

Towards more compact South African settlements through informal housing: The case of backyard densification in Bridgton and Bongolethu, Oudtshoorn

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Abstract

This article engages the concepts of urban sprawl and density, as the foundations for a discussion on South Africa's informal backyard rental sector. This research attempts to relate some of the spatial impacts levied by the backyard sector in post-apartheid South Africa, based on case study research in Oudtshoorn, Western Cape, the Rose Valley formalisation project, as well as the Bridgton and Bongolethu townships. This article employs both qualitative and quantitative analyses and arrives at several key findings. Results show that informal backyard rentals increase dwelling unit and population densities substantially in the case study, accommodating households who would otherwise occupy land illegally on the urban periphery, contributing to urban sprawl. Findings also suggest that these backyard tenants enjoy excellent access to services, placing increased pressure on Oudtshoorn's already overcapacitated infrastructure network. This article posits that informal backyarding has to be encouraged and supported based on the sector's contribution to urban compaction, but that related impacts on infrastructure be addressed in future planning interventions.

Key words: Urban sprawl, density, low-cost housing, informal backyard rentals, South Africa

DIE WEG NA MEER KOMPAKTE SUID-AFRIKAANSE NEDERSETTINGS DEUR INFORMELE BEHUISING: DIE GEVAL VAN AGTERPLAAS VERDIGTING IN BRIDGTON EN BONGOLETHU, OUDTSHOORN

Abstrak

Hierdie artikel betrek konsepte soos stedelike randsprei en digtheid as die grondslag vir 'n bespreking oor Suid-Afrika se informele agterplaasverhuringsektor. Dië navorsing poog om die ruimtelike impak van die agterplaasverhuringsektor uit te lig in die era na apartheid in Suid-Afrika, gebaseer op veldwerk in Oudtshoorn in die Wes-Kaap, die dorp se Rose Valley formaliseringsprojek en die Bridgton en Bongolethu nedersettings. Hierdie artikel maak gebruik van beide kwalitatiewe en kwantitatiewe analyses om tot 'n gevolgtrekking te kom. Resultate toon aan dat informele agterplaasstrukture wooneenheid- en bevolkingsdigthede merkwaardig verhoog in die gevallestudie, terwyl die sektor huishoudings huisves wat andersins onwettig op die stedelike periferie sou vestig en randsprei bevorder. Resultate wys ook dat agterplaasverhuurders goeie toegang tot dienste geniet, wat meer druk op Oudtshoorn se reeds oorlaaide infrastruktuurnetwerk teweeg bring. Hierdie artikel voer dus aan dat informele agterplaasverhuring aangemoedig en ondersteun word, gebaseer op die sektor se bydrae tot stedelike kompaktheid, maar dat verwante impakte op infrastruktuur in toekomstige beplanning aangespreek word.

Sleutelwoorde: Stedelike randsprei, digthede, laekoste behuising, informele agterplaasverhuring, Suid-Afrika

MALEBANA LE BODULO BO PETETSANENG HAHOLO AFRIKA BORWA KA MATLO A SENG MOLAONG: QAKA YA TETEANO YA MATLO DIJARETENG TSE KA MORAO BRIDGTON LE BONGOLETHU, OUDTSHOORN

Atikele ena e sebedisa mehopolo ya ho se tswellepele ha toropo le ho teteana. Tsena di sebediswa jwalo ka metheo bakeng sa puisano ya lekala la khiriso e seng molaong ya dijarete tse ka morao matlong Afrika Borwa. Dipatlisiso tsena di leka ho amanya tse ding tsa dikgahlamelo tsa tefo ho ya ka lekala la khiriso ya dijarete tse ka morao matlong nakong ya dilemo tsa kgethollo Afrika Borwa. Dipatlisiso tsena ke ho ya ka Western Cape Town ya Oudtshoorn, projeke ya ho etsa dintho semolao ya Rose Valley le makeishene a Bridgton le Bongolethu. Atikele ena e sebedisa manollo ya lebadi le ya boleng (quantitative and qualitative analysis), mme hape e fihlella diphumano tse mmalwa tsa sehlooho. Thutong ena ya mehlala (the case study), diphetho di bontsha hore khiri e seng molaong ya dijarete tsa ka morao matlong e eketsa diyuniti tsa bodulo le bongata ba baahi, e fana ka bodulo ho malapa ao a neng a ka inkela dibaka tsa bodulo ntle le molao toropong; mme sena se bapala karolo ho se tswelleng pele ha toropo. Diphetho hape di bontsha hore bahiri ba matlo a ka morao dijareteng ba fumana ditshebeletso tsa boemo bo hodimo, mme sena se beya boima bo eketsehileng hodima marangrang a meralo ya motheo Oudtshoorn; e seng e sena bokgoni. Atikele ena e paka hore ho dula matlong a ka morao dijareteng ka ntle ho molao ho tlameha ho kgothalletswa le ho tshhehetswa ho ya ka kabelo ya lekala bakeng sa ho fokotsa toropo, empa dikgahlamelo hodima meralo ya motheo di tlamehile ho sekasekwa nakong e tlang ha ho etswa merero.

Mantswe a sehlooho: Ho se tswellepele ha toropo, ho teteana, matlo a theko e tlase, khiri e seng molaong ya matlo a ka morao jareteng, Afrika Borwa

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1. INTRODUCTION

The South African city is typified by a sprawling urban form, perpetuated by peripheral, low-density subsidised housing development and mass informal housing settlements, as shanty towns (Goebel, 2007: 292; Jay & Bowen, 2011: 575; Klug, Rubin & Todes, 2013: 668; Turok, 2013: 180; Cash, 2014: 127; Du Plessis, 2014: 70). However, the low densities that characterise subsidised housing projects are augmented regularly by the addition of informal backyard rental accommodation (Gardner, 2009: 14; Shapurjee & Charlton, 2013: 663; Tshangana, 2013: 12) that also absorb a large proportion of those households who would otherwise occupy sprawling informal settlements. The informal backyard rental sector has shown sustained growth in terms of new informal backyard dwellings (Bank, 2007: 206; Lemanski, 2009: 473; Turok & Borel-Saladin, 2014: 687), but has gone underreported in the national Census (Watson, 2009: 5), remains unrecognised in national policy, and enjoys limited, piecemeal attention at both provincial and local level (Carey, 2009: 7; Rubin & Gardner, 2013: 68), particularly in smaller, undercapacitated municipalities that show a shortage of technical expertise to address it (Morange, 2002: 20). In fact, the sector has been described as *terra incognita* (Parnell & Hart, 1999: 367), hidden (Turok, 2012: 22) especially when its spatial implications are considered (Shapurjee *et al.*, 2014: 21). In recognition of the above, this article intends to shed light on the spatial impacts of informal backyard rental accommodation in the smaller local municipality of Oudtshoorn and an area in the Bridgton and Bongoletu townships. Accordingly, this research aims to quantify the level of backyard densification taking place, present the case for informal backyard infill as counter to urban sprawl, and engage with consequences for bulk infrastructure and service delivery as issues to be recognised and addressed in future planning initiatives. This article is not intended as a comprehensive discussion on

all facets related to informal backyard renting in South Africa.

The article begins with a literature review intended to explore core concepts such as urban sprawl and density and familiarise the South African housing and informal backyard rental sectors, all of which are revisited in the empirical section. Empirical research consists of a case study of Oudtshoorn, focusing specifically on new low-cost housing development taking place in the Rose Valley extension as well as on the established practice of informal backyard densification in Bridgton and Bongoletu.

2. LITERATURE REVIEW

2.1 The urban sprawl concept

Recently, urban sprawl has received amplified attention, but the concept remains elusive, with no generally agreed upon definition or empirical measurement (Inostroza, Baur & Csaplovics, 2013: 88). Yet, definitive principles seem to recur in the literature. This article provides that urban sprawl entails a change in land use from the non-urban to the urban, often as new low-density, single-use urban expansion as residential or commercial strip development at or near the urban fringe, with land consumption exceeding population growth, producing a strung out and discontinuous urban form (Fulton, Pendall, Nguyen & Harrison, 2001: 3; Ewing, Pendall & Chen, 2002: 3; Osman, Nawawi & Abdullah, 2008: 40; Brunner, 2012: 1; Inostroza *et al.*, 2013: 88; Linard, Tatem & Gilbert, 2013: 23; Yue, Liu & FAN, 2013: 358; Cash, 2014: 126). Sprawl is mostly related to housing demand, as cities will consume new areas if housing demand cannot be met within existing urban boundaries (Broitman & Koomen, 2015: 32). Expansion is inevitable. The challenge lies in deciding on what degree of sprawl is acceptable in maintaining compact and sustainable cities (Inostroza *et al.*, 2013: 96-97), while accommodating the effects of urbanisation and population growth. The definition also evidences the relationship between density and

urban sprawl. Density is highly correlated with nearly all measures of urban sprawl (Brownstone & Golob, 2009: 91). Osman *et al.* (2008: 41) state that “[d]ensity is the most important dimension of sprawl” and is the most widely used indicator to evaluate the phenomenon. Density is discussed accordingly and revisited in the ensuing case study.

2.2 The density concept

Density continues to garner attention in the quest for a more sustainable urban form; this article accepts density as a principal element of sustainability. Density, as an indicator of sprawl, is considered a proxy for access to employment, amenities and other destinations (Brownstone & Golob, 2009: 91) and even socio-economic features such as income (Forsyth, Oakes, Schmitz & Hearst, 2007: 679). In this sense, density has become an important analytical tool, but also a multifaceted one vulnerable to ambiguity and misapprehension (Turok, 2011: 470). Density can be measured and defined as dwelling units per land area; habitable rooms per land area; people or bed spaces per land area; or as stand ratios with floor area multiplied by the number of storeys/area of the site, commonly referred to as the floor area ratio (FAR) (Poulsen & Silverman, 2005: 23; CABE, 2010; McGaffin, Cirolia & Massyn, 2015: 64; Turok, 2016a). Of these, population per land area or housing unit or number of dwelling units per land area seem most popular (SCANPH, 2004), with the latter commonly favoured. Furthermore, it is important to distinguish between gross and net densities. Gross density refers to the number of stands or area used for development, including allowances for roads and other obligatory land allocations, which are excluded from net density calculations (Sivam & Karuppanan, 2012: 269). Net density is revisited in the case study research.

