HUMAN SETTLEMENTS AND URBAN LAND REFORM

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INTRODUCTION

The centrality of urban land reform

The debate about amending Section 25 of the Constitution to allow expropriation of property without compensation has an urban as well as a rural dimension. Increasing urbanisation and the concentration of economic activity within urban areas means that the quality of urban land development will be a strong influence on the efficiency of the economy as a whole. By the same token, outcomes which create uncertainty about urban property rights, whether imposed from above or driven from below, will strike at the heart of the confidence necessary to underpin investment and economic growth.

Human settlement pressure

The most volatile component of the urban land system is human settlement, as determined by the efforts of households to establish themselves within the constraints that they face. These constraints include household incomes, the extent to which the state can assist poorer households, policies defining access to housing opportunities, existing urban form and associated existing rights. The pressure arising from household efforts can either be accommodated in productive ways or result in explosions including land invasion, damaging the fabric of rights and creating political pressures forcing the state into less than optimal policies. Accommodation is much to be preferred. It avoids counter-productive developments and, properly worked out, it improves growth. An accommodative strategy requires an understanding of the pressures, the resources available for coping with them and policy debate.

The plan of this study

The study begins with an analysis of urban settlement. Three urban geographical types ('geotypes') are distinguished: metropolitan areas, other urban areas outside traditional areas, and urban areas within traditional areas. Urban areas within traditional areas are not specifically identified by Statistics South Africa, so a method has to be found for identifying the population within them.

Estimates and projections of populations in these geotypes are then made between 2011 and 2030 within a coherent demographic framework. The distribution of household income among these households is then estimated and projected, making possible a projection of new households within each of four household income categories.

The study then considers housing stock by type of dwelling and by tenure in 2016, and analyses housing need in that year. It provides an account of current housing policy and state provision and assesses it in relation to housing need. The conclusion summarises the main findings of the study.

How to read this document

In large measure, this document draws on statistical sources, necessitating the employment of quantitative methods. In order to ensure transparency of the argument, it is necessary to give an account of them, but these accounts may make the document unnecessarily complex for readers not interested in technical details. To the greatest extent possible, technical details are placed in appendices which non-technical readers can skip, without losing the thread of the analysis.

THE URBAN SYSTEM

Identifying urban areas

Statistics South Africa's current practice, used both in the 2011 Census and the 2016 Community Survey, is to classify the population into three geotypes according to human settlement characteristics:

- Urban areas
- Traditional areas (tribal areas)
- Farms

The definition of each geotype is as follows:

> Urban areas are formal cities and towns characterised by higher population densities, high levels of economic activities and high levels of infrastructure. An urban area is a continuously built-up area with characteristics such as type of economic activity and land use. Cities, towns, townships, suburbs, etc. are typical urban areas. An urban area is one which was proclaimed as such (i.e. in an urban municipality under the old demarcation) or classified as such during census demarcation by the Geography department of Stats SA based on their observation of the aerial photographs or on other information.
>
> A traditional area is communally owned land under the jurisdiction of a traditional leader.
>
> A rural area is any area that is not classified urban. Rural areas may comprise one or more of the following: tribal areas, commercial farms and informal settlements.[1]

The 2011 Census reports populations in each ward of each municipality classified in this way. The 2016 Community Survey has published information by municipality, but not by ward.

The difference between geographical types and municipalities

South Africa has wall-to-wall municipalities: every place in the country is contained in one municipality or another. It follows that any municipality may contain an urban area, a traditional area or farms, or any combination of these three geographical types. Put another way, one can cross tabulate the population by municipality and geographical type.

Urbanisation in traditional areas

There is an asymmetry between the treatment of traditional areas and other areas. Cadastral maps from February 2018 and a land use map from 2013/14[2] show areas, within wards where the population was returned as wholly traditional in the 2011 Census, which are either:

- divided into erven, at densities similar to urban areas outside traditional areas, or
- demarcated as high density urban areas on the land use map, but not divided into erven.

Both of these categories have a claim to be regarded as urban. Together they are extensive, as can be seen from the accompanying atlas which contains maps of these erven and high density areas in six municipalities:

- Tshwane
- Buffalo City
- Msunduzi (Pietermaritzburg)
- Rustenburg
- Polokwane
- Mbombela (Nelspruit)

In each municipality, and especially in Tshwane and Mbombela, there are areas within traditional areas which can reasonably be regarded as formal or informal urban areas, but are not counted as such. To be sure, some these areas may have become urban since 2011, but many were in existence as such before then.

Can the urban population in traditional areas be estimated?

Method

A method for estimating the urban population in traditional areas has been devised as follows:

- Identify indicators associated with urbanisation in the 2016 Community Survey.
- Select a subset of indicators most strongly associated with urbanisation outside traditional areas.
- Create the combination of the subset variables which best predicts urbanisation outside traditional areas.
- Use the combination to predict the probability that a household in a traditional area is in an urban area.

1 Statistics South Africa, Multilingual Statistical Terminology, 2013: Chapter 9
2 Compiled by the Surveyor-General and downloadable from Data – Planet GIS at https://planetgis.co.za/data.php

- Find the (weighted) total of these household probabilities to arrive at an estimate of the population in traditional urban areas.

The same procedure can be applied to the 2011 Census results. Technical details are set out in the methodological appendix.

Results

The results of the analysis are striking, as Table 1 indicates:

Table 1 – Urbanisation outside and inside traditional areas

	2011	2016
Urbanisation outside traditional areas	93.3%	94.4%
Urbanisation inside traditional areas	65.7%	64.3%
Urbanisation – whole country	84.3%	83.8%

Both the 2011 Census and the 2016 Community Survey yield estimates of urbanisation in traditional areas at above 60%. The table should not be read as indicating that urbanisation decreased between 2011 and 2016. Rather the two estimates of urbanisation in traditional areas contain a degree of uncertainty and suggest a roughly constant rate.

One can go a step further and map the urbanisation rates in traditional areas within municipalities which contain them. The map appears in the atlas. The observed pattern has been shaped by the following factors:

1. The Land Acts. The 1913 Land Act mainly defined traditional areas in the eastern part of the country, while the 1936 Act added areas mainly in the north, less promising for agricultural activity, and with greater spatial concentration of the population.
2. The proximity to metropolitan areas.
3. The extent to which the black population could be displaced or settled in traditional areas within reach of urban areas outside of them.

Table 2 sets out the proportions of the population living in six municipalities in urban areas outside traditional areas and in all urban areas in 2016. The difference represents the proportion living in urban parts of traditional areas, identified by the method described above.

Table 2 – Urbanisation in six municipalities

Municipality	In urban areas outside traditional areas only	In all urban areas
Buffalo City	80%	91%
Msunduzi	70%	92%
Rustenburg	62%	88%
Tshwane	89%	95%
Mbombela	13%	76%
Polokwane	39%	76%

Mbombela is an egregious example of displaced urbanisation, but it can be found in all the municipalities listed,

32% of the population lives in both the urban traditional and rural traditional areas. If we are to understand the conditions facing them, and the urban system as a whole, Statistics South Africa needs to refine its geographical type classification. This would entail using an appropriate definition of 'urban' throughout the country, and not just outside traditional areas.

The second point is more subtle. If South Africa is over 80% urbanised, urban form is to a great extent set in stone. People have acquired sites, acquired or built their dwellings, usually their single greatest form of investment and will often be reluctant to move even where there are opportunities for better location.

METHODOLOGICAL APPENDIX

Ten variables were considered as indicators of urbanisation. Four of them were selected as the predictive subset.

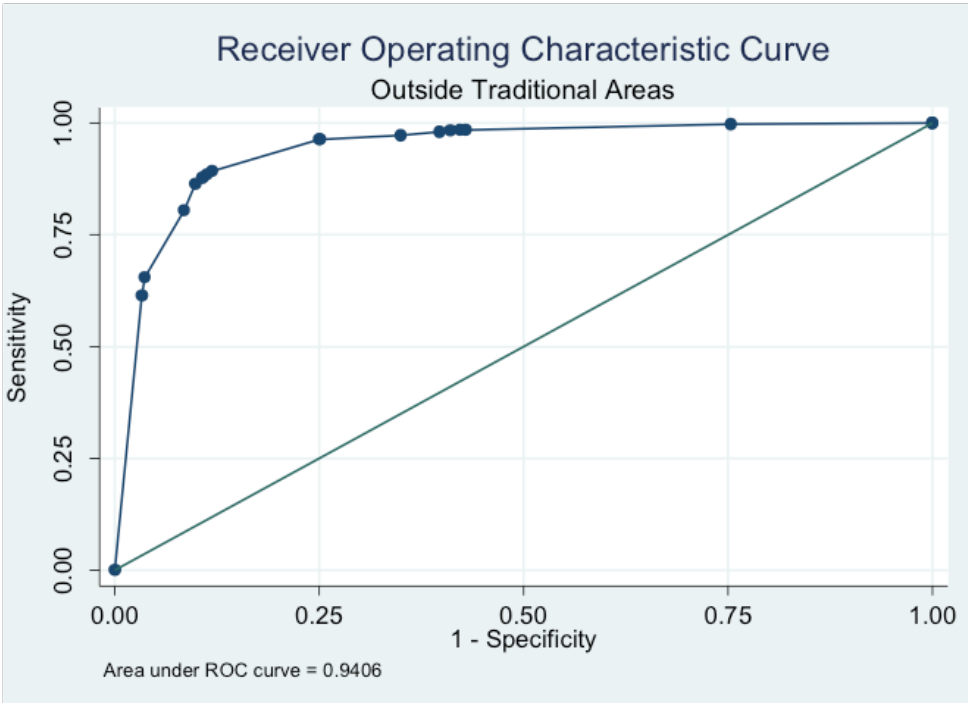
Indicator	In subset	Values indicating urbanisation
Source of water	No	
Water supplier	Yes	1 – Municipality 2 – Other water scheme
Toilets	No	
Access to electricity	No	
Refuse removal	Yes	1 – Removed by local authority/private company/community members at least once a week
Mail	Yes	1 – Delivered to the dwelling
Main dwelling type	No	
Whether dwelling subsidised	No	
Agricultural activity	Yes	No

A probit analysis[3] with urban residence as the dependent variables and the subset of indicators as the independent variable was carried for households living outside the urban areas.

How well does the combination of indicators work? A proxy (the predictor) for urban residence in relation to actual urban residence may lead to four outcomes:

- The proxy correctly indicates urban residence
- The proxy indicates urban residence when the household actually lives in a rural area (Type I error)
- The proxy indicates rural residence when the household actually lives in an urban area (Type II error)
- The proxy correctly indicates rural residence.

The figure displays the Receiver Operating Characteristic curve (ROC) for areas outside traditional areas. Sensitivity refers to the ratio of true urbanisation to proxy urbanisation and specificity to the ratio of true rural residence to proxy rural residence. One approach to determining whether a particular household is urban or not is to specify a level of probability as a threshold for urban residence. If the proxy measure is above this level, the household is classified as urban. Otherwise it is regarded as rural. Different specifications of the threshold would yield different estimates of the urban and rural population. There is an element of arbitrariness in specifying the threshold probability. One way of getting around this is to vary the level of the threshold probability indicating urban residence, generating the ROC curve. This curve represents the trade-off between sensitivity and specificity. A perfect proxy would yield a curve ascending the vertical axis from zero to one and then travelling parallel to the horizontal axis. In this case, the area under the curve would be 1. The area under the curve generated using the proxy is 0.941, indicating good performance of the proxy. The same exercise carried out for 2011 produces an area under the ROC curve of 0.955.



The prediction of urbanisation in traditional areas is an 'out of sample' prediction.

3 A probit analysis seeks to determine the influence of a number of variable on the probability of an event occurring, in this case whether a household lives in an urban area or not.

THE DISTRIBUTION OF HOUSEHOLDS ACROSS GEOGRAPHICAL TYPES

Introduction

In order to assess the current pattern of human settlements and to consider their possible development, one needs a projection of the number and distribution of households. In turn, this needs a coherent demographic framework, which cannot entirely be based on South African sources. Statistics South Africa's demography has been all over the place in the last fifteen years, and municipal population estimates are prone to exaggeration. Accordingly United Nations estimates and projections of the population from their 2017 revision, and of urbanisation from the 2014 revision will be used, with estimates of average household sizes based on Census 2011 and the 2016 Community Survey. The households will be allocated across five mutually exclusive and collectively exhaustive geographical types:

- Metro,
- Other Urban (outside traditional areas) ('Urban'),
- Traditional Urban,
- Traditional Rural, and
- Rural (outside traditional areas) ('Rural').

Estimates and projections will be built up for each year from 2011 to 2030.

Method

Table 1 sets out estimates of the distribution of the population based on the 10% Census sample and Community Survey. They exclude people living in institutional settings.[4]

Table 1 - Data from the census and community survey

	Number		Percent	
	2011	2016	2011	2016
Urban	29 908 890	35 455 447	62,92%	63,71%
Traditional	15 418 243	18 019 427	32,44%	32,38%
Traditional urban	9 989 000	11 674 226	21,01%	20,98%
Traditional rural	5 429 243	6 345 201	11,42%	11,40%
Rural	2 206 441	2 178 781	4,64%	3,91%
Total	47 533 574	55 653 655	100,00%	100,00%

Historical estimates and projections are then built up as follows:

1. UN population estimates are used, along with UN urbanisation rates. The UN urbanisation rates follow country practices, so they represent urbanisation outside the traditional areas.
2. Step 1 gives the estimate of the urban population. The Rural population is based on the proportion of population in the rural areas in 2011 and 2016. A projection of a rural population of 1.9 million is made for 2030. The population of Traditional areas is found by subtracting the Urban and Rural populations from the total population.
3. The Traditional urban population is found by taking the average of the traditional urbanisation rates in 2011 and 2016, which are assumed constant throughout. The Traditional rural population is found by subtraction.
4. The metro population includes a relatively small number of people living in traditional and rural areas. An appropriate part of the rural and traditional population is transferred to the metros. The metro urban population as a proportion of urban population is found from the census and community survey, with 62% projected for 2030. Estimates and projections for intervening years are made using quadratic interpolation.

