27 %	0,24 %	100 %

This report was prepared by Albert Ferreira

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Annexure A. Data extraction and data mining

This report is based on queries generated from the MapAble® database. The data sources are indicated in the table below. All the data utilised is in the public domain and can be sourced from the respective data custodians.

The bulk of the data comes from census data from Statistics South Africa. Each census is queried at the smallest data level at which a census was released. The 1996 census was released at enumerator area (EA) level while the 2001 census was only released at sub-place level. A sub place consists of a number of EA's. The 2011 census was released as a small area layer (SAL). Small areas are larger than EA's but smaller than sub-places. It is important to note that the censuses are not consistent in so far as data categories are concerned. It was therefore necessary to make adjustments to some census data (subdividing categories or lumping categories together) in order to get the data at a consistent and comparable basis. Due to the way data is extracted from the census the totals in the tables in the report are not necessarily consistent or exactly the same throughout the report. The following affects table totals:

- When data is extracted from the censuses, values of less than 5 are randomised with values between 1 and 5 in order to protect individual's identities. This accounts for smaller variations in totals.
- Data categories are not consistent between the censuses.
- The process of data partitioning is by its very nature affected by the physical scale at which queries are done. The smaller an area is the bigger the possibility for anomalies become.

Notwithstanding these issues, the results are valid and sufficiently accurate for general use.

Data partitioning is used in MapAble® to determine values for the selected areas. Data partitioning calculates the proportional ratios of underlying data sets (data linked to polygons such as EA's or sub-places) within a selected query area (ward, municipality, farm portion, etc.). Data partitioning is used to overcome the need for information on census demographics for areas that are not consistent with the standard boundaries themselves. Or as the case in this report where boundaries change from time to time and area profiles are not directly comparable. The proportions are based on the area of the intersecting themes.

Data partitioning allows for comparisons between datasets, which each having their own unique demarcations and which are not necessarily spatially comparable or compatible.

Data sources

Data table	Data source
Table 1: Smaller town, settlements and villages	Municipal Demarcation Board from 1996 to 2016
Table 2: Gas and Oil Pipeline infrastructure	National Department of Transport, 2015
Table 3: List of border posts	National Department of Transport, 2015
Table 4: Harbours	National Department of Transport, 2015
Table 5: Airport functional details	National Department of Transport, 2015
Table 6: Airport technical details	National Department of Transport, 2015
Table 7: Details of rail types as in 2014	NGI, 2015
Table 8: List of railway stations and sidings	NGI, 2015
Table 9: Road services in the area	National Department of Transport, 2015
Table 10: Toll plaza data for the affected area	National Department of Transport, 2015
Table 11: Infrastructure elements reported	Department of Water Affairs, 2015
Table 12: Water management areas	Department of Water Affairs, 2015
Table 13: Dams	Department of Water Affairs, 2015
Table 14: Water Schemes	Department of Water Affairs, 2015
Table 15: Weirs in the assessment area	Department of Water Affairs, 2015
Table 16: Water abstraction points	Department of Water Affairs, 2015
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Table 18: Canals	Department of Water Affairs, 2015
Table 19: Access to water services 1996, 2001 and 2011	Statistics South Africa. Census data for 1996, 2001 and 2011
Table 20: Sanitation schemes	Department of Water Affairs, 2015
Table 21: Waste water treatment facilities	Department of Water Affairs, 2015
Table 22: Waste water treatment capacities (Ml/day)	Department of Water Affairs, 2015
Table 23: Access to sanitation services 1996, 2001 and 2011	Statistics South Africa. Census data for 1996, 2001 and 2011
Table 24: Access to electricity services 1996, 2001 and 2011	Statistics South Africa. Census data for 1996, 2001 and 2011
Table 25: Access to refuse removal services 1996, 2001 and 2011	Statistics South Africa. Census data for 1996, 2001 and 2011
Table 26: Bulk water pipelines	Department of Water Affairs, 2015

Annexure B. Classification of service access data from the censuses

This annexure shows how census data was classified in order to be represented as access to different access categories used in national service delivery policies.

1. Water services

Census 1996	Census 2001	Census 2011
Piped water in dwelling	Piped water inside dwelling	Piped (tap) water inside dwelling/institution
Full	Full	Full
Piped water on site	Piped water inside yard	Piped (tap) water inside yard
Intermediate	Intermediate	Intermediate
Public tap	Piped water on community stand distance < 200m from dwelling	Piped (tap) water on community stand: distance less than 200m from dwelling/institution
Basic	Basic	Basic
Water-carrier/tanker	Piped water on community stand distance > 200m from dwelling	Piped (tap) water on community stand: distance between 200m and 500m from dwelling/institution
Below basic	Below basic	Below basic
Borehole/rainwater tank/well	Borehole	Piped (tap) water on community stand: distance between 500m and 1000m (1km) from dwelling/institution
Below basic	Below basic	Below basic
Dam/river/stream/spring	Spring	Piped (tap) water on community stand: distance greater than 1000m (1km) from dwelling/institution
None	Below basic	Below basic
Other	Rain-water tank	No access to piped (tap) water
None	Below basic	None
Unspecified/Dummy	Dam/pool/stagnant water	Unspecified
None	None	None
	River/stream	Not applicable
	None	None
	Water vendor	
	Basic	
	Other	
	None	

2. Sanitation services

Census 1996	Census 2001	Census 2011
Flush or chemical toilet	Flush toilet (connected to sewerage system)	Flush toilet (connected to sewerage system)
Full	Full	Full
Pit latrine	Flush toilet (with septic tank)	Flush toilet (with septic tank)
Below basic	Full	Full
Bucket latrine	Chemical toilet	Chemical toilet
Below basic	Intermediate	Intermediate
None of the above	Pit latrine with ventilation (VIP)	Pit toilet with ventilation (VIP)
None	Basic	Basic
Unspecified/Dummy	Pit latrine without ventilation	Pit toilet without ventilation
None	Below basic	Below basic
	Bucket latrine	Bucket toilet
	None	Below basic
		Other
		Below basic
		Unspecified
		None
		Not applicable
		None
		None

3. Electricity services

Census 1996			Census 2001			Census 2011		
Electricity from authority direct	Full		Electricity	Full		Electricity	Full	
Electricity from other source	Full		Gas	None		Gas	None	
Gas	None		Paraffin	None		Paraffin	None	
Paraffin	None		Candles	None		Candles (not a valid option)	None	
Candles	None		Solar	Full		Solar	Full	
Other	None		Other	None		None	None	
Unspecified/ Dummy	None					Unspecified	None	
						Not applicable	None	

4. Refuse removal services

Census 1996			Census 2001			Census 2011		
Removed by local authority at least weekly	Full		Removed by local authority at least once a week	Full		Removed by local authority/private company at least once a week	Full	
Removed by local authority less often	Intermediate		Removed by local authority less often	Intermediate		Removed by local authority/private company less often	Intermediate	
Communal refuse dump	Basic		Communal refuse dump	Basic		Communal refuse dump	Basic	
Own refuse dump	Below basic		Own refuse dump	Below basic		Own refuse dump	Below basic	
No rubbish disposal	None		No rubbish disposal	None		No rubbish disposal	None	
Other	None					Other	None	
Unspecified/ Dummy	None					Unspecified	None	
						Not applicable	None	