Densities influence urban form and function and present several positive and negative impacts. Table 1 captures these effects, providing advantages and disadvantages for increased and low-density development synthesised from the literature.

Table 1: Advantages and disadvantages of both lower and increased densities

	Increased densities	Lower densities
Advantages	<ul style="list-style-type: none"> Decreased land consumption per capita Reduced land acquisition costs by reducing land area requirements Reduced development costs due to reduced servicing costs Decreased infrastructure and servicing demands Promotes non-motorised transport More viable public infrastructure Promotes efficient public transport Encourages efficient natural resource consumption Encourage efficient energy consumption Reduce carbon emissions due to decreased travel distances Protect agricultural land from infringement Protect ecosystems from infringement Protect biodiversity from infringement Increased access to amenities More public open space due to reduced area required for top structures 	<ul style="list-style-type: none"> Increased privacy More public open space Reduced land acquisition costs due to cheaper land on the periphery More affordable for residents due to decreased land costs Greater appeal for residents Reduces overcrowding
Disadvantages	<ul style="list-style-type: none"> Traffic congestion due to increased traffic in a reduced total area Reduced privacy due to proximity Increased overcrowding due to proximity Escalating crime rates due to intensification Fewer public open spaces due to competition for land Increased construction costs for top structures Opposition by residents Polluted ecosystems due to intensification Inflated property prices due to increased development costs and exclusivity Increased number of cars parked on the street 	<ul style="list-style-type: none"> Traffic congestion due to increased need for private vehicles Increased commuting times due to increased distances Increased commuting costs due to increased distances Increased land consumption per capita Increased land acquisition costs due to increased land area requirements Increased infrastructure and servicing demands Increased development costs Inflated property prices Public transport inefficiency

Source: Own construction adapted from Churchman (1999); Carruthers & Ulfarsson (2003); Poulsen & Silverman (2005); Carey (2009); CABE (2010); McConnell & Wiley (2010); Boyko & Cooper (2011); Turok (2011); Sivam & Karuppannan (2012); Chhetri *et al.* (2013); Rubin & Gardner (2013); Rode, Floater, Thomopoulos, Docherty, Schwinger & Mahendra (2014); Brewer & Grant (2015); Glaeser & Sims (2015); Turok (2016a, 2016b)

Densification is commonly pursued as a planning and sustainability goal (Rubin & Gardner, 2013: 19). However, for Turok (2016a: 238), "... urban density on its own is no panacea for prosperity". Density is a valuable condition that supports resource efficiency and human interaction, but is not sufficient on its own. It does not guarantee positive outcomes such as more sustainable urban environments (Poulsen & Silverman, 2005: 24). It would thus be irresponsible to assume that increased densities are universally positive when compared to lower density arrangements. Table 1 demonstrates that densities at any level may present challenges and opportunities and that density should be considered in a context-sensitive manner in order to balance potential positives and negatives. Context may be regarded as the single most important factor in planning. As such,

the following sections introduce the South African context in terms of informal housing, the low-cost subsidised housing sector and the informal backyard rental subsector.

2.3 Informal housing in South Africa and the post-apartheid status quo

South Africa's contemporary urban structure is a product of its apartheid past (Du Plessis, 2014: 71). Apartheid planning established 'shadow cities', whereby White settlements were accompanied by 'locations', or townships, for Black or Coloured populations, located at some distance from them (Cash, 2014: 128), or separated by natural or artificial buffers (Jürgens, Donaldson, Rule & Bähr, 2013: 256) that provided a limited number of citizens with accommodation. By the end of apartheid, many of those who could not access urban

areas legitimately, gained access to cities *via* informal housing, either in shanty towns or in the informal backyard structures erected in non-White townships (Crankshaw, Gilbert & Morris, 2000: 3). Informal housing has traditionally been linked to a myriad of challenges, including geographically and environmentally hazardous locations that contravene planning regulations; poorly constructed and dilapidated informal structures that oppose building regulations; a lack of access to infrastructure, basic services and public amenities; with informal dwellers burdened by disease, violence, exclusion and tenure insecurity and informality perceived as indicative of instability and unsustainable futures (Cities Alliance, 2002; UN-Habitat, 2003: 4; Goebel, 2007: 295; Richards, O'Leary & Mutsonziwa, 2007: 2; Mehta & Dastur, 2008; Lombard & Huxley, 2011: 122; UN-Habitat, 2013, 2014; Turok & Borel-Saladin, 2016).

The post-apartheid democratic government endeavoured to make sustainable development a leading objective. The commitment to sustainability, especially regarding urban development and housing, was encapsulated, *inter alia*, in commitments towards the UN's Sustainable Habitats Agenda (Goebel, 2007: 292) and publications such as the *Breaking New Ground Strategy* (RSA, 2004) and the 2013 Spatial Planning and Land Use Management Act (SPLUMA) (Van Wyk & Oranje, 2014; Nel, 2016). The democratic age brought a renewed focus on urban integration and compaction (Turok, 2016b: 9) and an emphasis on low-income subsidised housing as a vehicle to remedy past injustices (Turok, 2016a), promote spatial sustainability and address the informal housing issue. The approach to low-income housing was initiated in 1994 with the Reconstruction and Development Programme (RDP) based on eradicating informal housing and delivering home ownership opportunities to the disadvantaged *via* full housing subsidies (Morange, 2002: 3). Low-income housing subsidies have been

made available to households who earn less than R3 500 per month, delivering homes for nuclear families as detached one- to two-bedroom units of 40m² on fully serviced stands of approximately 250m² (Poulsen & Silverman, 2005: 21). Roughly 2.8 million subsidised units have now been delivered (Turok, 2016a: 235). New low-income subsidised housing projects, as discussed in the case study to follow, have had significant impacts on South Africa's urban landscape, but have generally not reversed apartheid's spatial legacy. Pressure to deliver large housing volumes within limited budgets, together with a land-intensive housing typology, have precluded the majority of low-income housing projects from securing well-located and more spatially integrated development sites (Massyn, McGaffin, Viruly & Hopkins, 2015: 413; McGaffin *et al.*, 2015: 62). And so, the poor are commonly established on the urban periphery (Goebel, 2007: 294; Turok, 2012: 14; Haferburg, 2013: 262; Jürgens *et al.*, 2013: 256; Turok, 2016b: 11), in suburbs that continue to contort settlement patterns and entrench fragmentation, segregation, inefficiency, and urban sprawl (Brunner, 2012: 4; Chobokoane & Horn, 2015: 79; Nel, 2016: 81). Sprawl is further intensified by the detached housing typology that requires substantial road space and establishes configurations of "very low density" (Van Rooyen, 2010: 47), generating densities of roughly 40 units and 160 persons per hectare (Poulsen & Silverman, 2005: 21). These densities are often augmented exponentially by the addition of backyard dwellings (Harrison & Todes, 2015: 157; McGaffin *et al.*, 2015: 65).

Sprawling low-income subsidised suburbs have housed approximately 10 million beneficiaries, increasing the proportion living in formal housing from 64% in 1996 to 78% in 2011 (Turok, 2016a: 235). The proportion of urban households residing informally might have fallen, but the absolute number has risen (Turok & Borel-Saladin, 2014: 688). Land invasions persist and informal

housing has increasingly sheltered the poor. The country's informal settlements have expanded in both size and number since 1994, with approximately 2 700 informal settlements now established nationally, housing nearly 1.2 million households (Turok, 2012: 21) as part of the escalating housing backlog. Progress has thus been significant, but insufficient, as the current approach to housing cannot deliver to scale at a sustainable rate (Gardner, 2009: 6). Housing only these 1.2 million households in the full RDP package, in 40m² units on 250m² stands, with a 30% allowance for roads and amenities, would require 39 000 ha of Greenfield area.

It is worthy to note that informal settlements and, to a limited extent, the state's low-income housing projects with their backyard dwellings, establish relatively high population densities on the urban outskirts (Sukhai & Jones, 2014: 12). South African cities are among few globally that present a rise in average population density with distance from the centre (Turok, 2016b: 11). Yet, average population densities remain well below density standards in comparable middle- and low-income, developing countries and almost half of standards in higher income, developed nations (Turok, 2011: 471). These densities are often still too low to establish the thresholds needed to supply city functions viably (Massyn *et al.*, 2015: 413). It is thus maintained that, in South Africa, low-density expansion stands in the way of more sustainable human settlements (Poulsen & Silverman, 2005: 20). "There is a clear need to break not only the pattern, but also the underpinning logics which drive the production of low-density and sprawling low-income settlements" (McGaffin *et al.*, 2015: 73) and to introduce a more compact urban form, in which increased densities may play a crucial part (Mammon & Ewing, 2009: 4).

2.4 Introducing the informal backyard rental sector

For Carey (2009: 12), a solution to the densification conundrum lays in existing stock, in the well-established practice of providing informal backyard rentals. The informal backyard rental sector was established during apartheid and now houses over 756 000 households (StatsSA, 2014) in new low-cost housing settlements and more prolifically in older, well-located townships (Lemanski, 2009: 474). In lieu of an officially accepted definition, this article defines an informal backyard rental unit as

An informal structure erected by a property owner or tenant within the boundaries of a formally registered property that contains at least one formal dwelling unit. The materials and construction practices used do not comply with National Norms and Standards with the structure constructed attached or adjacent to an existing formal dwelling.