Table 2 sets out the resulting population estimates and projections.

4 An institution is a communal place of residence for people with a common characteristic, such as hospital/clinic, school hostel, defence force barracks, prisons or convents and monasteries. Such sets of living quarters usually have certain common facilities shared with by the occupants (baths, lounges, dormitories and so forth). Residential hotels, workers' hostels, students' residences and homes for the independent aged are not treated as institutions in this sense.

Table 2A – Estimates of the population, 2011-2020

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Metro	18 736 045	19 410 583	20 077 230	20 753 380	21 429 873	22 103 577	22 713 681	23 314 541	23 878 044	24 472 531
Other urban	14 938 943	15 094 012	15 237 118	15 383 419	15 526 675	15 665 414	15 801 460	15 935 864	16 046 628	16 183 387
Rural	2 285 783	2 220 795	2 157 311	2 095 221	2 034 402	1 974 676	1 931 811	1 896 016	1 862 924	1 832 536
Traditional urban	10 328 333	10 295 586	10 296 529	10 289 638	10 269 835	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743
Traditional rural	5 974 412	5 977 237	5 999 208	6 017 913	6 030 441	6 036 063	6 034 460	6 016 256	6 041 757	5 997 031
Population	52 263 516	52 998 213	53 767 396	54 539 571	55 291 225	56 015 473	56 717 156	57 398 421	58 065 097	58 721 229
Urbanization	83,9%	84,2%	84,5%	84,8%	85,1%	85,3%	85,6%	85,8%	86,0%	86,3%
Population growth		1,41%	1,45%	1,44%	1,38%	1,31%	1,25%	1,20%	1,16%	1,13%
Metro growth		3,60%	3,43%	3,37%	3,26%	3,14%	2,76%	2,65%	2,42%	2,49%
Other Urban growth		1,04%	0,95%	0,96%	0,93%	0,89%	0,87%	0,85%	0,70%	0,85%
Traditional urban growth		-0,32%	0,01%	-0,07%	-0,19%	-0,33%	0,00%	0,00%	0,00%	0,00%
Total Rural growth		-0,75%	-0,51%	-0,53%	-0,60%	-0,67%	-0,56%	-0,68%	-0,10%	-0,95%

Table 2B – Estimates of the population, 2021-2030

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Metro	25 028 466	25 613 828	26 156 550	26 727 902	27 219 445	27 769 341	28 274 790	28 770 181	29 256 085	29 692 886
Other urban	16 298 186	16 438 734	16 556 982	16 701 411	16 801 878	16 949 035	17 077 307	17 209 658	17 347 178	17 466 292
Rural	1 804 852	1 779 872	1 757 595	1 738 022	1 721 153	1 706 988	1 695 527	1 686 769	1 680 715	1 677 365
Traditional urban	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743	10 235 743
Traditional rural	5 998 728	5 927 872	5 903 756	5 805 705	5 730 816	5 692 938	5 618 121	5 531 907	5 435 223	5 393 248
Population	59 365 976	59 996 049	60 610 627	61 208 783	61 709 036	62 354 046	62 901 489	63 434 258	63 954 945	64 465 533
Urbanization	86,5%	86,8%	87,0%	87,3%	87,6%	87,8%	88,0%	88,3%	88,5%	88,7%
Population growth	1,10%	1,06%	1,02%	0,99%	0,82%	1,05%	0,88%	0,85%	0,82%	0,80%
Metro growth	2,27%	2,34%	2,12%	2,18%	1,84%	2,02%	1,82%	1,75%	1,69%	1,49%
Other Urban growth	0,71%	0,86%	0,72%	0,87%	0,60%	0,88%	0,76%	0,78%	0,80%	0,69%
Traditional urban growth	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Total Rural growth	-0,33%	-1,23%	-0,60%	-1,54%	-1,22%	-0,70%	-1,17%	-1,30%	-1,42%	-0,64%

Key features of the estimates and projections are:

1. The share of urban population outside the traditional areas living in metros rose from 54.4% in 2011 to 57.2% in 2016, and it is projected to rise further to 62.0% in 2030. This implies a more rapid rate of growth in the metros than anywhere else, though metro population growth will decline over time as population growth declines.
2. The population in traditional urban areas, which slightly declined between 2011 and 2016 is projected flat from 2016 to 2030.
3. The consequence is a projected rise in the total urbanisation rate from 83.9% in 2011 to 88.0% in 2030.
4. The rural areas (traditional and otherwise) saw a decline in population between 2011 and 2016, and this decline is projected to continue.

It remains to convert population projections to household projections.

Average household size dropped in the metros and traditional areas between 2011 and 2016, and remained roughly constant in urban and rural areas. The main reason for the decline is a drop in the child dependency ratio[5] and the ratio is expected to continue to 2030. Table 3 sets out the child dependency rate as estimated and projected in the United Nations World Population Projection (2017 revision).

Table 3 – Children aged 0-19 per 100 adults aged 20-64, 2010-2030 and adults 65 and over per 100 adults aged 20-64

Date	Child dependency ratio	Old persons dependency ratio	Total dependency ratio
2010	73.4	8.5	81.9
2015	68.6	9.0	77.6
2020	65.1	10.0	75.1
2025	62.1	11.1	73.2
2030	58.9	12.2	71.1

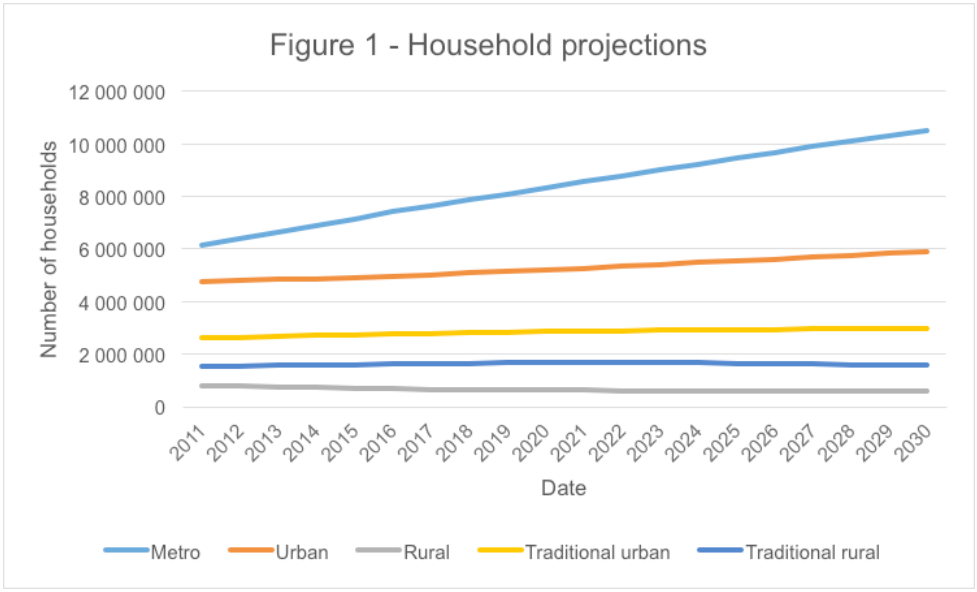
In dependency ratio terms, the increase in the old persons dependency ratio partly offsets the decrease in the child dependency ratio, but old people are more, not less, likely to be household heads than adults between the ages of 20 and 64. Accordingly, Table 4 is based on estimated average household sizes in 2011 and 2016, and it projects a drop in average household size between 2016 and 2030. The projection for all households in 2030 is based on constant five year household headship rates from the 2016 data, applied to a changed population structure.

Table 4 - Average household sizes

	2011	2016	2024	2030
Metro	3,04	2,97	2,89	2,82
Urban	3,13	3,15	3,04	2,95
Rural	2,92	2,94	2,92	2,90
Traditional	3,94	3,73	3,51	3,45
All	3,30	3,21	3,07	2,99

Figure 1 graphs the estimates and projections. It shows clearly that the burden of accommodating new households falls heavily on the metros, which accounted for 42.6% of all households in 2016, with a projected rise to 47.6% in 2030.

5 The child dependency ratio is simply the ratio of children age 0-19 to adults age 20 to 64. The old persons dependency ratio is the ratio of old people age 65 and above to adults are 20 to 64. The rationale for these measures is that people age 20 to 64 are regarded as being in the working age range, while children and old people depend on them, either directly in households or through fiscal transfers.



The average annual increases in number of households between 2016 and 2030 are projected as follows:

Table 5 - Average annual increase in households

	2016-2024	2024-2030
Metro	228 619	211 361
Urban	66 162	69 985
Traditional urban	21 298	8 476
Total	**316 079**	**289 823**

The metros are in most need of human settlement development and urban land reform. Should the population growth relativities between individual metros between 2007 and 2011, and 2011 and 2016 persist, Johannesburg and Tshwane will be under the greatest pressure. Fortunately, metro municipalities have the greatest resources. Even so, they will need a lot of help from the national level of government.

APPENDIX - A NOTE ON THE URBAN SYSTEM

The logic of the argument here is that urban areas both inside and outside the traditional areas should be regarded as a single system. On the other hand, the forms of urbanisation vary across municipalities, ranging from the largest metros, to organization around a single centre as in The Msunduzi (Pietermaritzburg), to a number of discrete urban areas such as those found in the Mpumalanga coalfields, to urban areas partly outside and partly inside traditional areas, as in the cases of Mbombela and Polokwane, to urban areas which have evolved out of dense settlements in traditional areas, to dorp en skema in small towns, such as Brandfort (see the Atlas for the layout in this case).

It has long been noted that the size distribution of populations across cities and towns usually conforms to Zipf's law. Zipf's law is satisfied where the probability that the size of a city or town is larger than size S is proportional to 1/S. Thus, the probability that a city or town is greater than a million is ten times the probability that it is greater than 100 000. It turns out that, if one ranks all cities and towns by size, and draws a graph with log rank on the vertical axis and log population size on the horizontal axis, Zipf's law implies a straight line with a slope of -1. If one thinks of each city or town as subject to a series of population growth shocks with a common mean and a common variance, then in steady state, the system will conform to Zipf's law . The assumption that the shocks are of this nature is known as the Gibrat assumption.

It is generally found that measured conformity to Zipf's law is improved if each urban area is carefully delineated. Our options are limited by the fact that the most recent data (from the 2016 Community Survey) are aggregated up to the municipal level. So each municipality provides a single observation, although there may be more than one discrete urban area in it. The urban population, for the purpose of this analysis, is taken to be the estimated urban population both outside and inside traditional areas.

Figure 2 presents the Zipf plot. It is divided into three ranges:

1. The five large metros, which are sui generis and do not conform to Zipf's law. One major problems is that, although Cape Town and Ethekwini are discrete cities, the boundaries between Johannesburg, Ekurhuleni and Tshwane arbitrarily cut across continuous urban settlement.
2. All remaining municipalities with urban populations of 50 000 and above. Here we find substantial conformity to Zipf's law.[6] The correlation coefficient to the fitted straight line is very high and the slope is -1.1
3. Municipalities with urban populations of below 50 000, where the plot bends away from the fitted straight line. Zipf's law would predict greater urban populations than are actually found.

Figure 3 plots the average annual population growth rate between 2011 and 2016 against population size. If Zipf's law holds, there ought to be zero correlation between the two variables. The actual correlations are -0.15 between the growth rate and the population size and -0.09 between the growth rate and the logarithm of the population size. Figure 3 suggests that the variance of growth rates is higher in smaller urban areas, in contravention of the Gibrat assumption. It should be noted that there is a lot of statistical noise in Figure 3. Sampling variability creeps into the 2011 census via the post-enumeration survey adjustment, the 2016 Community Survey is a large sample, the estimates of urbanisation in traditional areas is based on a probit analysis, and population estimates are adjusted to a consistent demographic system.

The growth rate in all urban areas between 2011 and 2016 is estimated at 1.02%, considerably lower than the 3.36% in the metros. The low average rate and relatively high variance in population growth rates means that 81 municipalities experienced a drop in urban population between 2011 and 2016.

The conclusion to be drawn from this analysis is not that the urban system is incoherent, but rather that projections of new demand for housing in the urban areas as a whole in the household income distribution section are too low, since dwellings cannot be transported from negative to positive population growth municipalities. The effect is not massive, however, adding less than 10% to urban demand.

6 A discussion of the economics behind the population growth shocks is contained in Xavier Gabaix, Zipf's law for cities: an explanation, Quarterly Journal of Economics. 114(3), August 1999. Consideration of them would take us too far afield. The purpose here is to examine the extent of conformity of the South African urban system to Zipf's law.

Figure 2 - Zipf plot: 2016

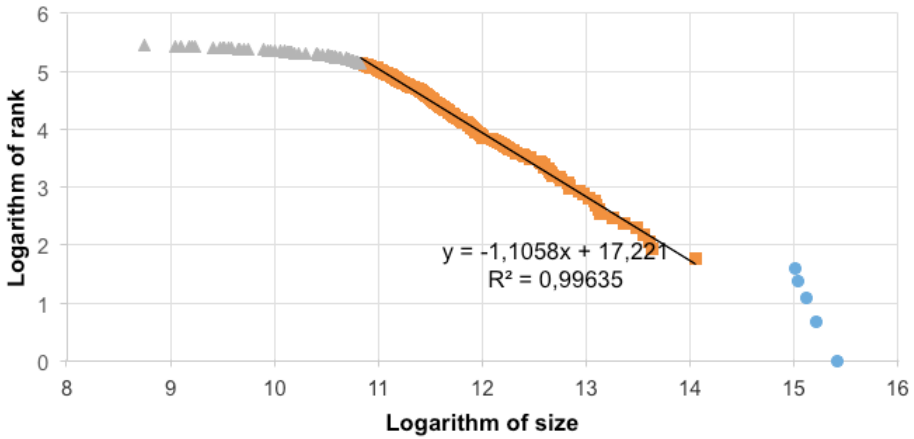
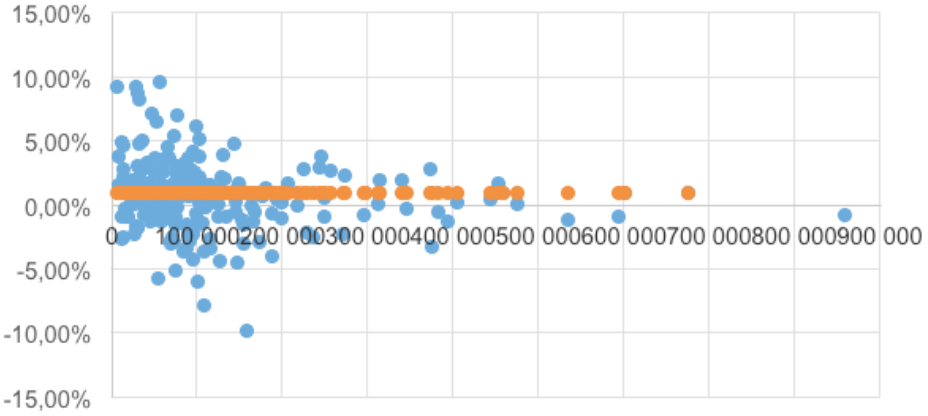


Figure 3 - Annual growth rates 2011-2016 plotted against population size in 2011



HOUSEHOLD INCOME DISTRIBUTION

Introduction

The previous section established the distribution of households across five geographical types. This brief will set out an analysis of the distribution of household income across these types. Human settlement options vary with income and, in light of national housing policy, the following income bands are of particular interest:

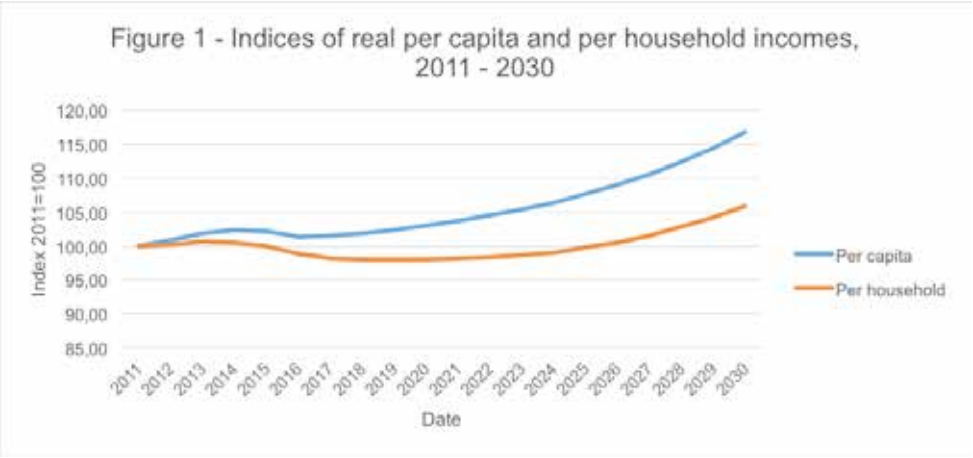
- The poorest households: Less than R3 500 per month
- The state assisted private housing bands
  - R3 500 to R7 500 per month
  - R7 500 to R15 000 per month
- The unassisted private housing band: More than R15 000 per month.

According to the 2012 regulations under the Social Housing Act, households with incomes of less than R7 500 are eligible for social housing.

All incomes are (counterfactually) in 2016 prices or, to put the matter another way, the band limits will be assumed to rise in line with inflation.

Slow growth in real per capita income

Per capita income is estimated and projected to 2023 using the International Monetary Fund's April 2018 data. South Africa's potential growth rate at present is below 2%.[7] The IMF's projection for the period 2020 – 2023 implies a potential growth rate of 1.8% over that period, and it is projected to rise to 2.8% by 2030. This projects real per capita income in 2030 at 16.8% higher than in 2011, as indicated in Figure 1. Figure 1 also projects the real per household income, which grows more slowly, since household size is projected to drop.[8]



Source: International Monetary Fund, World Economic Outlook database. April 2018 for projection to 2023. Thereafter the growth rate in real per capita income is projected to rise to 2.0% per annum by 2030, implying a growth rate of 2.8% in that year.

Average household income is projected to take until 2027 to again reach the 2013 level, and a total increase of 8.1% is projected between 2020 and 2030.

The analysis

Total household income is reported in the General Household Survey. It is however, right censored[9] at R20 000 per month in 2011 and R40 000 per month in 2016. All incomes above these limits are reported at them, so we know the proportion of incomes above the limit, but not their values.

To proceed, we need the form of the distribution of household income. As a general rule, household income is approximately log normally distributed, that is to say the logarithm of income is distributed according to the normal ("bell curve") distribution.[10]

7 Johannes Fedderke and Daniel Mengisteab, Estimating South Africa's potential growth rate and output gap, South African Reserve Bank Working Paper WP/16/02
8 See the preceding brief in this series
9 A distribution is right censored if, above a certain point, we do not know what the values of the variable are. In this case, the variable is household income. Once μ and σ have been estimated, the distribution can be used to determine the percentage of households lying within any given income range.
10 A normal distribution is completely defined by just two variables: its mean (μ, or mu) and its standard deviation, or sigma). Once μ and σ have been estimated, the distribution can be used to determine the percentage of households lying within any given income range. Techniques exist to estimate these parameters given censored data. The method used here is described in A K Gupta, Estimation of the mean and standard deviation of a normal population from a censored sample, Biometrika, 39(3-4), 1952: 260-273

Details of the estimation are set out in the Methodological Appendix.

Results

Table 1 shows the distribution of aggregate household income across geographical types between 2011 and 2030.

Table 1 - Distribution of household income across geographical types

	2011	2016	2024	2030
Metro	53,6%	58,0%	61,1%	62,9%
Urban	29,3%	25,8%	24,1%	23,5%
Traditional urban	6,1%	6,0%	5,6%	5,3%
Traditional rural	5,7%	5,5%	5,1%	4,7%
Rural	5,2%	4,7%	4,1%	3,5%
Total	100,0%	100,0%	100,0%	100,0%
Total urban	89,1%	89,8%	90,9%	91,7%

Table 1 shows how concentrated household income is in urban areas, and the concentration is projected to increase.

Table 2 sets out the number of households in each income category in 2011, 2016 and 2024.

Table 2A - Households by income category, 2011, 2016, 2024 and 2030

	2011	2016	Distribution	2024	Distribution	2030	Distribution
	2016		2024		2030		
Metro							
Below R3 500	2 263 524	3 223 466	43,4%	4 449 850	48,0%	5 163 204	49,0%
R3 500 - R7 500	1 385 579	1 578 725	21,2%	1 930 397	20,8%	2 182 113	20,7%
R7 500 - R15 000	1 123 800	1 197 197	16,1%	1 378 881	14,9%	1 539 275	14,6%
Above R15 000	1 394 327	1 432 885	19,3%	1 502 099	16,2%	1 644 800	15,6%
Total	**6 167 230**	**7 432 272**	**100,0%**	**9 261 227**	**100,0%**	**10 529 392**	**100,0%**
Urban							
Below R3 500	2 026 556	2 448 087	49,2%	2 997 324	54,5%	3 290 709	55,6%
R3 500 - R7 500	1 151 141	1 138 299	22,9%	1 204 316	21,9%	1 281 363	21,6%
R7 500 - R15 000	827 196	751 050	15,1%	737 574	13,4%	772 653	13,0%
Above R15 000	767 932	634 133	12,8%	561 651	10,2%	576 052	9,7%
Total	**4 772 825**	**4 971 569**	**100,0%**	**5 500 865**	**100,0%**	**5 920 777**	**100,0%**
Traditional urban							
Below R3 500	1 753 288	1 937 203	70,6%	2 181 781	74,8%	2 224 831	75,0%
R3 500 - R7 500	586 699	550 737	20,1%	518 100	17,8%	524 328	17,7%
R7 500 - R15 000	216 247	198 703	7,2%	170 404	5,8%	171 798	5,8%
Above R15 000	62 512	58 996	2,1%	45 739	1,6%	45 924	1,5%
Total	**2 618 746**	**2 745 639**	**100,0%**	**2 916 024**	**100,0%**	**2 966 882**	**100,0%**

Note: All incomes are in constant 2016 prices

Table 2B - Increase in households by income category

	Annual increase 2016-2024	Distribution of increase	Annual increase 2024-2030	Distribution of increase
Metro				
Below R3 500	153 298	67,1%	118 892	56,3%
R3 500 - R7 500	43 959	19,2%	41 953	19,8%
R7 500 - R15 000	22 711	9,9%	26 732	12,6%
Above R15 000	8 652	3,8%	23 784	11,3%
Total	**228 619**	**100,0%**	**211 361**	**100,0%**
Urban				
Below R3 500	68 655	103,8%	48 897	69,9%
R3 500 - R7 500	8 252	12,5%	12 841	18,3%
R7 500 - R15 000	-1 685	-2,5%	5 847	8,4%
Above R15 000	-9 060	-13,7%	2 400	3,4%
Total	**66 162**	**100,0%**	**69 985**	**100,0%**
Traditional urban				
Below R3 500	30 572	143,5%	7 175	84,6%
R3 500 - R7 500	-4 080	-19,2%	1 038	12,2%
R7 500 - R15 000	-3 537	-16,6%	232	2,7%
Above R15 000	-1 657	-7,8%	31	0,4%
Total	**21 298**	**100,0%**	**8 476**	**100,0%**

Between 2016 and 2024, 67% of all units will be needed by the poorest category of households in the metros, and all units will be needed by the poorest category in both urban and traditional urban areas. In the second period, the need will be spread over all income groups, but it will still be concentrated among the poor. These conclusions are not much altered by reasonable alternative projection assumptions. Additional effort will be needed to deal with those unsatisfactorily housed in 2016.

In interpreting Table 2, it should be borne in mind that it refers to all households, whether currently housed or not.

HOUSING TYPE AND HOUSING TENURE

Introduction

The two most fundamental variables relevant to an assessment of housing are:

1. The type of dwelling
2. Dwelling tenure

This brief describes the distribution of type and tenure in metropolitan, urban and traditional urban areas and discusses some of the elements determining the distribution of households between them.

Housing type

The distribution of households across dwelling types is presented in Table 1.

There was a shift towards formal dwellings in metros and urban areas, but not in traditional urban areas between 2011 and 2016, with a corresponding decrease in informal settlements not in backyards. There has also been a shift to dwellings in backyards in metros and urban areas, indicating densification of settlement.

Table 1 - Distribution of households across dwelling types

	Metro	Urban	Traditional urban	Total	Metro	Urban	Traditional urban	Total
	2011 - Percentage				2016 – Percentage			
Formal dwelling on separate stand	59,6%	72,6%	69,2%	**65,5%**	64,0%	71,9%	65,4%	**66,7%**
Traditional dwelling	1,2%	1,6%	20,1%	**5,0%**	0,9%	1,5%	19,1%	**4,3%**
Apartment	8,1%	3,5%	1,7%	**5,4%**	5,4%	2,5%	1,4%	**3,8%**
Cluster house in complex	1,9%	0,6%	0,1%	**1,1%**	1,3%	0,7%	0,2%	**0,9%**
Townhouse in complex	2,8%	0,9%	0,1%	**1,7%**	1,3%	0,8%	0,0%	**0,9%**
Semi-detached house	2,6%	1,1%	0,1%	**1,6%**	1,3%	0,6%	0,3%	**0,9%**
Formal dwelling in backyard	4,0%	2,7%	1,7%	**3,1%**	7,7%	6,4%	5,3%	**6,9%**
Informal dwelling in backyard	6,4%	5,8%	2,4%	**5,4%**	6,8%	5,7%	3,3%	**5,8%**
Informal dwelling elsewhere	11,7%	9,3%	3,6%	**9,4%**	9,8%	7,9%	3,3%	**8,1%**
Room/flatlet on property	1,0%	0,8%	0,3%	**0,8%**	0,7%	0,9%	0,7%	**0,8%**
Caravan/tent	0,1%	0,1%	0,1%	**0,1%**	0,0%	0,0%	0,0%	**0,0%**
Other	0,8%	0,9%	0,5%	**0,8%**	0,6%	1,0%	1,0%	**0,8%**
Unspecified					0,0%	0,0%	0,0%	**0,0%**
Total	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Subtotal formal	79,9%	82,3%	73,3%	**79,3%**	81,8%	83,9%	73,2%	**81,0%**
Subtotal informal	20,1%	17,7%	26,7%	**20,7%**	18,2%	16,1%	26,8%	**19,0%**
Backyard	11,4%	9,4%	4,4%	**9,4%**	15,3%	13,1%	9,3%	**13,5%**
Dwellings	6 167 230	4 772 825	2 618 746	**13 558 801**	7 432 272	4 971 569	2 745 639	**15 149 480**

Note: Formal dwellings are formal dwellings on a separate stand, apartments, cluster houses, townhouses, semi-detached houses, formal dwellings in backyards and rooms/flatlets on property

Backyard dwellings are formal dwellings in backyard, informal dwellings in backyard and room/flatlets on property

Tenure

Table 2 presents information on households distributed across types of tenure in 2011 and 2016.