Backyard densification is attributed to infill development (Lategan & Cilliers, 2013: 305), referring to the use of land located within an already developed surrounding area (McConnell & Wiley, 2010: 9; Inostroza *et al.*, 2013: 88; McGaffin *et al.*, 2015: 70). Informal backyard rental infill does not refer to the use of relatively large consolidated open areas, but to the intensified use and densification of residential properties already deemed developed by authorities according to their zoning policies and official registers.

For Gardner (2009: 6), the informal backyard rental sector presents "the greatest latent human settlement potential in South Africa", whilst Shapurjee and Charlton (2013: 655) contend that the sector can improve settlement-wide performance, and Tshangana (2013: 11) confirms that informal backyard rentals may play a positive part in building sustainable human settlements. As alluded to in Section 2.3, informal backyard dwellings have contributed to intense horizontal densification nationally (McGaffin *et al.*, 2015: 62) and continue to provide shelter to vulnerable households, those more suited to rental accommodation

or awaiting ownership of subsidy homes (Rubin & Gardner, 2013: 6; Shapurjee, Le Roux & Coetzee, 2014: 20) with intermediate access to basic services, often in more central locations (Morange, 2002: 10; Bank, 2007: 206; Carey, 2009: 17; Watson, 2009: 5). Fundamentally, the majority of backyard tenants would be housed in sprawling shanty towns, if they did not contribute to backyard densification.

The effects of backyard infill on future spatial and land-use planning and municipal infrastructure management cannot be ignored (Shapurjee *et al.*, 2014: 20). Access to urban services is a main motivation for backyard renting (Morange, 2002: 19). For, unlike those in informal shanty towns, backyard tenants may enjoy some access to sanitation, water and electricity (Shapurjee *et al.*, 2014: 24) *via* services provided to their landlords in main dwellings. Electricity may be accessed *via* informal connections to the main house, whilst water and sanitation may be accessed through outside lavatories and taps on the stand, or access granted to facilities within the main house. When considering backyard infill and infrastructure, two main arguments have emerged (Tshangana, 2013: 7).

The first supports backyard densification to make improved use of existing infrastructure networks and capitalise on existing investments (see Table 1), by providing a more sustainable number of users (Solé-Ollé & Rico, 2010: 2-4; Carey, 2009: 3; Gardner, 2009: 5; McConnell & Wiley, 2010: 3; Rubin & Gardner, 2013: 9; Shapurjee & Charlton, 2013: 633). The second argument cautions against excessive backyard infill as a strain on already overcapacitated infrastructure networks (Rubin & Gardner, 2013: 6; Turok & Borel-Saladin, 2014: 687). In South Africa's low-income suburbs, infrastructure networks are generally designed to service the very low densities planned for in subsidised housing projects. The intense densification introduced by informal backyard rentals may thus place immense pressure on networks and counter the potential of backyard

rentals to introduce increased densities sustainably. As a result, local authorities have generally viewed the increased occupancy densities introduced by backyard infill in a negative light, given the burden placed on municipal infrastructure (Poulsen & Silverman, 2005: 22) and the difficulties with metering, service consumption metering, and payment posed thereby (Tshangana, 2013: 10). Municipalities cannot generate an additional income through rates and taxes on informal backyard rentals and thus profit-driven authorities, or indeed smaller, underfunded municipalities, may be reluctant or unable to commit resources to the backyard sector (Carey, 2009: 12). As such, most municipalities have not extended basic services to backyard residents (Bank, 2007: 206); financing basic urban services remains a formidable challenge to sustainable urban development in South Africa (Goebel, 2007: 269).

Infrastructure upgrades or retrofits to service backyard tenants may not be unilaterally required in all low-income suburbs that present backyard densification. Some infrastructure networks are indeed buckling under the pressure, whereas others continue to cope with the added stress (Rubin & Gardner, 2013: 22). These networks may manage demand due to the capacity for which infrastructure networks were initially planned and installed. There are examples in which original infrastructure was overspecified and thus cope with increased densities (Tshangana, 2013: 7). In the majority of cases, only minimum capacities can be sustainably serviced, as most formal low-income settlements continue to discount the potential demands of their informal tenants (Lemanski, 2009: 477).

Secondly, networks may cope due to a national decrease in average household size (Turok, 2012: 29) of 25% between 2001 and 2011 (Tshangana, 2013: 7), a trend expected to continue. It is argued that reduced average and smaller household sizes, conventionally attributed to informal backyard dwellings, indicate that the additional

load imposed by backyarding is not proportional in service capacity to the number of households added to an area (Gardner, 2009: 16; Rubin & Gardner, 2013: 22), or for which services were initially planned. However, this is highly contingent on the number of backyard households presented and their and main households' specific demographic profiles. Generalisations should be avoided and cases evaluated on a context-related basis, as backyard populations are not uniform (Shapurjee *et al.*, 2014: 20).

The following section, the empirical research component, explores the town of Oudtshoorn and the new Rose Valley extension and delves into the spatial impacts of the informal backyard rental sector in a section of the Bridgton and Bongoletu townships in keeping with the focus on contextualised research.

3. EMPIRICAL RESEARCH

3.1 Research methodology

The town of Oudtshoorn was identified as case study as a fitting alternative to the abundance of planning research in South Africa focussed on metropolitan areas and large cities (Zwaig, 2015: 2). Initially, this research was sparked by the sudden establishment of an informal settlement on the outskirts of Oudtshoorn, the Rose Valley informal settlement. This article references a survey conducted in Rose Valley in 2012, a survey conducted in Oudtshoorn's Bridgton and Bongoletu townships in 2013, and a more intensive survey conducted in the same area of Bridgton and Bongoletu in 2015.

3.1.1 Sampling methods, sample sizes and data collection

The 2012 Rose Valley survey involved the distribution of 100 surveys on a door-to-door basis in the Rose Valley informal settlement. Respondents were selected based on convenience sampling and included on the grounds of their willingness to participate. Questions were fairly rudimentary, with the aim of exploring where settlers came from, what their

opinion regarding housing, increased densities, backyard renting, and future housing aspirations were. The Rose Valley survey revealed that the majority of respondent settlers originated from informal backyard dwellings in Oudtshoorn's Bridgton and Bongoletu townships. It is from there that the area of Bridgton and adjacent Bongoletu was identified as study area when the 2013 survey was considered. The specific study area within the townships (see Figure 3) was targeted, given the then recent refurbishment of the Bridgton Pavilion and the aim of that research to investigate the use of public green space in low-income housing areas and to determine the effects of informal backyard renting thereupon (Lategan & Cilliers, 2014: 430). The 2013 Bridgton/Bongoletu survey concentrated on 101 properties immediately surrounding the Bridgton Pavilion, regardless of whether they contained informal backyard dwellings or not. The area in Bongoletu was included, as the Bridgton Pavilion is, in fact, located outside, but on the boundary of the Bridgton township, within Bongoletu. As a result, properties surrounding the Bridgton Pavilion are located in both Bridgton and Bongoletu (see Figure 3). Participating households were selected with convenience sampling. However, Bridgton/Bongoletu survey data (2013) revealed certain shortcomings such as the omission of residential addresses to record stand sizes and targeted questions for backyard renters themselves. These deficiencies were addressed with the 2015 survey. The latter focused on the same broad area as the 2013 survey, due to the high number of backyard dwellings identified there in 2013, the level of familiarity the research team now enjoyed in the community, and the opportunity to compare certain findings in both data sets. The 2015 Bridgton/Bongoletu survey extended beyond properties immediately bordering the Bridgton Pavilion, thus penetrating both Bridgton and Bongoletu. It included only properties that presented informal backyard components, selected on the basis of convenience sampling, with

willing landlord and backyard tenant respondents. A total of 103 properties were included in the survey, with different, targeted questionnaires distributed to landlords and backyard tenants, respectively.

3.1.2 Response rate and limitations

Out of the 141 informal backyard rental structures recorded in the Bridgton/Bongoletu survey (2015), only 120 backyard households were represented in questionnaires; representing a sufficient sample size (Hashim, 2010). In addition, the stand numbers of only 81 of the 103 properties included in the survey could be retrieved on the municipal valuation roll and be allocated stand sizes by the time statistical analysis took place. The intention of the Bridgton/Bongoletu survey (2015) was to probe the informal backyard rental phenomenon with regard to spatial, demographic, economic and social trends. This article reports on the spatial aspects only.

3.1.3 Data analysis and interpretation of findings

Both 2013 and 2015 Bridgton/Bongoletu questionnaires were drafted in collaboration with the North-West University's Statistical Consultancy Services, who also captured data and helped with statistical analysis and interpretation. Statistical analysis was conducted using IBM's SPSS software. It must be noted that, as convenience instead of random sampling was used, p-values are reported in this article for the sake of completeness, but not interpreted.

Case study research was further supplemented by semi-structured interviews with municipal officials in selected departments of the Oudtshoorn Local Municipality (OLM) and other stakeholders who filled gaps in the literature and provided a more nuanced perspective, as referenced throughout. Please note that pseudonyms are used to cite these interviewees.

3.2 The case of Oudtshoorn

The town of Oudtshoorn is located in South Africa's Western Cape province, within the Eden District Municipality (EDM). Oudtshoorn is the main centre of the OLM, which also includes scattered rural settlements (OLM, 2015a) (see Figure 1). The OLM covers an area of 353 755 ha and is occupied by 95 933 residents in 21 910 households, according to the 2011 Census, whereas Oudtshoorn comprises 3 696 ha (OLM, 2015b: 16), with a total population of roughly 61 500 residents, classifying it as a small- to medium-sized town (OLM, 2015a: 15). Nearly 80% of the White population still resides in the original town of Oudtshoorn, with other racial groups mostly remaining in apartheid-era townships such as Bridgton and Bongoletu (see Figure 2) and dispersed rural settlements (Wisner, Pelling, Mascharenhas, Holloway, Ndong, Faye, Ribot & Simon, 2015: 174). Consequently, the poorest citizens are still denied equitable access to the socio-economic opportunities pledged under the promise of democracy (OLM, 2015b: 40).