Table 2 - Households by tenure, 2011 and 2016

	Metro	Urban	Traditional urban	Total	Metro	Urban	Traditional urban	Total
	Percentage - 2011				Percentage - 2016			
Rented from private individual					19,4%	19,4%	4,7%	**16,8%**
Rented from other					3,6%	3,5%	0,2%	**3,0%**
Subtotal rented	32,8%	29,6%	7,9%	**26,9%**	23,0%	22,9%	4,9%	**19,8%**
Owned but not yet paid off	16,9%	11,4%	4,3%	**12,7%**	13,6%	10,0%	7,2%	**11,3%**
Owned and fully paid off	32,8%	40,3%	60,8%	**40,6%**	47,5%	50,4%	73,1%	**52,9%**
Occupied rent free	14,7%	15,6%	23,3%	**16,7%**	9,5%	9,3%	8,0%	**9,2%**
Other	2,8%	3,1%	3,7%	**3,1%**	5,3%	6,4%	6,0%	**5,8%**
Not known					1,0%	1,0%	0,7%	**0,9%**
Unspecified					0,1%	0,1%	0,1%	**0,1%**
Total	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**

The changes in tenure patterns are striking. There has been a drop in the percentage of units rented between 2011 and 2016 in the metros and urban areas. Further analysis shows that the absolute number of rental units has dropped by 16% in metros and has remained constant in urban areas. The drop in the metros has taken place across all dwelling types, except in formal dwellings in backyards, and has been particularly strong in formal dwellings on separate stands and apartments. The proportions of units which are owned but not yet paid off also dropped in metros and urban areas.

Also noticeable is the reduction in the percentage of units owned but not yet paid off in metro and urban areas. There has been an absolute drop in the number of these units between 2011 and 2016. This is mirrored by the growth in mortgage advances between 2011 and 2016 of 20.6%,[11] compared with a rise of 33.6% in the First National Bank house price index between the same years.

11 South African Reserve Bank, *Quarterly Bulletin*

The increase in the percentage of units owned and fully paid off is accounted for mainly by an increase in formal dwellings on a separate stand. Quite why this has happened is not clear. It is not likely that the over one and a half million increase in the metros and urban areas consists mostly of newly constructed dwellings. Some dwellings occupied rent free may have been transferred to their occupants. In other cases, title transfer or change in perception of tenure may have changed.

Who rents? Who owns?

Using data from the 2016 General Household Survey, it is possible to investigate some of the determinants of the choice to rent and the choice to own. Explanatory characteristics investigated include gender and age of household area, whether the dwelling is located in a metro, an urban area or a traditional area, whether there are children under 18 in the household and which income bracket the household is in. Results from probit analysis are reported in the appendix. The results are not surprising: women household heads are a little more likely to rent than own, the propensity to rent declines, and the propensity to own increases, with the age of the household head. Other things equal, renting is more common in metro areas and less common in traditional areas. The presence of children under the age of 18 increases the propensity to own and decreases the propensity to rent. Households with incomes above R3 500 are more likely to rent than those with low incomes.

	Renters	Owners
Gender of household head – male	-0.081	0.108
Age of household head		
15-20	1.257	-1.116
20-25	1.401	-1.272
25-30	1.304	-1.290
30-35	1.200	-1.155
35-40	0.981	-0.929
40-45	0.731	-0.754
45-49	0.462	-0.537
50-54	0.300	-0.376
55-59	0.094	-0.213
65-69	-0.219	0.256
70-74	-0.272	0.116
75-79	-0.156	0.030
80+	-0.327	0.272
Metro	0.140	-.056
Traditional	-0.803	0.734
Rural	-0.203	-0.449
Children under 18	-0.571	0.530
Income		
R3 500 - R7 500	0.310	0.078
R7 500 - R15 000	0.433	-0.011
Over R15 000	0.352	0.198

Reference group: Female, 60-64, urban, no children under 18, income below R3500

HOUSING NEED IN 2016

Introduction

From time to time articles appear in the press, or speeches are made by politicians, about the housing backlog in various municipalities. In so far as they have any empirical basis at all, they will draw on one of two sources: municipal housing waiting lists and consulting work on municipal development plans. Both sources have fatal defects. Municipal waiting lists are not routinely weeded of households who no longer exist or who do not now qualify for social housing. And the work of consultants is based in individual municipalities and not done on a coherent basis across the country. Add the facts that waiting lists are not published by many municipalities or shortages estimated by all consultants, and it becomes clear that no coherent national account can exist using the conventional methods.

This brief sets out a new approach to the problem. Every household lives somewhere: the question is whether the dwelling is satisfactory in light of a normative framework. Such a framework should emerge from the dialectic between desire and the constraints on what can be financed and sustainably lived in. The point of departure here is national human settlements policy: housing for households with incomes less than R3 500 per month, subsidised financing of formal dwellings for households with incomes between R3 500 and R15 000 per month, and no assistance to households earning more than R15 000 per month.

The information is taken from the 2016 General Household Survey and provides a snapshot of the position in that year. The analysis is confined to metros, urban areas and traditional urban areas.

Apart from providing a consistent framework, the approach here is able to identify appropriate actions. It is not necessary for all households in unsatisfactory housing to be placed in new dwellings. Alternatives are extension of more services to existing dwellings or repairs to existing dilapidated dwellings. Moreover, new housing can be divided into BNG housing and housing acquired on the market.

Method

1. Exclude from the analysis all households with unknown income, dwelling types returned as caravan/tent, other or unspecified, or unknown age of head.[12]
2. Divide households into those living in formal dwellings and those living in informal dwellings (traditional dwellings, informal dwellings in backyards and informal dwellings elsewhere).
3. Identify households with incomes of R15 000 or more.
4. Treat households as vulnerable if their income is less than R3 500, or the age of the household head is less than 20, or 60 or more, or there is a severely disabled person present.
5. Treat dwellings as dilapidated if the roof or the walls or the floor is in a weak or very weak condition.
6. Divide formal dwellings into those which are adequate, those are overcrowded (divided into vulnerable and non-vulnerable), and those which are not overcrowded but dilapidated.
7. Divide informal dwellings into backyard dwellings and dwellings elsewhere.
8. Identify adequate backyard dwellings, those which are overcrowded (divided into vulnerable and non-vulnerable) and those which are not overcrowded but dilapidated.
9. Identify informal dwellings elsewhere and divide them into adequate dwellings with adequate services[13], adequate dwellings with inadequate services, dilapidated dwellings with adequate services, dilapidated dwellings with inadequate services, and overcrowded dwellings (divided into vulnerable and non-vulnerable).

The method covers every household. In terms of action required, households are divided into six categories:

1. Unknown status
2. No action required
3. Housing for the poor
4. New private units required
5. Owner to repair
6. Upgrade of services.

The full analysis is presented in Appendix 1.

Table 1 sets out a summary of households by action category.

12 The age of the head is regarded as unknown if the age returned is less than fifteen, a hundred or more, or missing
13 Adequate services are defined as attached to a municipal water supply, a flush toilet or a pit latrine with ventilating pipe, refuse removed at least once a week, and access to electricity

Table 1 - Summary

Required action	Metro	Urban	Traditional urban	Total	Metro	Urban	Traditional urban	Total
	Number				Percentage			
Unknown	991 212	348 000	85 405	**1 424 617**				
	4 574	2 996						
No action required	105	422	1 970 564	**9 541 091**	72,7%	71,1%	67,0%	**71,0%**
Housing for the poor and vulnerable	476 400	351 425	265 714	**1 093 539**	7,6%	8,3%	9,0%	**8,1%**
New private units	294 692	167 760	72 826	**535 278**	4,7%	4,0%	2,5%	**4,0%**
Owner to repair	414 741	436 123	233 344	**1 084 208**	6,6%	10,4%	7,9%	**8,1%**
Upgrade services	532 066	261 962	399 336	**1 193 364**	8,5%	6,2%	13,6%	**8,9%**
	7 283	4 561						
Total	**216**	**692**	**3 027 189**	**14 872 097**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Aggregate overcrowding	771 092	519 185	338 540	**1 628 817**				
Overcrowding rate	12,3%	12,3%	11,5%	**12,1%**				

Seventy-one per cent of dwellings are adequate in the sense that they have services, are not structurally weak or very weak, and are not overcrowded. The biggest need is for services to be extended in free standing informal settlements, followed by the need for repair of dwellings by the owners. Additionally, housing for poor and vulnerable households is needed, particularly in traditional urban areas. The shortage of privately owned/rented accommodation is relatively small.

The proportion of overcrowded households is much the same across the three geographical types. Of the households living in overcrowded conditions, 60.5% live in a single living room. The average age of three of more people living in a single room is 22, substantially and significantly lower than the average age in all households of 33. Appendix 2 reports a more detailed probit analysis, which indicates that female headed households are less likely to be overcrowded, that overcrowding drops as the age of the household head increases, that the presence of children and grandchildren make overcrowding more likely, that the effect of having both children and grandchildren is about double of having either, that having an adult male (20 years or older) decreases overcrowding in female headed households and that, when all else in is controlled for, overcrowding is less likely to occur in traditional urban areas than in the metros and other urban areas.

Falling household size will, other things equal, reduce overcrowding.

APPENDIX 1 – FULL ANALYSIS OF THE POSITION OF HOUSEHOLDS

	Metro	Urban	Traditional urban	Total	Required action
Households	7 283 216	4 561 692	3 027 189	**14 872 097**	
Missing income	869 038	307 995	73 790	**1 250 823**	Unknown
Caravan/tent/other/unspecified	105 949	34 690	2 738	**143 377**	Unknown
Unknown age of head	1 227	1 626	7 414	**10 267**	Unknown
Unknown living rooms	14 998	3 689	1 463	**20 150**	
Balance	6 292 004	4 213 692	2 941 784	**13 447 480**	
Income above R15 000	1 425 019	685 229	138 871	**2 249 119**	None
Balance	4 866 985	3 528 463	2 802 913	**11 198 361**	
Formal housing	3 544 452	2 820 551	2 243 981	**8 608 984**	
Adequate	2 837 141	2 160 238	1 815 993	**6 813 372**	None
Overcrowded: non-vulnerable households	159 693	112 230	51 564	**323 487**	New private units
Overcrowded: vulnerable households	267 186	209 163	155 946	**632 295**	Housing for the poor
Dilapidated but not overcrowded	280 432	338 920	220 478	**839 830**	Owner to repair
Informal housing	1 322 533	707 912	558 932	**2 589 377**	
Backyard	504 412	246 311	29 849	**780 572**	
Adequate	256 128	107 200	12 022	**375 350**	None
Overcrowded: non-vulnerable households	68 345	22 335	1 939	**92 619**	New private units
Overcrowded: vulnerable households	75 053	41 826	5 125	**122 004**	Housing for the poor
Dilapidated but not overcrowded	104 886	74 950	10 763	**190 599**	Owner to repair
Free standing	818 121	461 601	529 083	**1 808 805**	
Adequate	55 817	43 755	3 678	**103 250**	None
Adequate dwelling but inadequate services	275 136	129 317	275 751	**680 204**	Upgrade services
Dilapidated dwelling with adequate services	29 423	22 253	2 103	**53 779**	Owner to repair
Dilapidated dwelling with inadequate services	256 930	132 645	123 585	**513 160**	Owner to repair, upgrade services
Overcrowded: non-vulnerable	66 654	33 195	19 323	**119 172**	New private units
Overcrowded: vulnerable	134 161	100 436	104 643	**339 240**	Housing for the poor

APPENDIX 2 – PROBIT ANALYSIS

Probability of overcrowding

Female head	-0,203
Age of head	-0,040
25-30	-0,201
30-35	-0,481
35-40	-0,575
40-45	-0,800
45-50	-0,944
50-55	-1,144
55-60	-1,185
60-65	-1,458
65-70	-1,214
70-75	-1,498
80+	-1,218
Children only	0,380
Grandchildren only	0,451
Children and grandchildren	0,952
Adult male in female headed household	-0,151
Urban	-0,059
Traditional urban	-0,327
Pseudo Rsquared	0,076

Reference category
Male
20-24
No children or grandchildren

Spatial land use and housing delivery systems

It is widely recognised that South Africa's cities are inefficient. They sprawl, and they are imperfectly integrated internally. The development of unused and poorly used land, the densification of existing settlements, and the mix of housing delivery are all tightly integrated issues. The Spatial Planning and Land Use Management Act of 2013 provides a legal framework within which the issues can be worked out, and municipalities have been developing spatial development plans accordingly.

Large infill development projects

Characteristically, in addition to densification, spatial development plans call for the development of mixed use infill projects, with human settlement accompanied by a mix of commercial, light industrial and public facility development. Particular blocks of land can be acquired by developers, or placed in their hands by the state. An example is Bridge City, developed by Tongaat Hulett between KwaMashu and Phoenix Industrial Estate, seventeen kilometres north of the Durban city centre. It contains a shopping centre, a regional hospital, a magistrate's court, other civic services, light commercial and industrial development, as well as affordable housing and social housing. It is integrated as a hub within the Ethekwini metro public transport system.

The success of developments like these depend on the dynamism of the local and national economy. While they are certainly an addition to national output, their impact on housing need will depend on the price at which affordable housing units can be offered, and the extent of social housing they provide.