The democratic age brought political emancipation, yet the OLM has struggled to establish political consistency. Two main political parties have competed for power, resulting in the OLM being placed under administration by the provincial authority to address issues such as soaring municipal debt and service delivery failures. Infrastructure is a particularly sensitive topic in the OLM as Oudtshoorn's bulk infrastructural capacity, related to ultimate service delivery, is under stress. In this regard, both water and sewer reticulation networks are at capacity and no new development can be approved without updated master plans. The existing waste-water treatment works is under stress, presenting spare hydraulic capacity, but with biological capacity exceeded. The electricity network is also at full capacity. Master plans are outdated and exclude recent developments and exact loading on electrical infrastructure and spare capacity cannot be determined accurately.

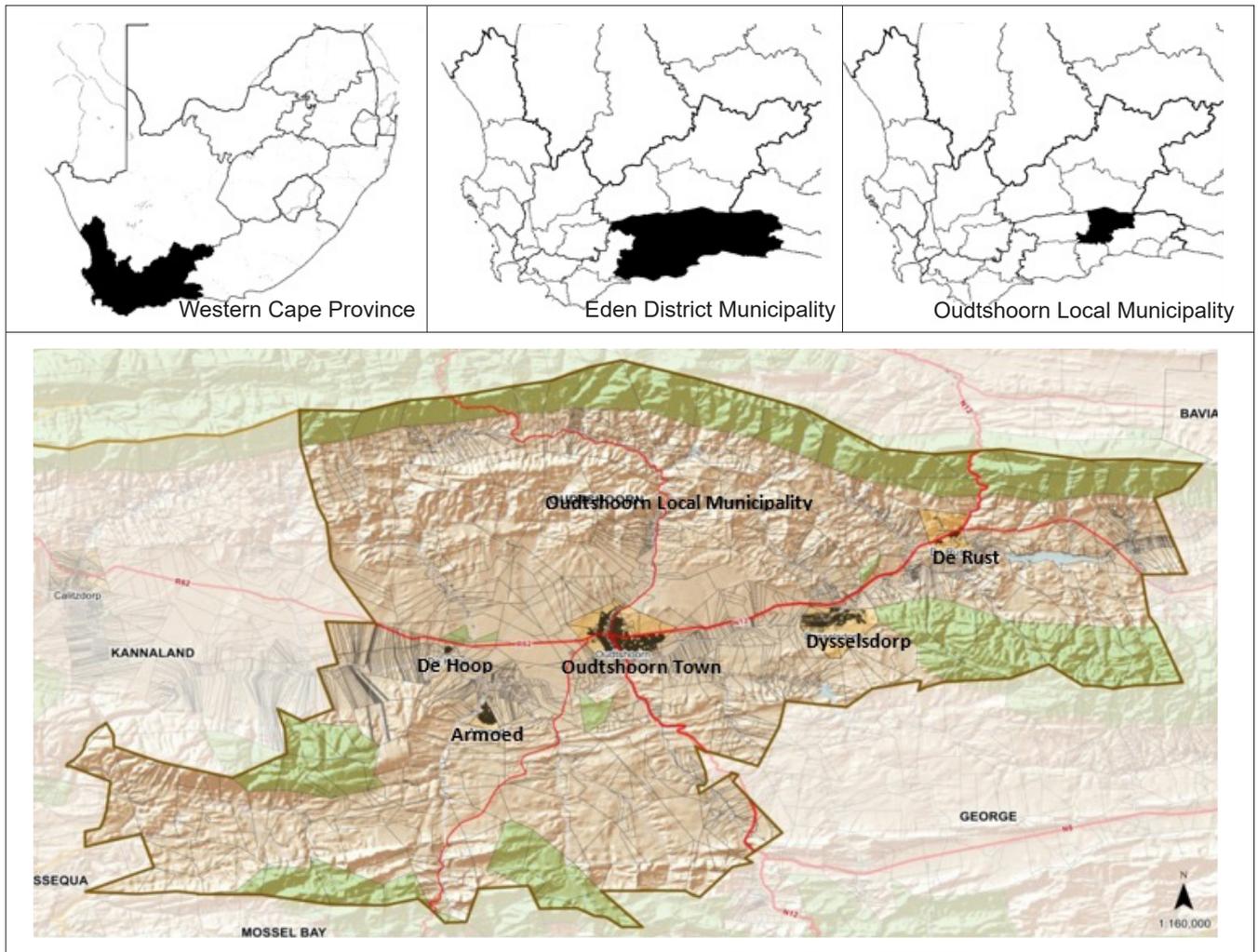


Figure 1: The OLM within South Africa

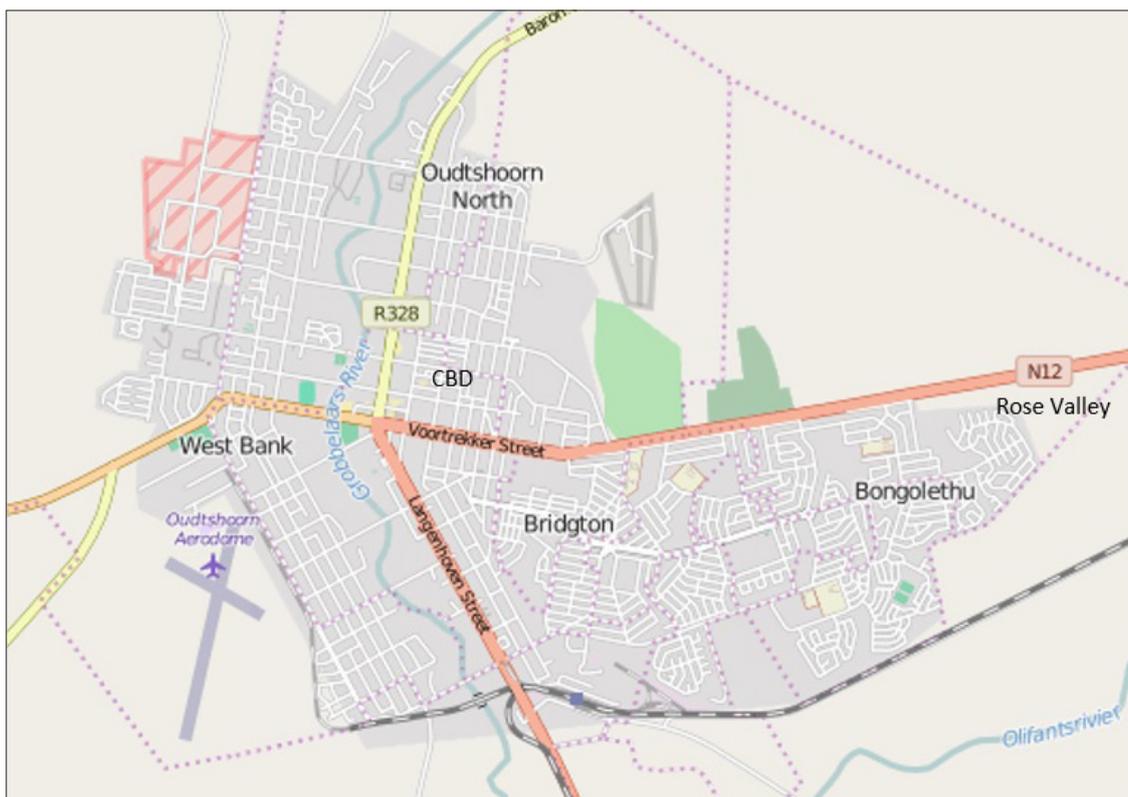


Figure 2: The spatial layout of Oudtshoorn town

Development decisions are thus made without a clear long-term strategy on network expansion or capacity, and urgent upgrades are needed. Furthermore, the town's time-worn subterranean infrastructure has eroded road surfaces; potholes are common, with gravel roads servicing much of Oudtshoorn's township areas (WCPT, 2014; OLM, 2015a: 13). Inadequate infrastructure capacity will severely influence future residential, commercial and industrial development. Of these, residential development is of particular concern when the housing demand for the OLM and subsequent servicing demands are considered. The following section reflects on housing demand in the OLM.

3.3 Housing demand in the Oudtshoorn Local Municipality

Determining Oudtshoorn's housing demand was somewhat challenging. The municipal housing waiting list reflected 14 517 names in 2015 (WCHS, 2015: 4), while Gold (2015) estimated that housing demand was closer to 16 000. The total number of inadequately housed households (those in informal dwellings, informal backyard structures, and overcrowded dwellings) was recorded as 3 942 (WCHS, 2015: 7). Seemingly based more on this figure, the Oudtshoorn Spatial Development Framework (OSDF) (2015) states that there is a need to make land available to accommodate a potential demand of 6 000 new housing units, as 3 000 low-income and 3 000 middle-income dwellings by 2020 (OSDF, 2015: 54). In spite of recognising a demand of only 6 000 units, the OSDF provides spatial planning for an additional 16 000 new housing opportunities without referencing the housing waiting list or motivating why such vast areas are set aside for future housing development (OLM, 2015a). For the Western Cape Department of Human Settlements, the discrepancy between numbers recorded for inadequate housing and Housing Demand Database figures may be attributed to an overestimate on the database, significant growth

since the Census, or errors in the interpretation and manipulation of Census figures to calculate housing status. Most worrying perhaps is that the Department states that, regardless of the large contradiction in figures, "these two figures provide useful ranges for the planning of human settlement interventions" (WCHS, 2015: 24). This article accepts housing demand as the number of persons registered on the official housing database, as these names constitute demand regardless of the number of households currently residing informally or inadequately. Municipal officials (Christian, 2012; Gold, 2015) also provided figures corresponding more closely with database figures. The collective capacity of areas demarcated for housing in the future by the OSDF further seem to support housing database figures despite other contentions held therein.

The OLM currently delivers between 250 (Christian, 2012) and 300 (Gold, 2015) new subsidy units per annum. Accepting an average of 275 units per year and a subsidised housing demand of approximately 14 517 units, it would take over 52 years to comply with demand, discounting an annual increase in demand of 6% to 7% (Gold, 2015). Housing demand has been expressed most urgently in recent times by the establishment of a substantial informal settlement on Oudtshoorn's periphery, as discussed accordingly.

3.4 Informal settlement in Oudtshoorn – from Riemvasmaak to Rose Valley

Oudtshoorn's housing demand reached breaking point in 2010, when a major informal settlement was established following a land invasion on Oudtshoorn's south-eastern boundary (see Figure 2). The informal settlement was initially known as Riemvasmaak, but has now been baptised Rose Valley (Lategan & Cilliers, 2013: 306). The Rose Valley site was incorporated into Oudtshoorn's urban edge in the 1980s (Lee, 2012; Westen, 2013), then intended for low-income housing. By founding a new

settlement here, settlers effectively supported apartheid-era spatial planning that banished Oudtshoorn's non-White residents to an expanding urban periphery on the town's eastern boundary. The actions of informal settlers could be excused as ignorant, perpetrated out of desperation to access housing and claim their Lefebvrian right to the city. Rose Valley was certainly established from such motivations, but another more obscure force was also at play. Many Rose Valley settlers were reportedly lured by politicians who promised housing in exchange for political support (Westen, 2013: interview). These promises were not left unfulfilled. By 2015, the first stage of the Rose Valley housing project was under way, perpetuating apartheid development under the banner of post-apartheid housing and service delivery. The project was justified by South Africa's informal settlement upgrading programme (ISUP) and the incremental upgrade of informal settlements accordingly (OLM, 2015a: 54).

Rose Valley is developed by ASLA, following what is best described as RDP principles (Lee, 2012). The project delivers detached housing units in a layout that provides 966 residential stands, a large school, library, police station, two crèches, three churches, six public open space stands, and two business-use stands. In addition, Rose Valley is linked to Oudtshoorn and its commercial and employment opportunities by an added entrance on the N12 motorway and a public transport route to be operated by minibus taxis (Westen, 2013). Phase one of the Rose Valley extension has now been completed, delivering 299 units. Phase two will provide 335 units, while Phase three is planned to deliver 332 units and enhanced service sites (Dickens, 2016). Residential stands are delivered at an average 150m² (Dickens, 2016), with dwellings constituting 40m² and consisting of two bedrooms, one bathroom and an open plan living-kitchen area (Daughters, 2015). Despite claims in the OSDF, Dickens (2016) maintains that Oudtshoorn's bulk infrastructure has sufficient

capacity to cope with phases one to three of the Rose Valley extension.

Rose Valley is of value to this article, not only because it perpetuates urban sprawl, but also considering where the majority of Rose Valley's settlers migrated from. The Rose Valley survey (2012) found that 61% of the respondents relocated to Rose Valley from the backyards of formal dwellings elsewhere in Oudtshoorn, with the majority of those (68.85%) coming from the townships of Bridgton (52.46%) and Bongoletu (16.39%). On its part, the Rose Valley extension may remain exclusively formal with some difficulty, as new RDP settlements provide new locations for backyard tenancy (Lemanski, 2009: 474; Shapurjee & Charlton, 2013: 663), instigating the 're-informalisation' of formal housing and the overburdening of service networks (Tshangana, 2013: 11). Robins (2002: 516) likens the way informal backyard rentals emerge from the settling dust in new housing schemes to the fortitude of the mythical phoenix. In the Rose Valley survey (2012), 39% of the respondents foresaw that informal backyard rentals would be included in their survival strategies once they received their subsidised homes. Backyard densification has, in fact, already started, with Dickens (2016) stating that new shacks were being erected in Rose Valley as the first construction phase was under way. These shacks were addressed

by the OLM's legal department and removed, as they lacked municipal approval (Daughters, 2015).

The next section investigates the case study area as the origin of many Rose Valley settlers and an area still accommodating a significant backyard tenant population.

3.5 The Bridgton and Bongoletu study area

The study area (see Figure 3) was selected based on Rose Valley findings on the origin of settlers and concentrated in a central part of both the Bridgton and Bongoletu townships, well-known as a community hub owing to landmark features such as the Bridgton Pavilion, Bridgton Post Office and Bongoletu Public Library, with a high concentration of informal backyard dwellings. Morange (2002: 10) found that in Port Elizabeth's Walmer township "... most backyard shacks concentrate in the 'old location', around the heart of the township: the community centre ...", as also reflected in the study area.

The following section mainly reports on the findings of the Bridgton/Bongoletu survey (2015) in terms of number of respondents reached, the size of main and backyard dwellings, dwelling unit and population densities, and service access, with other surveys and interviews cited where appropriate.

3.5.1 Results and discussion based on Bridgton/Bongoletu case study findings

i. Introduction and demographic findings

The Bridgton/Bongoletu survey (2015) reached 244 households, as 103 (42.21%) main households and 141 (57.79%) informal backyard households. Of these, 223 were represented in questionnaires, as 103 (46.19%) main households and 120 (53.81%) informal backyard households. The 223 households accommodated 1 023 persons, 577 (56.40%) in main dwellings and 446 (43.60%) in informal backyard structures. An average of 5.60 people ($s=2.928$) were housed in main dwellings, whereas a mean of 3.72 ($s=1.74$) were accommodated in each informal backyard structure.

If we accepted Census 2011 data indicating a total of 990 informal backyard dwellings in the OLM (WCHS, 2015), then this study reached 14.24% ($n=141$) of all backyard households. However, accepting this is problematic as this figure discounts growth in the sector post 2011 and would imply that 14.24% of backyard dwellings were located in the backyards of 0.47% ($n=103$) of the OLM's 21910 households.

This seems unlikely, given the proliferation of informal backyard dwellings throughout the town's

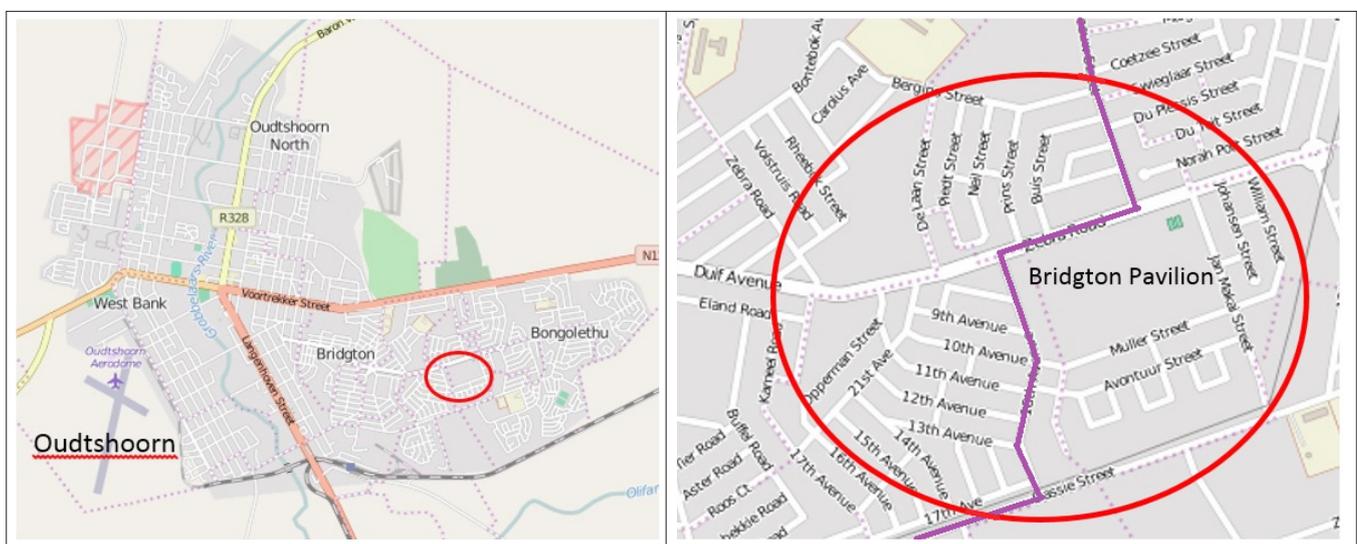


Figure 3: The Bridgton/Bongoletu case study area

low-income suburbs, evident in satellite imagery and site visits. The Census figure is further queried considering the extent of the OLM's housing waiting list and that the database does not include all backyard dwellers. It is common nationally for many informal backyard tenants not to be registered on the housing waiting list (Carey, 2009: 11). In the Bridgton/Bongoletu survey (2015), only 70.8% of backyard households were represented on the housing waiting list. This article thus concurs with others who relayed that informal backyard rentals have been underreported in both official surveys and the National Census (Carey, 2009: 12; Watson, 2009: 5; Shapurjee *et al.*, 2014: 22). Underrepresentation on the housing waiting list and underreporting in the National Census suggest that the total number of informal backyard structures and tenants in Oudtshoorn might be considerably higher than reflected on municipal spreadsheets and that real numbers remain unclear (Daughters, 2015). Regardless of numbers, backyard structures tend to display some general characteristics.

ii. The structures themselves

The majority of informal backyard structures in Oudtshoorn consist of one to two rooms (Daughters, 2015), with the informal dwellings surveyed presenting an average of 1.87 ($s=1.053$) rooms per structure. Of backyard dwellings, 46.7% of structures presented one room, followed by two rooms at 30.8%, and three rooms at 14.2%. Only 15.5% of backyard structures presented more than four rooms, with one showing seven rooms. In total, informal backyard dwellings provided 224 rooms, with an average of two persons per backyard room. Cramer's V test provided an effect size of 0.374 ($p=0$), indicating a practical visible significant association and medium effect between number of people and rooms per backyard structure. Thus, more rooms generally equalled more people.