Affordable housing units can be accessed by households earning over R15 000 per month without state assistance, and by households earning between R3 500 and R15 000 per month with the help of the Finance Linked Individual Subsidy Programme (FLISP). FLISP reduces the principal on a mortgage loan on a sliding scale depending on household income and is used to replace a deposit. The Appendix indicates the housing price which can be afforded at varying household incomes and mortgage interest rates. At the time of writing, the prime interest rate was 10%. Assuming the mortgage rate is the same, a R3 500 per month household could afford a dwelling selling at R177 000, while a R15 000 per month household could afford a unit selling at R408 000. Delivering units that can be mortgaged for less than half a million rand is a challenge, limiting the demand for FLISP subsidies. And the supply of social housing units by projects such as Bridge City, all certain to be taken up, are likely to meet only a small fraction of demand for them.

Greenfields projects

Development of new suburbs continues to be a source of urban expansion. Here the focus is primarily residential, although some scope has to be created for commercial development.

The development of site and service schemes is another option. Planned site and service schemes have rarely featured in cities and towns outside traditional areas. They entail incremental housing, financed through household savings and unsecured loans and they are usually constructed more cheaply than equivalent formal houses eligible for mortgage financing. The temptation is to develop these schemes in remote locations where land is cheap in order to keep costs down, but at the expense of poor integration into the urban area and isolation imposed by high transport costs. Better located land is more valuable and households at a particular income level would have to occupy it at higher density. There are major issues of acceptability, both to intended beneficiaries and to households in surrounding communities, both of which would have to be negotiated in particular contexts.

Upgrading, redevelopment and densification

The government has responded to conditions in existing informal settlements. The existing programme is in situ upgrading, involving the demarcation of plots and the installation of services. Instead of ex ante provision of sites and services at well chosen sites, ex post upgrading, usually at higher cost per unit and often in poor situations, is often the form of provision.

Redevelopment of existing residential areas is a function of changing household incomes and tastes. It may entail private conversion of single residences into apartments, either through dwelling modification or demolition and reconstruction. Further building on existing sites is possible, with or without subdivision. Some areas may go through a cycle of decay, falling property prices and subsequent redevelopment. All these changes produce densification and are forms of housing delivery.

Delivery options

In short, there are several housing delivery mechanisms, and the mix will determine the demand for new residential land and assistance from government. The mix should cater for the need across the household income spectrum, and accommodate the desire for rental occupation as well as owner occupation. Rental

accommodation may be preferred because it gives access to higher value housing, or because it suits those who plan a limited stay. Above all, it should mobilise the capacity of the private sector and households to deliver, with the state playing a regulatory and supportive role. The required outcome is not going to be met in any other way.

Policy framework

The National Department of Human Settlements supports housing development through a system of grants and institutions. The Department does not itself deliver housing. The provinces, municipalities and the private sector do, with varying degrees of support from the Department.

Targeted households are divided into five categories:

1. Households earning below R3 500 per month and vulnerable households, who are eligible for social housing.
2. Households earning between R3 500 and R15 000 per month, who obtain their housing on the market, and are eligible for mortgage subsidisation, on a scale which varies with income.
3. Households earning above R15 000 per month, who are expected to arrange their housing through the market without state support.
4. Households living in informal settlements, who are eligible for in situ upgrading of site and community infrastructure. Upgrading involves secure tenure and access to basic services.
5. Households requiring emergency housing, for instance as a consequence of fires in informal settlements.

In addition, the Department supports catalytic projects, which involve mixed use and mixed income integrated settlements which integrate communities spatially, socially and economically into wider urban areas.

The grant system: transfers from national government to provincial and local government

The grants are as follows:

1. *Housing Development Finance*, which are conditional grants and transfers to support catalytic projects
2. The *human settlements development grant*, to fund housing. This allocation goes to provinces.
3. The *urban settlements development grant* to metros, supporting the broader development of the built environment, with a strong focus on upgrading informal settlements,
4. The *consolidated capital grant*, which is transferred to the Social Housing Regulatory Authority.
5. The *title deeds restoration grant*, to assist provision of title deeds to beneficiaries who have not yet received them. This grant goes to provinces.
6. The *emergency housing grant*. This grant goes to provinces.
7. *Contributions* to public entities reporting to the Department.

Institutions

Apart from provinces and municipalities, the following institutions support housing delivery:

1. The *Housing Development Agency*, which identifies, acquires, holds, develops and releases land for residential and community purposes, and manages housing developments.
2. The *National Housing Finance Corporation*, which broadens and deepens access to affordable housing finance for low to middle income households by facilitating private sector lending for housing purposes.
3. The *National Urban Reconstruction and Housing Agency*, which provides bridging finance to contractors building low to middle income housing, infrastructure and community facilities.
4. The *Rural Housing Loan Fund*, which facilitates access to housing credit to low income rural households by providing finance through a network of retail intermediaries and community based organisations.
5. The *Social Housing Regulatory Authority*, which regulates the social housing sector, and ensures a flow of investment into the social housing sector to support the restructuring of urban spaces.
6. The *National Home Builders Registration Council*, which provides warranty protection against defects in new homes and regulates the home building industry.

Funding

Table 1 indicates the extent of financial support by the national government over the Medium Term Expenditure Framework period.

Table 1 – Grants over the Medium Term Expenditure Framework period

Grant	2018/19	2019/20	2020/21
Rmillion			
Human settlements development grant	18166.5	18832.8	20101.9
Urban settlements development grant	11306.1	11880.8	12534.5
Title deeds restoration grant	518.7	547.7	577.8
Emergency housing grant	400.0	426.0	453.7
Contributions to public entities	1159.0	1143.2	1152.9
National Home Builders Registration Council	915.4	968.5	1019.8
TOTAL	**32465.7**	**33799.0**	**35840.6**
Increase		4.1%	6.0%
To municipalities	11446.1	12029.9	12693.3
To provinces	18945.2	19657.4	20396.8

Delivery

Table 2 indicates delivery projections over the Medium Term Expenditure Framework.

Table 2 – Output projections over the MTEF

Indicator	2018/19	2019/20	2020/21
Number of title deeds to eradicate backlog	247 500	247 000	247 000
Number of title deeds for new development	105 000	105 042	105 115
Number of catalytic project housing subsidies	6 482	6 870	7 280
Number of subsidised houses	99 454	105 514	111 845
Number of additional households living in affordable rental housing units	20 429	20 822	21 238
Number of households benefiting from informal settlements upgrades	131 107	138 973	147 311
Number of finance-linked individual subsidies	18 680	30 643	49 029
Number of catalytic projects	7	10	14

Whether the delivery targets can be reached given the resources injected at all three levels of government is an open question. Provincial governments add an allocation from their equitable share to their human settlements budget, amounting to about 16% of the grants from central government. Municipalities, especially metros, may add a little more.

Critique

In the light of the analysis of existing and projected new need, existing policy and provision suffers from the following defects:

1. *Despite the emphasis on urban densification, policy neither incentivises nor supports it.* One way of supporting densification is to waive registration fees for subdivisions. A stronger policy would also make a contribution to surveying costs. Where parts of existing urban areas decay, incentives for redevelopment with increased densification should be considered.

   Johannesburg is considering a proposal which would require developers producing ten dwelling units or more to construct 20% of these units as rental units for households with incomes of below R7 000 per month, with rentals pegged at R2 100 per month. The units would have to contain a shower, basin and toilet and would have to be at least 15 square metres in extent, with 7 square metres of living space per person. The units would have to be on site, or within the township in the case of township development. In the cases of apartment, town house and cluster house developments, the units would take the form of small studio flats capable of housing one or two people. Where standalone houses are produced, the rental units could take the form of BNG houses.[14] In light of the projected income distribution of new households reported in Table 2B in the household income distribution section, developments such as these would be concentrated in the metros.

2. *Given the pattern of need, there is no coherent and viable framework to accommodate poor and lower middle income households.* The pace of provision of social housing is very slow in relation to need. As the South African Civil Society Information Service reported in May 2014:

   > Both private landlords and social housing institutions (SHIs) report exceptionally low vacancy rates. New social housing projects released onto the market in centres such as Johannesburg, Durban, Port Elizabeth and East London are typically over-subscribed often by a factor of ten or more.[15]

   Table 2B in the household income distribution section projects the annual need

14 A BNG (Breaking New Ground) house is a new version of the RDP house. It is bigger (40 square metres), and is expected to have two bedrooms, a separate bathroom with toilet, basin and shower, a combined kitchen and living area with wash basin and a ready board electrical installation.

15 Louse Scholtz, Why is there not enough affordable rental or social housing for the poor in South Africa's cities?, SACSIS, 7 May 2014

for housing among the poor arising from new household formation at 253 000 units between 2016 and 2024, and Table 1 the further need for 78 000 units a year to produce, over the fourteen years between 2016 and 2030, the units already required in 2016, bringing the annual total requirement to 331 000 units in metro and urban areas. Table 2 indicates that state provision of subsidised houses is running at about a third of the rate.

3. *Existing informal settlements are being upgraded, but there is no evidence of support for new site and service schemes.*

Costs

One needs an estimate of the average cost of a serviced site and a BNG house in order to assess what is possible in terms of state support of housing for the poor. Published sources are not plentiful, nor are they entirely consistent. Available information is as follows:

1. *Statistics South Africa*. The average building cost of private dwellings of less than 80 square metres during 2017 was R4 874 per square metre, with an average dwelling size of 49 square metres. Building a house of 40 square metres would cost R195 000.
2. *AECOM's Africa Property and Construction Cost Guide 2017*. The cost of site services to a low cost housing stand (250-350 square metres) is put at between R31000 and R48 000. The cost of low cost housing per square metre varies between R2 800 and R4 600, and the cost of private dwellings at the economic (cheapest) level is put at R4 600. All prices exclude VAT. Including VAT, the average cost of a site would be R45 000, and the cost of building a house of 40 square metres would be R169 000 at the average of the low cost housing costs and R210 000 at the least expensive private dwelling rate.
3. *Estimates of Free State provincial expenditure 2017*. The Free State intended to build 6 432 serviced sites and 5 377 houses in 2017 at a cost of R1 192 million. Assuming that a serviced stand costs 25% of a house, the cost of a house would be R172 000 and the price of a serviced site R43 000. If a serviced stand costs 20% of a house, the cost estimates become R180 000 and R36 000, respectively.

The average cost of a serviced site in 2017 prices is estimated at R44 000. The average cost of a BNG house, based on the lower AECOM estimate and the Free State estimate is R172 000, rising to R46 000 and R181 000 respectively in 2018. This means that the opportunity costs of one BNG house is four serviced sites. In 2018, the total cost of delivery of informal upgrades, estimated at 50% of a fully serviced site, for the national target of 131 107 informal upgrades would then be R3.0 billion in 2018 and of 99 454 houses would be R18.0 billion. The total of R21 billion can be financed from the national human settlements development grant from national government of R18.2 billion, with additional funding of 16% (R2.9 billion) from the provinces.

It is immediately apparent that the state is in no position to build houses for the poor at the rate needed. To do so would cost R60 billion per year. It would be fiscally possible to create serviced sites to meet all the additional needs of the urban poor at the required rate, at a cost of R14.6 billion in 2018. And not all housing need should be met by green field serviced sites. Densification has an important role to play if supportive policies can be put into place.

The revival of site and service?

Under these circumstances, it is not surprising to find moves in Gauteng for a renewal of the site and service approach to housing. Premier David Makhuru has appointed a five-member team, led by the Human Settlement MEC and including the mayors of Ekurhuleni and Tshwane to develop a plan and identify unused, government-owned land for the development of sites.[16] The approach has the support of Paul Mashatile, formerly Gauteng MEC for Human Settlements and Co-operative Governance and now ANC Treasurer-General. Should there be a shift towards site and service schemes, the following points should be borne in mind:

1. Land assembly is the first important step. Capacity for this function needs to be increased, fast.
2. Leadership will be necessary to increase acceptability, both among beneficiaries and host communities.
3. The aim of site and service schemes is eventual consolidation and steady improvement of dwellings. Consolidation is likely to be slow over the next decade, since the need is among poor households and average household income will likely increase slowly.
4. A site and service policy will require complementary inputs, such as small scale contractors, micro-finance providers and a range of possible building plans.

16 Greg Nicolson, Gauteng Premier's land release plans are politically attractive, practically difficult, Daily Maverick, 18 May 2018

What about non-poor households?

Table 2B indicates that only 3.8% of additional households in the metros between 2016 and 2024 will have incomes of above R15 000 in 2016 prices, and none in the urban or traditional urban areas. This means that nearly all additional households will qualify for some form of state assistance, whether in the form of rental social housing, allocation of BNG houses, mortgage subsidies, or allocation of serviced sites. Rental social housing is in short supply and policies need to be developed to stimulate its provision. BNG houses are also in short supply, and the situation will become more constrained if there is a shift in emphasis towards site and service. The number of households who can access mortgage finance is limited by three factors: the availability of a property over which a mortgage can be created, the ability of the lending institution to sell the property in execution in the event of default on the mortgage, and the ability of the household to sustain mortgage repayments over twenty years. Taken together, these constraints are severe and impact on the expansion of the FLISP programme. The alternative sources of finance are household savings, loans against pensions and long term insurance policies, and unsecured borrowing, none of which are subsidised. These sources of finance are likely to support incremental housing, rather than the delivery of a complete product up front. Serviced sites will nearly all be developed incrementally.

It follows that there will be an interest in serviced sites by households in the R3 500 to R7 500 monthly income range and even, but to a lesser extent, households in the R7 500 to R15 000 range. This would lead to a demand for serviced sites, over and above those provided to poor households.

APPENDIX - DWELLING AFFORDABILITY

The values in the table represent the maximum price of a dwelling which can be afforded on the relevant assumptions.