Landlord dwellings presented an average of 4.87 rooms per structure, including bathrooms, providing 502

rooms in total and an average of 1.5 persons per room. For main dwellings, Cramer's V test provided an effect size of 0.277 ($p=0.199$), indicating small to medium effect between number of people residing in the main house and number of rooms provided. The mean of all households included ($n=223$) produced an average of 1.82 persons per room ($s=1.27$). Comparing the results of Cramer's V test for main and tenant households for number of people residing and number of rooms provided, a relatively small difference in effect size was observed, with backyard structures displaying a larger effect size. This is expected, given that backyard dwellings are constructed around the needs of tenants, whereas main homes are fairly uniform housing products that, in the majority of instances, had not been extended.

iii. Findings related to dwelling unit and population densities

The Bridgton/Bongoletu survey (2015) revealed that respondent properties showed a mean of 1.37 ($s=0.7$) informal backyard rental structures per stand. The majority (73.8%) of the properties presented one informal backyard structure, whereas 8.7% showed three or more backyard structures. No respondents reported more than four informal backyard structures. Net residential density (see section 2.2) was employed to calculate dwelling units and population per hectare by dividing the total number of units and occupants presented by the total area of the stands included, following Brewer and Grant (2015). Stand sizes in the Bridgton/Bongoletu survey (2015) showed a mean of 315.11m^2 ($s=44.096$) and ranged from 214m^2 to 513m^2 (based on the 81 properties for which this data was available). Extrapolating a mean stand size of 315.11m^2 to all 103 properties yielded a total area estimated at $32\,456\text{m}^2$, or 3.25 ha. Density as total number of dwellings per land area could then be expressed as 244 dwellings per 3.25 ha or 75 dwellings per ha. Without informal backyard dwellings, density would be 103 dwellings per 3.25 ha, or 32 dwellings per ha. Thus,

informal backyard dwellings more than doubled dwelling unit densities. Considering population density for the 223 households represented in the Bridgton/Bongoletu survey (2015), a total population of 1 023 persons in both main and tenant households related to 1 023 people per 3.25 ha, or 315 people per ha. If figures were extrapolated to the 21 backyard dwellings unrepresented in questionnaires, this figure could increase to an estimated 339 people per ha, based on a mean population of 3.72 persons per backyard dwelling synthesised from the data. Without backyard tenants, the total population density would be 178 people per ha.

These findings are significant, yet inaccurate, in capturing the true extent of backyard densification. The Bridgton/Bongoletu survey (2015) included only properties that presented backyard dwellings and thus logically provided that dwelling unit densities were doubled and population densities increased substantially. To overcome this bias, the Bridgton/Bongoletu survey (2013) may be of value. This survey included 101 properties surrounding the Bridgton Pavilion, irrespective of whether properties accommodated backyard tenants or not. Data showed that 53% of the respondent properties presented informal backyard rental structures. Of the 172 households included, 101 (58.72%) were main dwellings and 71 (41.28%) were informal backyard structures. This survey excluded stand numbers and stand sizes could thus not be retrieved. However, assuming an average of 315.11m^2 (as provided above), this survey provided a dwelling unit density of 172 dwelling units per 3.18 ha or 54 dwelling units per ha. Without informal backyard structures, density would be 101 dwelling units per 3.15 ha, or 32 dwellings per ha. This survey included 510 people in main dwellings and 198 people in backyard accommodation. As a result, a total population density of 223 people per ha was recorded, which, without informal backyard tenancy, would be 160 people per ha. Surveys are synthesised in Table 2 for ease of comparison.

Table 2: Summary of density findings for the Bridgton/Bongolethu surveys

	Bridgton/Bongolethu survey (2013)	Bridgton/Bongolethu survey (2015)
Total dwelling units	172 dwelling units	244 dwelling units
Total main dwelling units	101 dwelling units	103 dwelling units
Total backyard dwellings	71 dwelling units	141 dwelling units
Total area	3.18 ha	3.25 ha
Du/ha total	54 dwelling units per ha	75 dwelling units per ha
Dwelling units per ha without backyard dwellings	32 dwelling units per ha	32 dwelling units per ha
Total population per ha	223 people per ha	315-339 people per ha
Population per ha without backyard tenants	160 people per ha	178 people per ha

According to Table 2, informal backyard rentals increased both dwelling unit and population per ha considerably in both surveys. Without backyard dwellings, the area would display dwelling unit densities below that of new low-income housing projects developed under state subsidies of approximately 40 dwelling units per ha. The following section is dedicated to the impacts of the case study's backyard densification on issues related to urban sprawl, as discussed in section 2.1.

iv. Reflections on sprawl issues

The value of backyard densification in counteracting urban sprawl is further highlighted by the socio-economic characteristics of those in low-income housing. The Bridgton/Bongolethu survey (2015) found that the majority of landlord and tenant households reported a monthly household income between R1 001 and R1 500. Consequently, private vehicle ownership was extremely low, with 10.7% of the main households and 5.8% of the backyard households reporting private vehicle ownership. The vast majority of respondents thus relied on the goodwill of others, walking or expensive minibus taxis to reach destinations. In South Africa, commuters who use minibus taxis may spend an average

26% of their income on commuting (Kerr, 2015: 16). Given the low levels of private vehicle ownership, especially in the informal backyard rental sector, the effects of relocating tenants to new low-income housing projects on the periphery, such as Rose Valley, were again stressed.

The survey (2015) further showed that backyard tenure was stable and secure. Backyard tenants reported occupying their structures for a mean of six and a half years, echoing findings in other studies (Morange, 2002; Carey, 2009; Lemanski, 2009; Watson, 2009). As such, the sudden settlement of Rose Valley underscores the real influence of political manipulation and the allure of home ownership. The survey (2015) found that 75.8% of the backyard respondents would only leave current accommodation in favour of home ownership. The Rose Valley invasion thus further evidences the challenges related to backyarding as a popular, but unideal form of accommodation. In this instance, the negatives of increased densities (see Table 1) may come into play and be intensified under low-income, mainly unemployed populations (Cameron, 2015). Of these negatives, overcapacitating infrastructure networks is a main concern, especially where existing bulk infrastructure is already under

stress, as experienced in Oudtshoorn (see section 3.2).

The following section examines infrastructure access for backyard tenants in the case study to underscore the potential impacts informal backyard tenants may have on bulk capacity.

v. Infrastructure considerations and service access

The Bridgton/Bongolethu survey (2015) revealed high levels of service access for backyard households. As such, 80.8% of the backyard respondents had access to electricity, with 77.5% accessing power *via* informal connections from the main home. The remaining 4.3% were serviced by a formal connection. Nearly all (98.3%) backyard respondents claimed access to basic sanitation, 6.7% *via* an external, communal lavatory, reflecting practice in older apartheid and some RDP developments to provide ablution facilities outside the house (Gardner, 2009: 22). The majority (89.2%) accessed a lavatory in the main house. For refuse removal, 96.7% of the backyard respondents relied on municipal waste removal. Data showed that 97.5% of the backyard respondents had access to water, 59.2% through a communal tap on the property, and 40% through a tap in the main dwelling. Table 3

Table 3: Service access for backyard respondents in study area vs average access in the Oudtshoorn Local Municipality

	Bridgton/Bongolethu survey (2015)	Average for Oudtshoorn Local Municipality	% difference
Electricity	80.8%	85.3%	-4.5%
Sanitation	98.3%	77.2%	21.1%
Refuse removal	96.7%	78%	18.7%
Piped Water	97.5%	74.5%	23%
Aggregate %			14.56%

Source: Own construction based on OLM (2015b)

synthesises levels of service access from the survey (2015) versus average levels of service access for the OLM.

Table 3 shows that the informal backyard households surveyed enjoyed improved service access, at an aggregate of 14.56%, compared to averages for the OLM, with the exception of access to electricity. In a broader sense, only 4.6% of the informal backyard households go completely unserved in the OLM when access to water, electricity and sanitation are combined as a single indicator (WCHS, 2015: 21). Other studies have confirmed that backyard tenants generally enjoy excellent access to basic services (Gardner, 2009: 27; Lemanski, 2009: 477; Shapurjee & Charlton, 2013: 660). Note that these levels of service access are not guaranteed, with examples from around South Africa where some backyard dwellings are consistently unable to access formal ablutions and potable water (Rubin & Gardner, 2013: 21).

4. CONCLUSION

This article has added to the pool of established literature on core planning concepts such as urban sprawl and density, accepting that low residential densities contribute to urban sprawl at the cost of urban compaction and sustainability. The review of post-apartheid South Africa and related planning literature showed that the country has failed to deliver integrated human settlements, instead producing sprawling, low-density settlements that replicate an apartheid geography, conflicting with sustainable development aspirations (Turok, 2016b: 11). Literature findings were reflected in the case study of Oudtshoorn. In this instance, a new low-density low-cost housing project has been located on the fringe of an apartheid-era township, as the Rose Valley extension, in response to a crippling housing demand of over 14 500 units. Rose Valley and its upgrade into a standard low-cost housing project represents a microcosm of South Africa's low-cost housing sector, encapsulating aspects such

as extreme housing demand, informal land invasion, formalisation, limited delivery capacity, low-density housing development, urban sprawl, and, importantly, issues related to informal backyard accommodation. The latter related to Rose Valley in the number of settlers who previously occupied informal backyard rentals, particularly in the more centrally located Bridgton and Bongoletu townships, and the renewed opportunities for backyard densification the extension will present, even as more aggressive action in preventing illegal construction and small stand sizes seem to signify a more restrictive attitude towards future informal backyard infill.