OWNERSHIP

Mortgage interest	Monthly household income								
Rate	15000	12500	10000	7500	7000	6000	5500	5000	3500
11,00%	383 372	338 110	291 648	246 361	236 599	218 249	209 661	199 899	171 787
10,50%	395 752	348 426	299 901	252 551	242 376	223 201	214 201	204 026	174 675
10,00%	408 601	359 134	308 467	258 976	248 372	228 340	218 912	208 309	177 674
9,50%	422 361	370 600	317 640	265 855	254 793	233 844	223 957	212 895	180 884
9,00%	436 667	382 522	327 178	273 008	261 469	239 567	229 203	217 664	184 222
8,50%	452 028	395 323	337 418	280 689	268 638	245 711	234 835	222 784	187 806
8,00%	468 565	409 104	348 443	288 957	276 355	252 326	240 899	228 297	191 665
7,50%	485 261	423 017	359 574	297 305	284 147	259 004	247 021	233 862	195 561
FLISP subsidy	20 000	35 300	49 400	64 675	67 025	72 900	76 425	78 775	87 000

Assumptions: 25% of household income spent on repayments. Constant nominal repayments over 20 years

RENTAL

25% of income	562 500	468 750	375 000	281 250	262 500	225 000	206 250	187 500	131 250
33% of income	750 000	625 000	500 000	375 000	350 000	300 000	275 000	250 000	175 000

CONCLUSIONS

When the hurly-burly's done.
When the battle's lost and won.
This shall be ere set of sun.
Shakespeare: Macbeth

The main conclusions from this study are:

1. *Urbanisation is further advanced than is generally realised.* The reason is that urbanisation has been proceeding in traditional areas, beneath the statistical radar screen. Although households are considerably poorer in urban areas within traditional areas than in other urban areas, people are living in both formally demarcated urban erven and in informal dense settlements in traditional areas, and they have access to urban services: water provided by the municipality, mail delivered to home and refuse collected at least once a week.

2. *Population growth in the metros was much higher than population growth in urban areas outside and inside traditional areas between 2011 and 2016, and population concentration in the metros is expected to continue increasing.* Growth rates of the urban population show considerable variance across municipalities, especially in municipalities with small urban populations. In just over a third of municipalities, the urban population dropped between 2011 and 2016.

3. *Average household size fell between 2011 and 2016, and based on constant headship rates by age and sex, they are expected to continue to fall to 2030.* The main reason is a fall in the number of children aged 0-19 in relation to adults aged 20-64. This development means that the growth in the number of households is exceeding the population growth rate.

4. *The consequence is that the number of households in metros is projected to grow from 6.2 million in 2011 to 10.5 million in 2030, an increase of 71% over nineteen years.* It is in the metros that the challenge of human settlement development is the greatest, and where the pressure for land reform will be the most urgent.

5. *The resolution of human settlement challenges have to be settled in a low growth environment.* The potential growth rate (the maximum rate at which the economy can grow in the medium term) is currently below 2%, and the International Monetary Fund expects this situation to continue until 2023. This means that per capita real income will grow slowly, and per household income will grow more slowly still. Income per household is projected not to reach its 2013 level again until 2027.

6. *The consequence is that two-thirds of the increase in the number of households will be in the poorest category (below R3 500 per month in 2016 prices) in metros and that virtually all of the increase urban areas will be in this category, between 2016 and 2024.* Provided that the potential growth rate can be increased to 3% by 2030, the income distribution among new households will be more diverse. Even so, more than half of them will be in the poorest category.

7. *Existing housing policy is poorly positioned to cope with the challenges.* It will be fiscally impossible to build BNG houses for all poor and vulnerable households. Present subsidised housing production is running at about a third of the level that would be required. Informal settlement upgrading is taking place, but there is no production of green field serviced sites. Nor is there any support for densification in existing urban areas, although this is widely supported as desirable. And the provision of rental housing needs to be supported by government policy and housing agencies.

8. *Under the circumstances, it is not surprising that calls for rapid land release and the revival of site and service schemes have emerged in Gauteng, the province under greatest pressure.* What is needed is not unimproved land, but serviced sites set out in an orderly fashion for provision to poor households and sale to other households interested in acquiring them. The first step is strengthening the land assembly process, and the second is contracting between the state and the private sector to service sites and connect them up to bulk infrastructure. The Gauteng government has set up a committee to investigate the potential for state owned land to be used for site and service schemes. Additionally, some expropriation of private land may be needed, though it is not fiscally necessary to do it without compensation. Instead, the valuer-general's formula should be used. The primary cost will not be land acquisition. It will be the cost of servicing sites and bulk infrastructure.

9. *More incremental housing in the metros is inevitable.* The only question is whether it happens in an orderly or disorderly fashion. The costs of disorder include sub-optimal location, increased costs of servicing down the line, and unnecessary social conflict. Order requires rapid repositioning of government policy and institutions. If you want an image of how new parts of metros will look, consider housing in traditional urban areas, which has been developed entirely without government support. The speed at which site and service schemes consolidate will depend on the rate of economic growth. Consolidation will be slow initially, but may speed up in the second half of the next decade.

10. *Coping with housing need involves more than the creation of new dwellings.* It also entails building inspection to ensure structures are safe, and to protect tenants against dwellings in a dilapidated sate. It requires extension of services. And it requires removal of restrictions on credit and housing production markets to permit those who can afford it to purchase housing.

11. *Given the scale of the challenge, it is important that the contribution of households and the private sector are maximised.* The appropriate role for government is policy determination, regulation and financial support. Production should be left to developers and households.

12. *The good news is that the demographic pressure will ease over time, as fertility continues to drop, population momentum declines and the urban transition comes to an end.* A return to somewhat higher levels of growth would also help.

CONTENTS

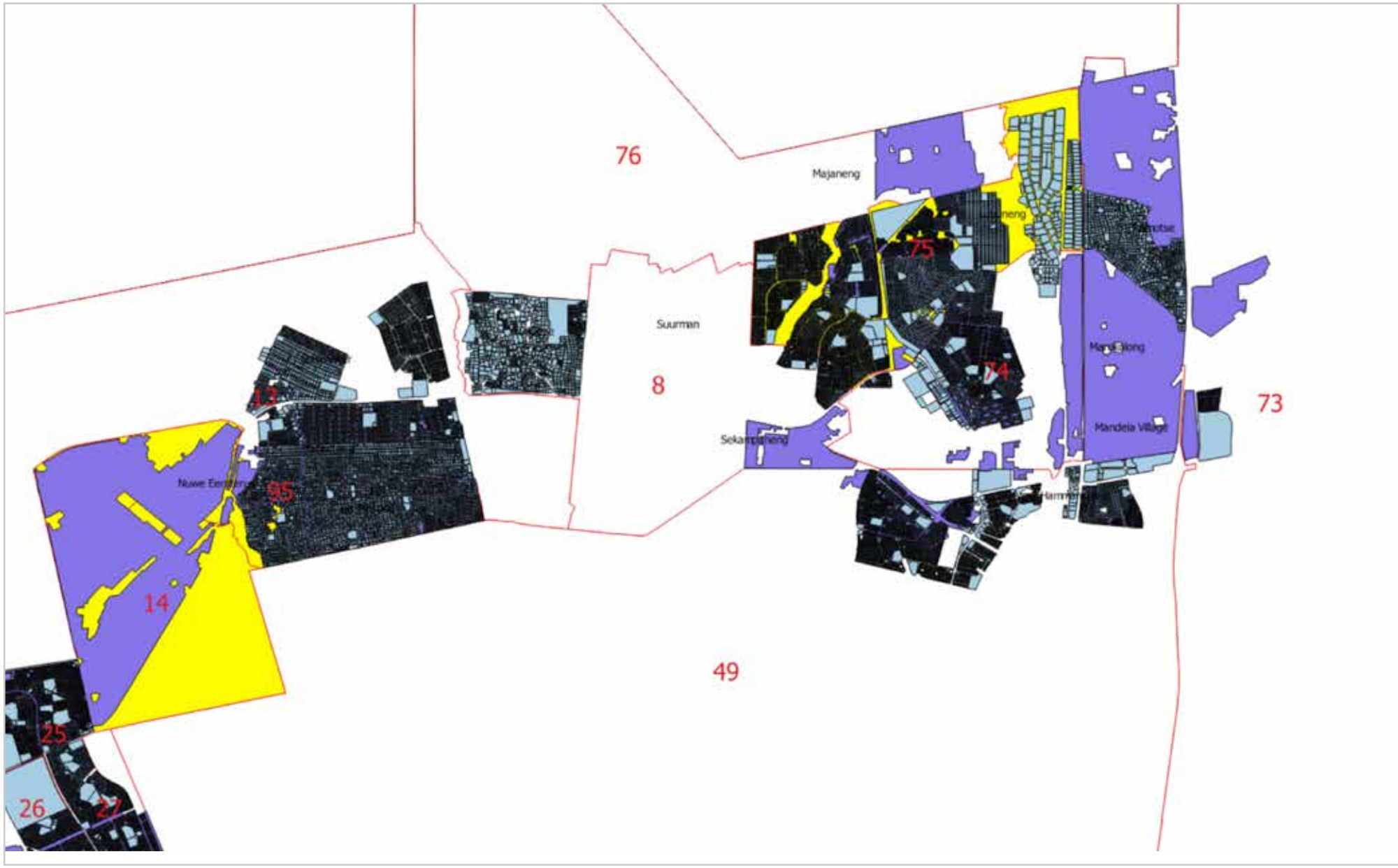
In all but the last two maps, wholly traditional wards in the 2011 census are indicated in yellow. The light blue/black areas contain erven. The purple areas are high density areas not demarcated into erven.

In the second last map, the extent of urbanisation is indicated by the shade of blue. The lightest blue areas have urbanisation of 40% or less, progressively darker shades indicate 40%-50%, 50%-60% 60%-70%, 70% - 80% and above 90%.

KEY

YELLOW	Wards returned as purely tribal/traditional in the 2011 Census
RED	Ward number
LIGHT BLUE/BLACK	Erven (February 2018)
PURPLE	High density urban not divided into erven (Land Use, 2014)

TSHWANE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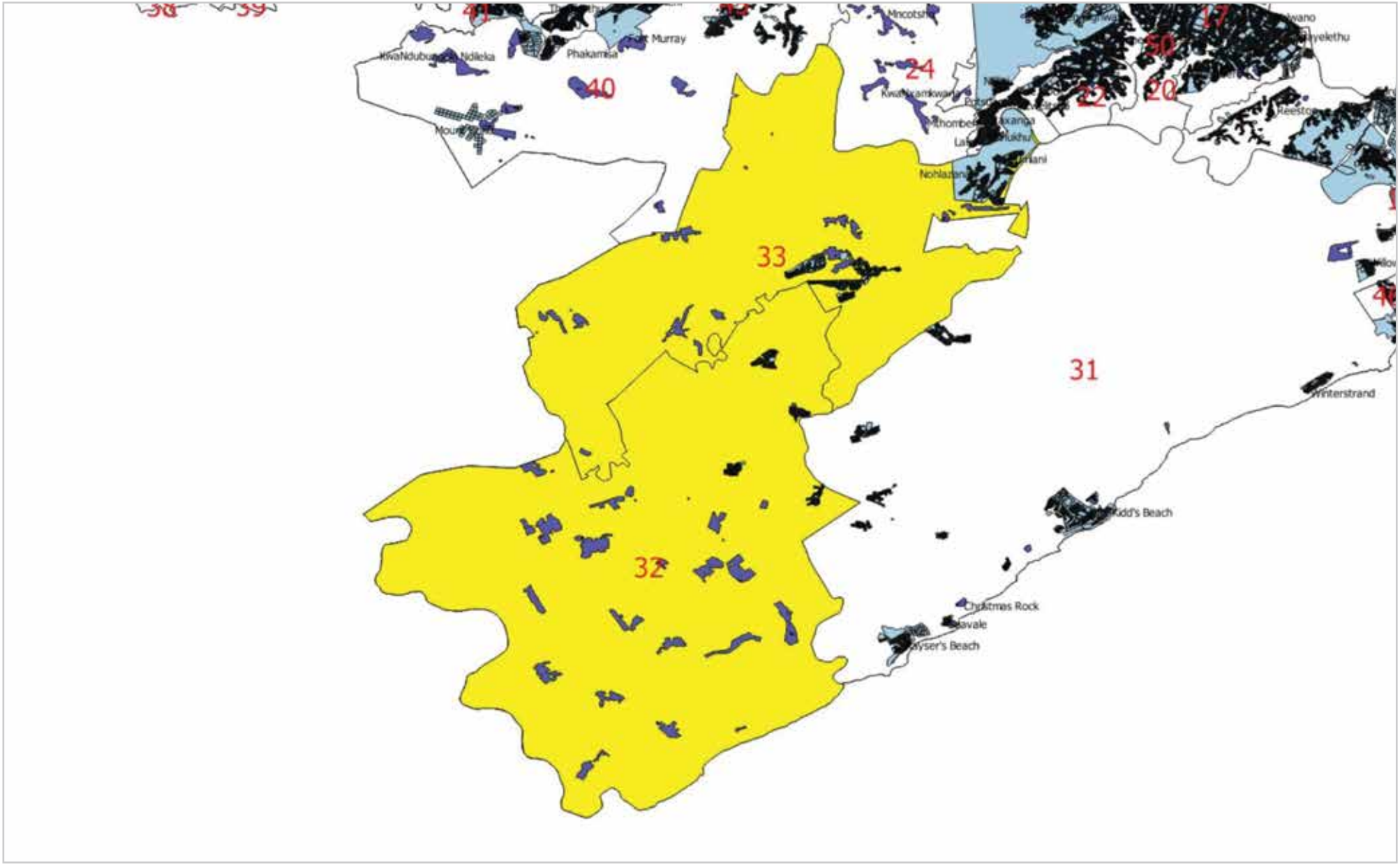
BUFFALO CITY