The literature emphasised the value of informal backyard accommodation in densifying otherwise very low-density townships, tested in the empirical section of this article by means of an analysis of data from the Bridgton/Bongoletu surveys (2013 and 2015). Quantifying the level of densification in the case study showed that informal backyard dwellings had increased dwelling unit density by at least 68.75% and augmented population density by at least 39.38%. Consequently, informal backyard rentals house a considerable number of tenants who would otherwise occupy land informally on a sprawling urban periphery, such as Rose Valley, within the existing urban footprint where they use existing services.

However, as shown in the literature, the shared use of infrastructure is cause for concern when infrastructural capacity is considered for the majority of low-income subsidised housing suburbs. In the Bridgton/Bongoletu case and for Oudtshoorn in general, backyard tenants enjoy excellent access to services, thus placing substantial pressure on Oudtshoorn's infrastructure in a context where all bulk services are functioning at full capacity and may already be overextended, exacerbated in circumstances of high municipal debt and existing service delivery failures.

In addition to excellent service access, research revealed that

informal backyard tenants in the case study generally enjoy security of tenure. As such, the mass exodus to Rose Valley indicates that backyard structures are far from ideal, that home ownership is a significant draw, and that backyarders are vulnerable to political manipulation. Rose Valley testifies to the importance of supporting and sustaining the informal backyard rental sector, if only to thwart urban sprawl by similar schemes in the future. Such initiatives will depend on accurate data regarding backyard-housing numbers for which this article has shown that the Census data may be inadequate.

Accordingly, it is recommended that local authorities, in particular, undertake informal backyard sector surveys and infrastructural evaluations to determine the status quo and take appropriate action based thereupon, ultimately bringing backyard dwellings out of the shadows of obscurity, as *terra incognita*, and placing them at the centre of future planning initiatives.

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REFERENCES LIST

- BANK, L. 2007. The rhythms of the yards: Urbanism, backyards and housing policy in South Africa. *Journal of Contemporary African Studies*, 25(2), pp. 205-228. <https://doi.org/10.1080/02589000701396298>
- BOYKO, C.T. & COOPER, R. 2011. Clarifying and re-conceptualising density. *Progress in Planning*, 76, pp. 1-61. <https://doi.org/10.1016/j.progress.2011.07.001>
- BREWER, K. & GRANT, J.L. 2015. Seeking density and mix in the suburbs: Challenges for mid-sized cities. *Planning Theory and Practice*,

- 16(2), pp.151-168. <https://doi.org/10.1080/14649357.2015.1011216>
- BROITMAN, D. & KOOMEN, E. 2015. Residential density change: Densification and urban expansion. *Computers, Environment and Urban Systems*, 54(November), pp. 32-46. <https://doi.org/10.1016/j.compenvurbsys.2015.05.006>
- BROWNSTONE, D. & GOLOB, T.F. 2009. The impact of residential density on vehicle usage and energy consumption. *Journal of Urban Economics*, 65(1), pp. 91-98. <https://doi.org/10.1016/j.jue.2008.09.002>
- BRUNNER, A. 2012. *The effects of urban sprawl on daily life*. South Carolina State University.
- CAMERON. City of Cape Town. Personal interview on 25 February 2015.
- CAREY, S. 2009. Investigation into the proliferation of low-income private rental housing supply, and the development of recommendations concerning appropriate interventions/ responses. Social Housing Foundation, Urban Landmark, pp. 1-36.
- CARRUTHERS, J.I. & ULFARSSON, G.F. 2003. Urban sprawl and the cost of public services. *Environment & Planning B: Planning & Design*, 30(4), pp. 503-522. <https://doi.org/10.1068/b12847>
- CASH, C. 2014. Towards achieving resilience at the rural-urban fringe: The case of Jamestown, South Africa. *Urban Forum*, 25(1), pp. 125-141.
- CHHETRI, P., HAN, J.H., CHANDRA, S. & CORCORAN, J. 2013. Mapping urban residential density patterns: Compact city model in Melbourne, Australia. *City, Culture and Society*, 4, pp. 77-85. <https://doi.org/10.1016/j.ccs.2013.03.001>
- CHOBOKOANE, N. & HORN, A. 2015. Urban compaction and densification in Bloemfontein, South Africa: Measuring the current urban form against Mangaung Metropolitan Municipality's spatial planning proposals for compaction. *Urban Forum*, 26(1), pp. 77-93.
- CHRISTIAN. Oudtshoorn Local Municipality. Personal interview on 6 July 2012.
- CHURCHMAN, A. 1999. Disentangling the concept of density. *Journal of Planning Literature*, 13(4), pp. 389-411. <https://doi.org/10.1177/08854129922092478>
- CITIES ALLIANCE. 2002. *Cities without slums. Cities Alliance annual report*. Washington, DC: Cities Alliance.
- CRANKSHAW, O., GILBERT, A. & MORRIS, A. 2000. Backyard Soweto. *International Journal of Urban & Regional Research*, 24(4), pp. 841-857. <https://doi.org/10.1111/1468-2427.00282>
- DAUGHTERS. Oudtshoorn Local Municipality. Personal interview on 7 October 2015.
- DICKENS. ASLA Devco. Personal interview on 8 February 2016.
- DU PLESSIS, D.J. 2014. A critical reflection on urban spatial planning practices and outcomes in post-apartheid South Africa. *Urban Forum*, 25(1), pp. 69-88. <https://doi.org/10.1007/s12132-013-9201-5>
- EWING, R., PENDALL, R. & CHEN, D. 2002. Measuring sprawl and its impact. Report by SmartGrowth America, Washington.
- FORSYTH, A., OAKES, J.M., SCHMITZ, K.H. & HEARST, M. 2007. Does residential density increase walking and other physical activity? *Urban Studies*, 44(4), pp. 679-697. <https://doi.org/10.1080/00420980601184729>
- FULTON, W., PENDALL, R., NGUYEN, M. & HARRISON, A. 2001. *Who sprawls most? How growth patterns differ across the US*. Washington, D.C.: The Brookings Institution.
- GARDNER, D. 2009. Strategy for increasing supply of small-scale private dwelling rental in South Africa. Social Housing Foundation, Urban Landmark, pp. 1-31.
- GLAESER, E. & SIMS, H. 2015. *Contagion, crime and congestion: Overcoming the downsides of density*. London: International Growth Centre.
- GOEBEL, A. 2007. Sustainable urban development? Low-cost housing challenges in South Africa. *Habitat International*, 31(3-4), pp. 291-302. <https://doi.org/10.1016/j.habitatint.2007.03.001>
- GOLD. Oudtshoorn Local Municipality. Personal interview on 13 October 2015.
- HAFERBURG, C. 2013. Townships of tomorrow? Cosmo City and inclusive visions for post-apartheid urban futures. *Habitat International*, 4(39), pp. 261-268. <https://doi.org/10.1016/j.habitatint.2012.10.014>
- HARRISON, P. & TODES, A. 2015. Spatial transformations in a "loosening state": South Africa in a comparative perspective. *Geoforum*, 61(May), pp. 148-162. <https://doi.org/10.1016/j.geoforum.2015.03.003>
- HASHIM, Y.A. 2010. Determining sufficiency of sample size in management survey research activities. *International Journal of Organisational Management & Entrepreneurship Development*, 6(1), pp. 119-130.
- INOSTROZA, L., BAUR, R. & CSAPLOVICS, E. 2013. Urban sprawl and fragmentation in Latin America: A dynamic quantification and characterization of spatial patterns. *Journal of Environmental Management*, 115, pp. 87-97. <https://doi.org/10.1016/j.jenvman.2012.11.007>
- JAY, I. & BOWEN, P. 2011. What residents value in low-cost housing schemes: Some South African concepts. *Building Research & Information*, 39(6), pp. 574-588. <https://doi.org/10.1080/09613218.2011.617082>
- JÜRGENS, U., DONALDSON, R., RULE, S. & BÄHR, J. 2013. Townships in South African cities – Literature review and research perspectives. *Habitat International*, 39, pp. 256-260. <https://doi.org/10.1016/j.habitatint.2012.10.011>
- KERR, A. 2015. Tax(i)ng the Poor? Commuting costs. *South Africa Labour and Development Research Unit Working Paper*. Cape Town: University of Cape Town.
- KLUG, N., RUBIN, M. & TODES, A. 2013. Inclusionary housing policy: A tool for re-shaping South Africa's spatial legacy? *Journal of Housing and the Built Environment*, 28(4), pp. 667-678. <https://doi.org/10.1007/s10901-013-9351-8>
- LATEGAN, L.G. & CILLIERS, E.J. 2013. South Africa's informal backyard rental sector: Linkages with smart growth and sustainability concepts. In: Zubir, S.S. & Brebbia, C.A. (Eds). *Proceedings of the Sustainable City VIII*, 3-5 December, Putrajaya, Malaysia. Ashurst: South Hampton: WIT Press, pp. 303-314.
- LATEGAN, L.G. & CILLIERS, E.J. 2014. The value of public green spaces and the effects of South Africa's informal backyard rental sector. In: Marchettini, N., Brebbia, C.A., Pulselli, R. & Bastianoni, S. *Proceedings of the Sustainable City IX*, 23-25 September, Siena, Italy. Ashurst: South Hampton:

- WIT Press, pp. 427-440. <https://doi.org/10.2495/sc140361>
- LEE. Oudtshoorn Local Municipality. Personal interview on 10 July 2012.
- LEMANSKI, C. 2009. Augmented informality: South Africa's backyard dwellings as a by-product of formal housing policies. *Habitat International*, 33(4), pp.472-484. <https://doi.org/10.1016/j.habitatint.2009.03.002>
- LINARD, C., TATEM, A.J. & GILBERT, M. 2013. Modelling spatial patterns of urban growth in Africa. *Applied Geography*, 44, pp. 23-32. <https://doi.org/10.1016/j.apgeog.2013.07.009>
- LOMBARD, M. & HUXLEY, M. 2011. Self-made cities: Ordinary informality? *Planning Theory & Practice*, 12(1), pp. 120-125.
- MAMMON, N. & EWING, K. 2009. Moving towards a design approach to low-income housing in urban Cape Town: The case of Joe Slovo Park. In: *Proceedings of the 33rd IAHS World Congress on Housing*, 27-30 September, Pretoria, South Africa, CD-ROM. 2009-06-04T12:49:41Z.
- MASSYN, M.W., MCGAFFIN, R., VIRULY, F. & HOPKINS, N. 2015. The challenge of developing higher density, affordable housing in the inner city of Cape Town. *International Journal of Housing Markets and Analysis*, 8(3), pp. 412-428. <https://doi.org/10.1108/IJHMA-11-2014-0049>
- MCCONNELL, V.D.K. & WILEY, K. 2010. *Infill development: Perspectives and evidence from economics and planning. Discussion Paper*. Washington, D.C: Resources for the Future.
- MCGAFFIN, R., CIROLIA, L.R. & MASSYN, M.W. 2015. Overcoming the challenge of vertical consolidation in South Africa's low-income settlements: A case study of Du Noon. *Urban Forum*, 26(1), pp. 59-75. <https://doi.org/10.1007/s12132-014-9232-6>
- MEHTA, B. & DASTUR, A. (Eds). 2008. *Approaches to urban slums: A multimedia sourcebook on adaptive and proactive strategies*. WBI Learning Resources Series. Washington, D.C.: World Bank.
- MORANGE, M. 2002. Backyard shacks: The relative success of this housing option in Port Elizabeth. *Urban Forum*, 13(2), pp. 3-25.
- NEL, V. 2016. Spluma, zoning and effective land use management in South Africa. *Urban Forum*, 27(1), pp. 79-92. <https://doi.org/10.1007/s12132-015-9265-5>
- OUDTSHOORN LOCAL MUNICIPALITY (OLM). 2015a. Greater Oudtshoorn Spatial Development Framework, pp. 1-28.
- OUDTSHOORN LOCAL MUNICIPALITY (OLM). 2015b. Oudtshoorn 2nd Integrated Development Plan Review 2014/2015. Oudtshoorn Municipality.
- OSMAN, S., NAWAWI, A.H., ABDULLAH, J. 2008. Urban sprawl and its financial cost: A conceptual framework. *Asian Social Science*, 4(10), pp. 39-50.
- PARNELL, S. & HART, D. 1999. Self-help housing as a flexible instrument of state control in 20th-century South Africa. *Housing Studies*, 14(3), pp. 367-386. <https://doi.org/10.1080/02673039982858>
- POULSEN, L. & SILVERMAN, M. 2006. Design strategies for the densification of low-income housing. *International Journal for Housing Science and Its Applications*, 30(1) (special issue), pp. 19-31.
- REPUBLIC OF SOUTH AFRICA (RSA). 2004. *Breaking new ground: A comprehensive plan for the development of sustainable human settlements*. Pretoria: Department of Human Settlements.
- RICHARDS, R., O'LEARY, B. & MUTSONZIWA, K. 2007. Measuring quality of life in informal settlements in South Africa. *Social Indicators Research*, 81(2), pp. 375-388. <https://doi.org/10.1007/s11205-006-9014-1>
- ROBINS, S. 2002. Planning 'suburban bliss' in Joe Slovo Park, Cape Town. *Africa*, 72(4), pp. 511-548. <https://doi.org/10.3366/afr.2002.72.4.511>
- RODE, P., FLOATER, G., THOMOPOULOS, N., DOCHERTY, J., SCHWINGER, P. & MAHENDRA, A. 2014. *Accessibility in cities: Transport and urban form. NCE Cities Paper 03*. LSE Cities. London School of Economics, pp.1-61.
- RUBIN, M. & GARDNER, D. 2013. Developing a response to backyarding for SALGA, pp. 1-93.
- SHAPURJEE, Y. & CHARLTON, S. 2013. Transforming South Africa's low-income housing projects through backyard dwellings: Intersections with households and the state in Alexandra, Johannesburg. *Journal of Housing and the Built Environment*, 28(4), pp. 653-666. <https://doi.org/10.1007/s10901-013-9350-9>
- SHAPURJEE, Y., LE ROUX, A. & COETZEE, M. 2014. Backyard housing in Gauteng: An analysis of spatial dynamics. *Town and Regional Planning*, Issue 64, pp.19-30.
- SIVAM, A. & KARUPPANNAN, S. 2012. Density design and sustainable residential development. In: Lehmann, S. & Crocker R. (Eds). *Designing for zero waste: Consumption, technologies and the built environment*. New York and London: Earthscan, pp. 267-283.
- SOLÉ-OLLÉ, A. & RICO, M.H. 2010. Does urban sprawl increase the costs of providing local public services? Evidence from spanish municipalities. *Urban Studies*, 47(7), pp. 1513-1540. <https://doi.org/10.1177/0042098009353620>
- SOUTHERN CALIFORNIA ASSOCIATION OF NON-PROFIT HOUSING (SCANPH). 2004. *Density guide for affordable housing developers*. Los Angeles, California: SCANPH.
- STATISTICS SOUTH AFRICA (STATSSA). 2014. *General household survey 2014: P0318*. Pretoria: Statistics South Africa.
- SUKHAI, A. & JONES, A.P. 2014. Urban density, deprivation and road safety: A small area study in the eThekweni metropolitan area, South Africa. *African Safety Promotion Journal*, 12(2), pp. 1-20.
- TSHANGANA, A. 2013. Local government position on municipal responses to backyarders and backyard dwellings. Draft policy proposal. South African Local Government Association, pp. 1-17.
- TUROK, I. 2011. Deconstructing density: Strategic dilemmas confronting the post-apartheid city. *Cities*, 28(5), pp. 470-477. <https://doi.org/10.1016/j.cities.2010.10.003>
- TUROK, I. 2012. Urbanisation and development in South Africa: Economic imperatives, spatial distortions and strategic responses. International Institute for Environment and Development. United Nations Population Fund, pp. 1-66.
- TUROK, I. 2013. Transforming South Africa's divided cities: Can devolution help? *International Planning Studies*, 18(2), pp. 168-187. <https://doi.org/10.1080/13563475.2013.774146>

- TUROK, I. 2016a. Housing and the urban premium. *Habitat International*, 54(3), pp. 234-240. <https://doi.org/10.1016/j.habitatint.2015.11.019>
- TUROK, I. 2016b. South Africa's new urban agenda: Transformation or compensation? *Local Economy*, 31(1-2), pp. 9-27. <https://doi.org/10.1177/0269094215614259>
- TUROK, I. & BOREL-SALADIN, J. 2014. Is urbanisation in South Africa on a sustainable trajectory? *Development Southern Africa*, 31(5), pp. 675-691. <https://doi.org/10.1080/0376835X.2014.937524>
- TUROK, I. & BOREL-SALADIN, J. 2016. Backyard shacks, informality and the urban housing crisis in South Africa: Stopgap or prototype solution? *Housing Studies*, 31(4), pp. 384-409. <https://doi.org/10.1080/02673037.2015.1091921>
- UN-HABITAT. 2003. *The challenge of slums: Global report on human settlements 2003*. London: Earthscan Publications.
- UN-HABITAT. 2013. *State of the world's cities 2012/2013. Prosperity of cities*. New York: Routledge.
- VAN ROOYEN, H. 2010. CSIR provides support in guiding housing and human settlement investment: Human settlements, construction and building. *CSIR Science Scope* (1), pp. 46-47.
- VAN WYK, J. & ORANJE, M. 2014. The post-1994 South African spatial planning system and Bill of Rights: A meaningful and mutually beneficial fit? *Planning Theory*, 13(4), pp. 349-369. <https://doi.org/10.1177/1473095213511966>
- WESTEN. Oudtshoorn Local Municipality. Personal interview on 14 August 2013.
- WATSON, V. 2009. Strategic literature assessment for informal rental research project. Report to the Social Housing Foundation, pp. 1-26.
- WESTERN CAPE HUMAN SETTLEMENTS (WCHS). 2015. Municipal human settlement demand profile. Oudtshoorn Local Municipality, pp. 1-36.
- WISNER, B., PELLING, M., MASCHARENHAS, A., HOLLOWAY, A., NDONG, B., FAYE, P., RIBOT, J. & SIMON, D. 2015. Small cities and towns in Africa: Insights into adaptation challenges and potentials. In: Pauleit, S., Coly, A., Fohlmeister, S., Gasparini, P., Jørgensen, G., Kabisch, S., Kombe, W.J., Lindley, S., Simonis, I. & Yeshitela, K. (Eds). *Urban vulnerability and climate change in Africa. Future City 4*, pp. 153-196. https://doi.org/10.1007/978-3-319-03982-4_5
- YUE, W., LIU, Y. & FAN, P. 2013. Measuring urban sprawl and its drivers in large Chinese cities: The case of Hangzhou. *Land Use Policy*, 31(March), pp. 358-370. <https://doi.org/10.1016/j.landusepol.2012.07.018>
- ZWAIG, P.J. 2015. Everyday hazards and vulnerabilities amongst backyard dwellers: A case study of Vredendal North, Matzikama Municipality, South Africa. *Jàmba: Journal of Disaster Risk Studies*, 7(1), pp.1-8. <https://doi.org/10.4102/jamba.v7i1.210>