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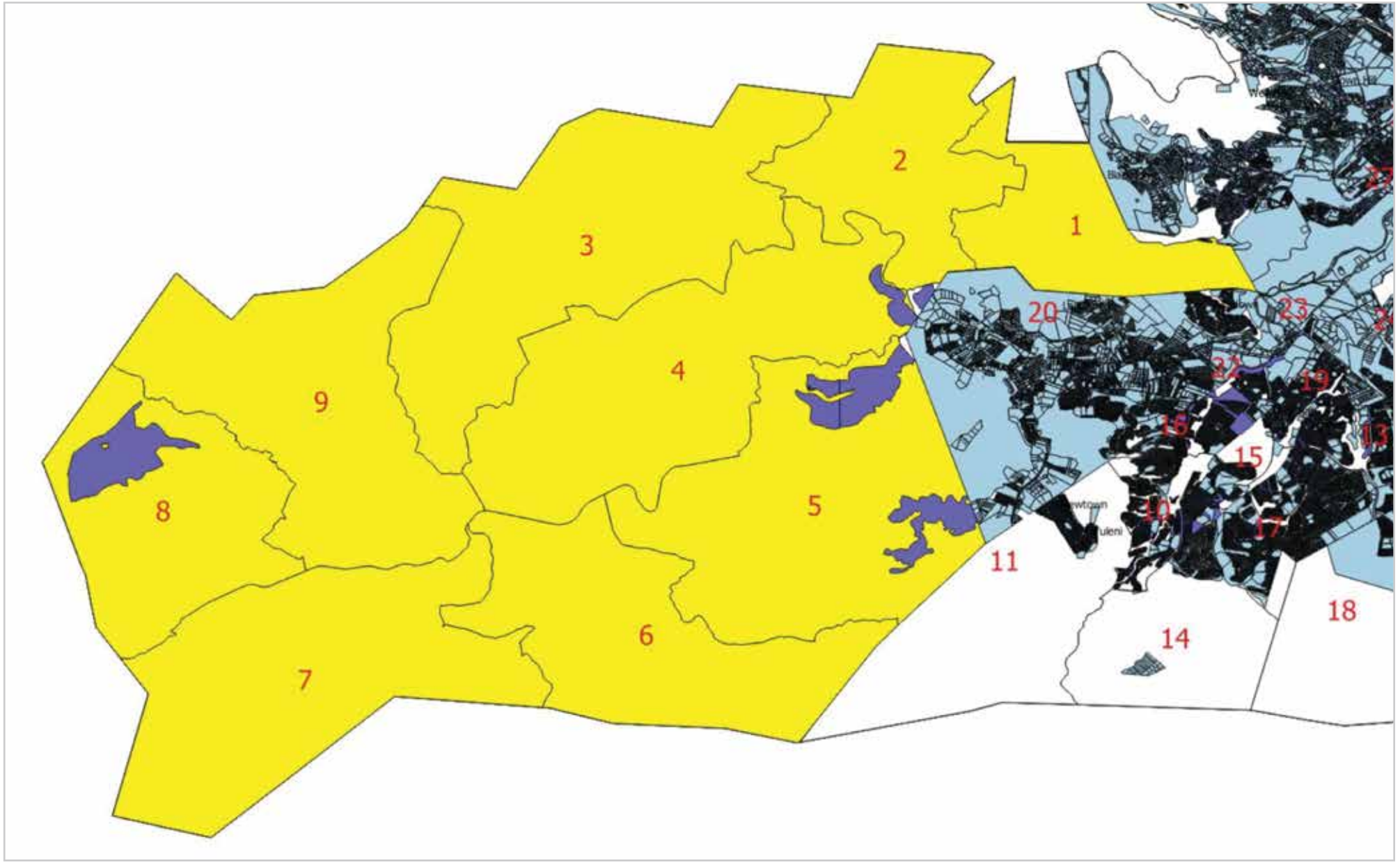

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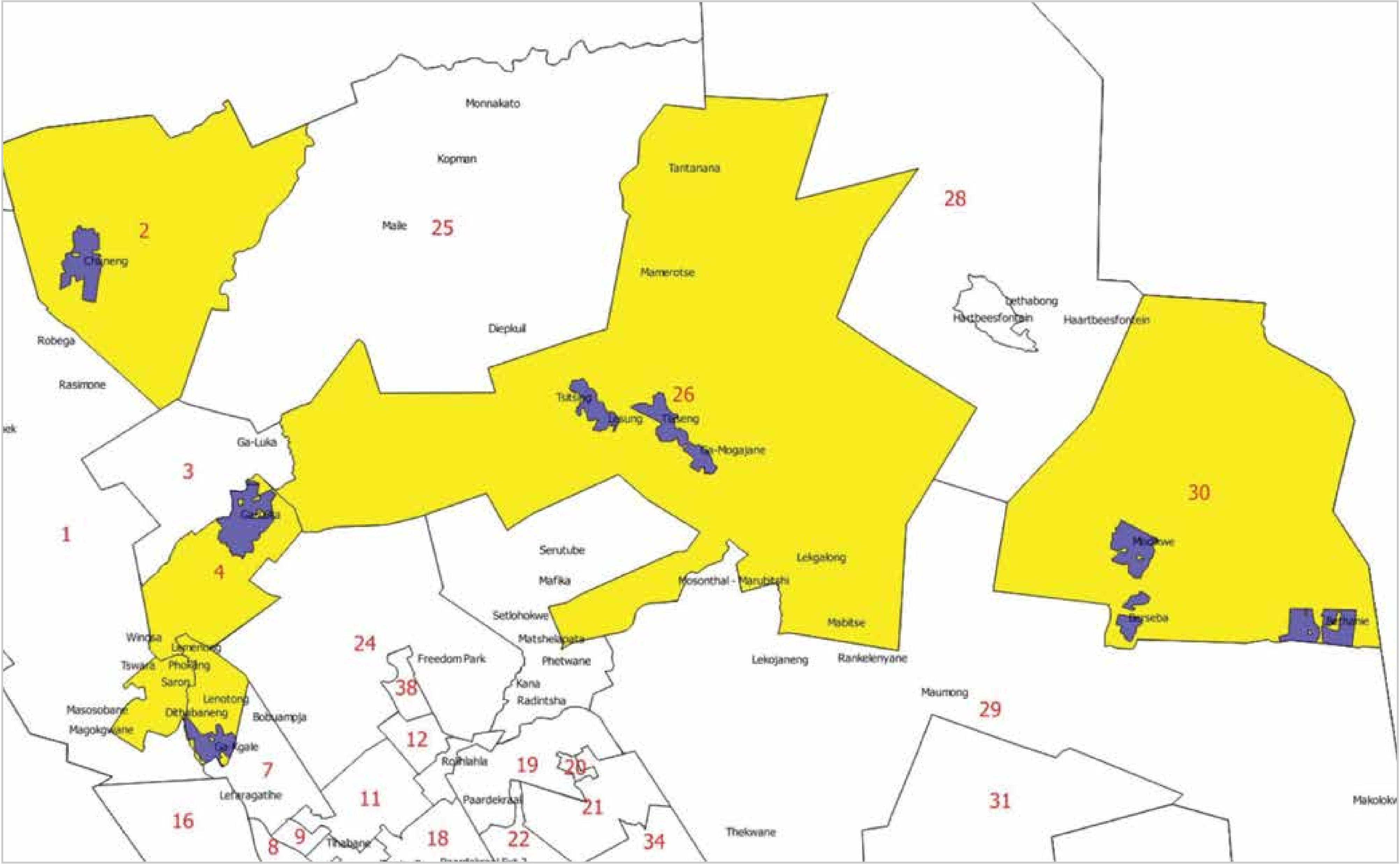
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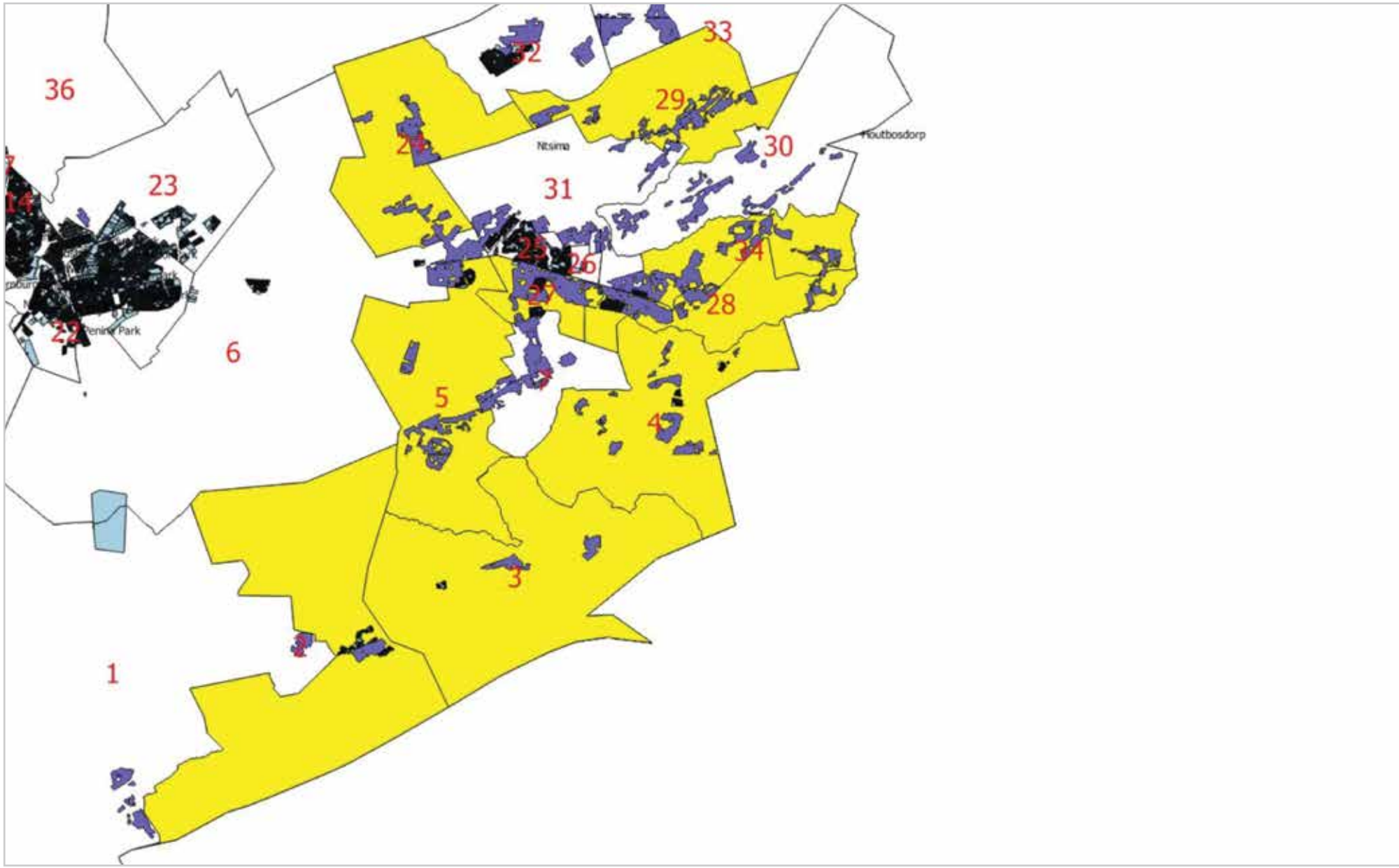
POLOKWANE EAST



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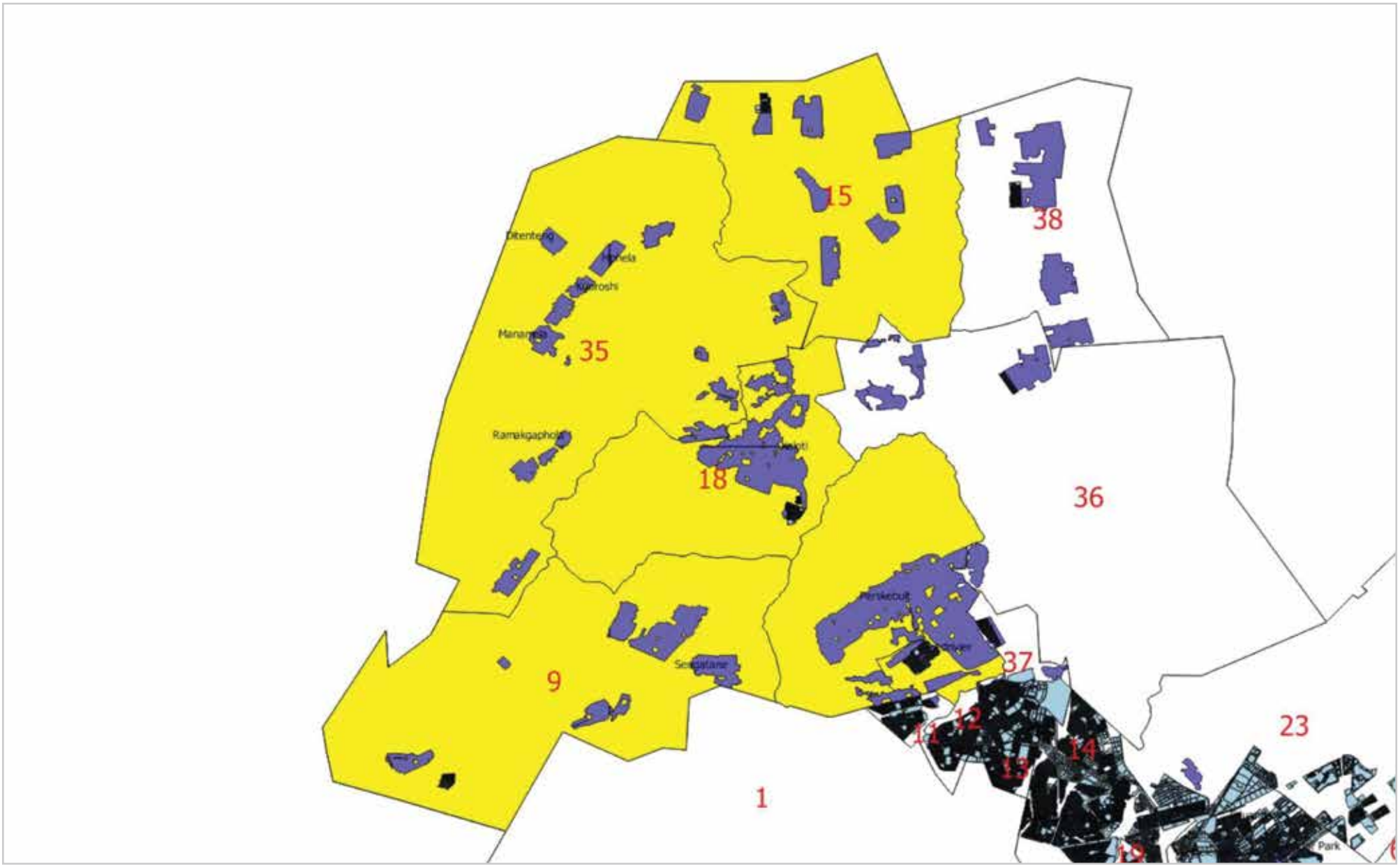

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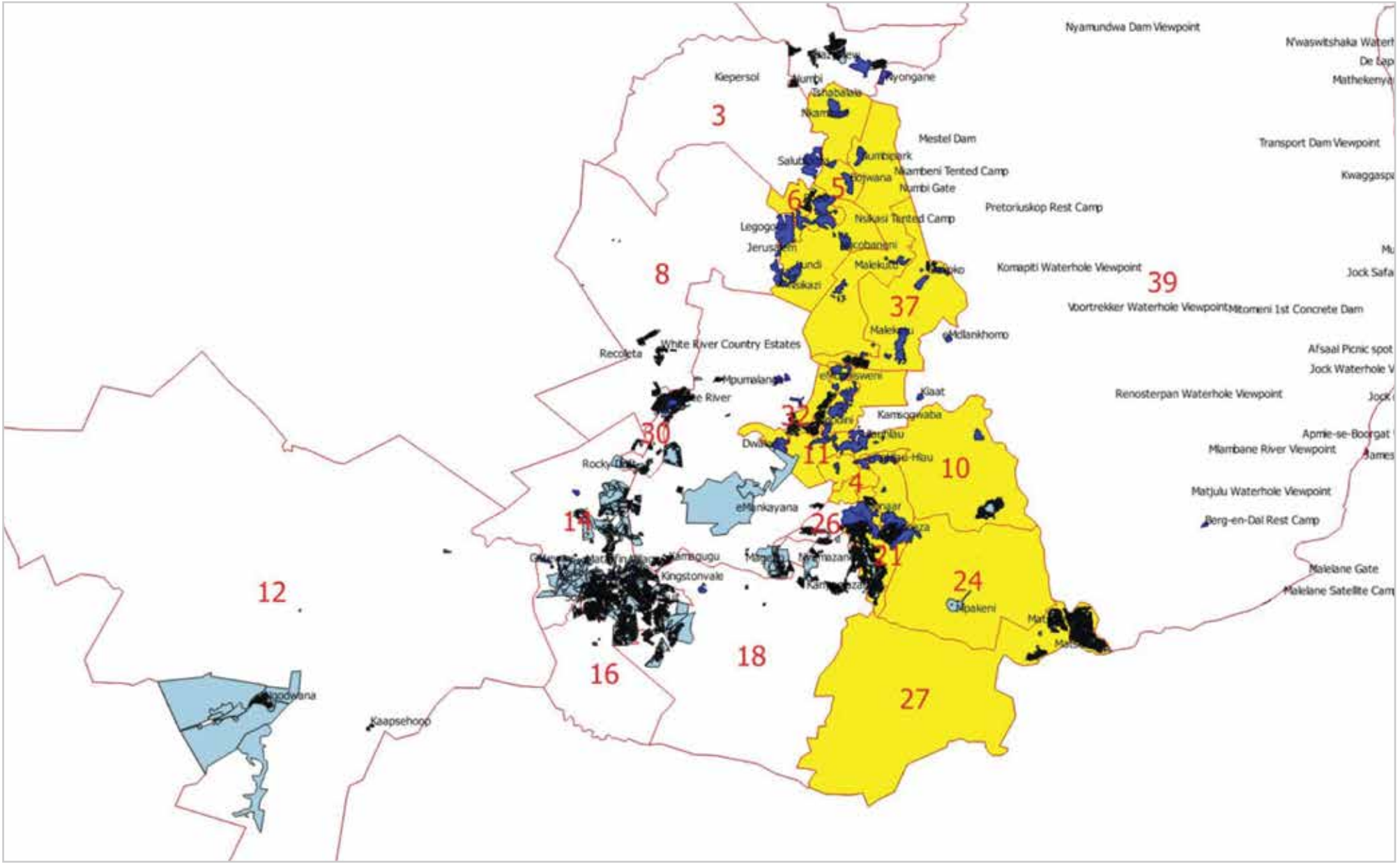
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Nkambeni Tented Camp
Numbi Gate
Pretoriuskop Rest Camp
Nukasi Tented Camp
Legogo
Jerusalem
Jacobanani
Makekube
Komapiti Waterhole Viewpoint
Jock Safa
Voortrekker Waterhole Viewpoint
Mtomeni 1st Concrete Dam
Mdlankhomo
White River Country Estates
Recoleta
Afsaal Picnic spot
Jock Waterhole V
Renosterpan Waterhole Viewpoint
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Kamagwaba
Aprie-se-Boorgat
Mlambane River Viewpoint
Matjulu Waterhole Viewpoint
Berg-en-Dal Rest Camp
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Malelane Satellite Cam
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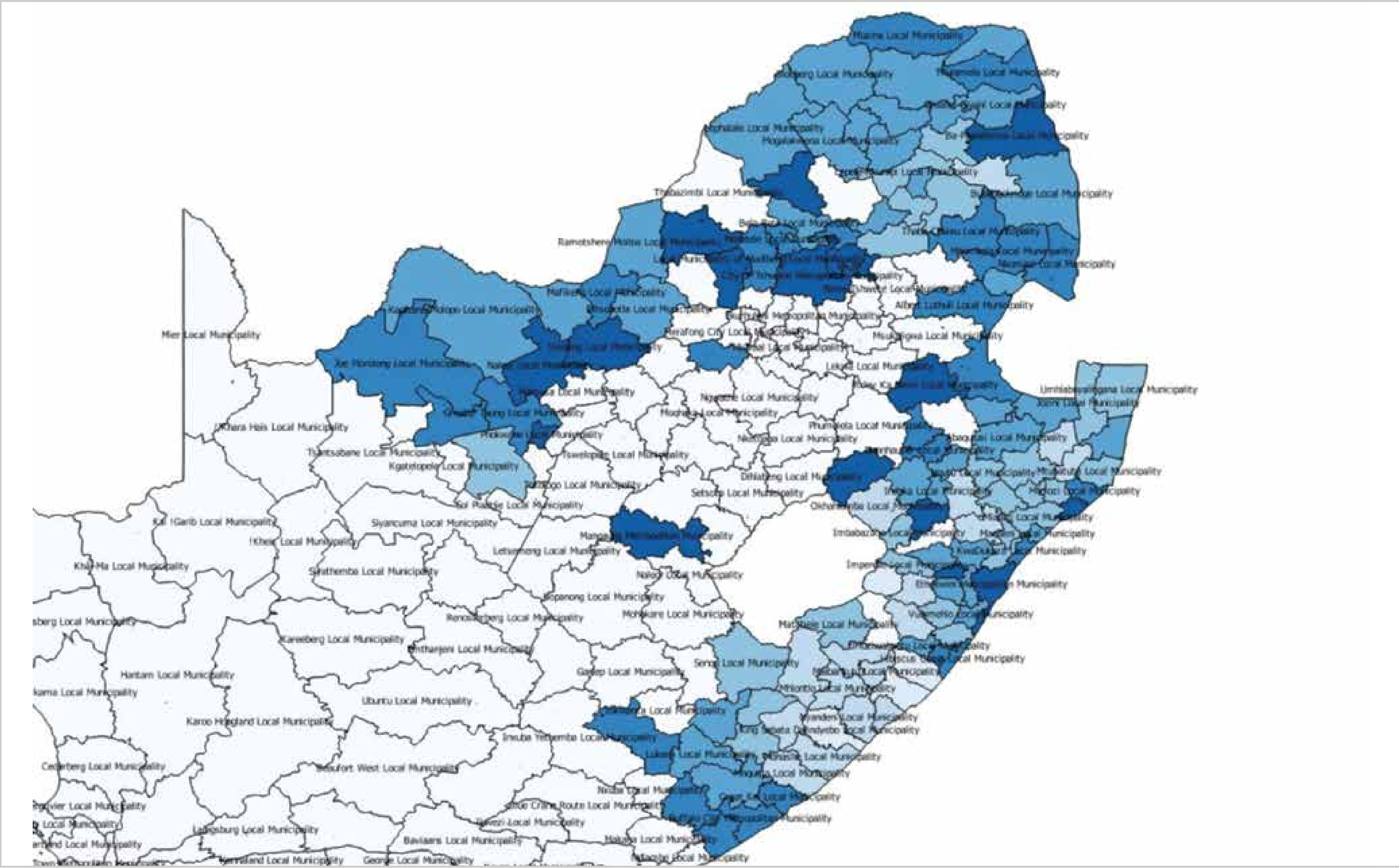
URBANISATION IN TRADITIONAL AREAS



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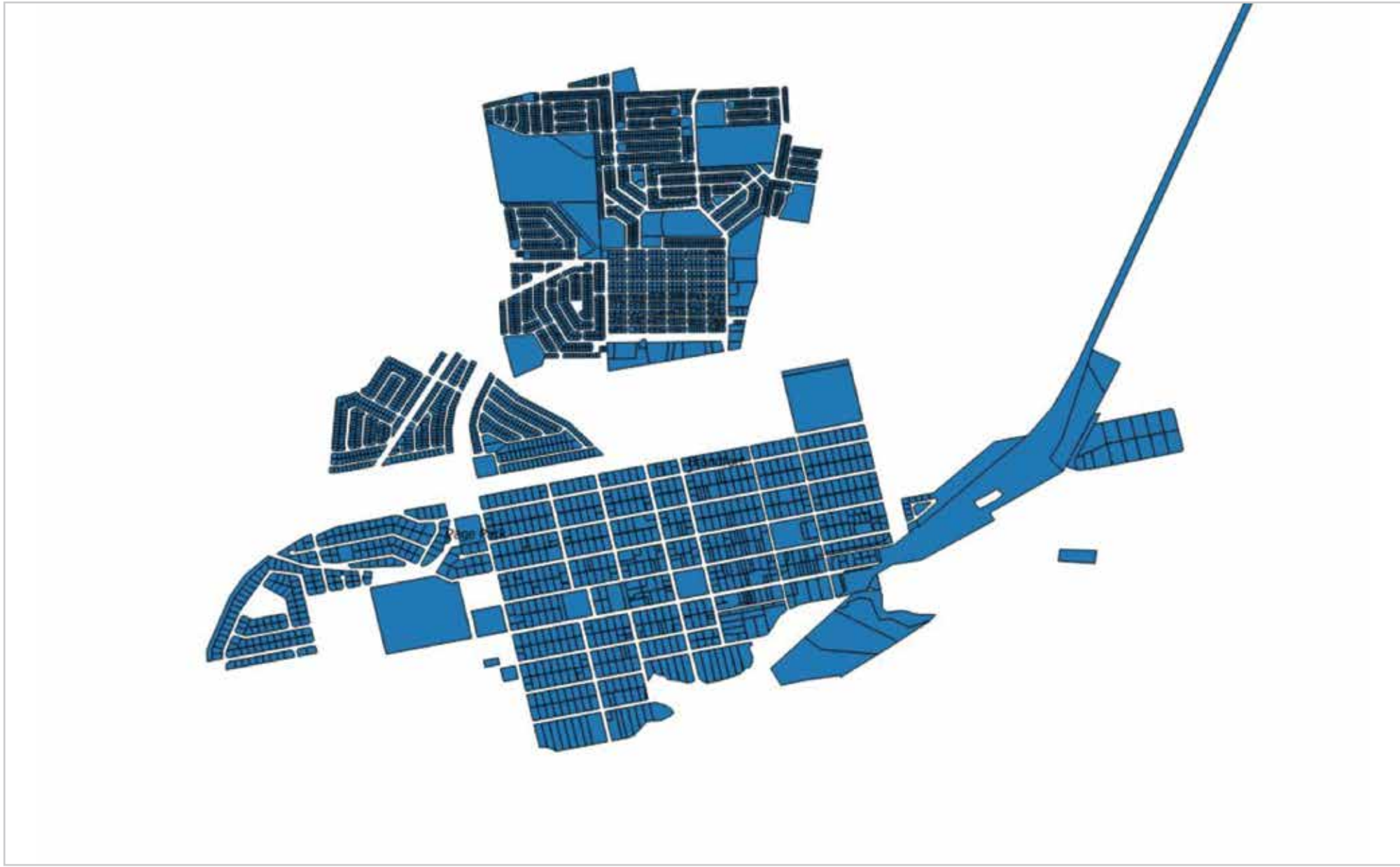

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