Abstract
This research reflects on planning for urban green space and the related impact of informal backyard rental densification in South Africa, based on the ‘compensation hypothesis’. Informal backyard dwellings may increase densities substantially, occupying private green space, but often without reciprocal increases in public urban green space area. According to the compensation hypothesis, residents with limited access to private green space are more likely to seek compensation elsewhere. This research employs qualitative and quantitative analyses to investigate access to, and use of green spaces in the Bridgton and Bongolethu townships, Oudtshoorn. Findings disprove the compensation hypothesis, showing that proximity public green spaces are used sporadically, not correlating to increased densities. The number of backyard dwellings does not result in compensation behaviour, but an increased number of backyard tenants affect perceptions of green space availability and privacy. Although the compensation hypothesis is disproved in this case, findings probe the need to reconsider urban green space planning within low-cost areas, particularly considering densification impacts, linked to quality of life. As such, accessibility to public green spaces, as well as their function and form should be questioned as part of broader spatial planning approaches.

Key words: Compensation hypothesis, ecosystem services, informal backyard rentals, urban green space

1. INTRODUCTION
Urban green space, as part of urban green infrastructure (Tzoulas Korpela, ...
Venn, Yli-Pelkonen, Kazmierczak & Niemela 2007: 139; Harrison, Bobbins, Culwick, Humby, La Mantia, Todes & Weakley, 2014: 67; Nolon, 2016: 1), is an invaluable resource in any human settlement, delivering various life-sustaining services (MEA, 2005; Daily, Polasky, Goldstein, Kareiva, Mooney, Pejchar, Ricketts, Salzman & Shallenberger, 2009: 21; Cilliers & Cilliers, 2015: 1; Cilliers & Cilliers, 2016: 9; Lindemann-Matthies & Brieger, 2016: 33). As such, this article departs by defining urban green space and unpacking related services, invoking the concepts of ecosystem services and disservices, and exploring related environmental, economic and social benefits. Whilst the significance of urban green space in terms of ecosystem services, environmental, economic and social benefits has been recognised for some time (Costanza, d’Arge, De Groot, Farber, Grasso, Hannon, Limburg, Naeem, O’Neill, Paruelo, Raskin, Sutton & Van den Belt, 1997; Bolund & Hunhammar, 1999; Kabisch, 2015: 557), urban green space remains an endangered resource, vulnerable to urbanisation pressures and attempts to densify and consolidate human settlements (Barbosa, Tratalos, Armsworth, Davies, Fuller, Johnson & Gaston, 2007: 187; McConnachie & Shackleton, 2010: 245; Chen & Hu, 2015: 33; Haaland & Van den Bosch, 2015: 760; Kabisch, Qureshi & Haase 2015: 26). This article explores this vulnerability in South Africa’s low-income housing context, as the country is recognised as one of the most urbanised countries in Africa, with an estimated 73.3% of the population to be urbanised by 2030, in addition to a crippling housing demand, currently projected at 2.3 million units (Turok & Borel-Saladin, 2014: 5). The results of such development pressures are varied, primarily defined by informal settlements, state-subsidised housing projects that display relatively low levels of urban green space provision, and the informal backyard rental sector. The informal backyard rental sector has become a prolific and growing component of South Africa’s post-apartheid housing landscape (Rubin & Gardner, 2013: 28; Shapurjee, Le Roux & Coetzee, 2014: 20). Informal backyard rentals have substantially increased both population and dwelling unit densities across the country (Shapurjee & Charlton, 2013: 663; Turok & Borel-Saladin, 2015: 5; Lategan & Cilliers, 2016), densifying backyard gardens in historic townships and new subsidised housing projects. These unsanctioned densification practices have continued without policy guidance (Lemanski, 2009: 475; Tshangana, 2013: 10), and have gained relatively little traction from researchers (Turok & Borel-Saladin, 2015: 10). Urban green space planning and use is one aspect that has been especially neglected in relation to informal backyard rentals. This research is the first of its kind to explicitly address urban green space planning and use with regard to informal backyard densification in South Africa. In particular, this article reflects on the ‘compensation hypothesis’ (Maat & De Vries, 2006) and its relevance within the local context. The compensation hypothesis, as a relatively rudimentary concept, is defined accordingly. There is a general understanding that increased densities and any subsequent loss of private green space may be equalised by increasing access to public green space (Maat & De Vries, 2006; Lin, Meyers & Barnett, 2015: 953). Thus, in terms of the compensation hypothesis, it is understood that residents will compensate poor access, or, in the context of this article, reduced area of private green space with access to public green space (Byrne & Sipe, 2010: 4). The hypothesis is tested in this article, as it has not been proven consistently elsewhere (Maat & De Vries, 2006; Grose, 2009; Byrne & Sipe, 2010), and may have significant impacts in terms of future policy planning with informal backyard densification in mind. This article draws on research conducted in a case study of the Bridgton and Bongolethu townships in the town of Oudtshoorn, where households surrounding a large urban green space, as the Bridgton Pavilion, were subjected to a questionnaire that probed access to, and use of public green space, domestic gardening trends and the impacts of informal backyard rentals. Results are discussed under Section 4 of the article. These findings are used to test the compensation hypothesis and draw ultimate conclusions.

2. LITERATURE REVIEW

2.1 Coming to terms with urban green space, related services and benefits

This article defines urban green space, following Chen and Hu (2015: 33), as all land covered by vegetation within the urban environment. This broad definition first includes those green spaces classified as public green space, exemplified by parks, playgrounds, botanical gardens, sporting fields, as well as pockets and corridors of natural and semi-natural vegetation accessible to the public and owned by public authorities (Comber, Brunsdon & Green, 2008: 103; Houssay-Holzschuch & Teppo, 2009: 353; Byrne & Sipe, 2010: 10; You, 2016: 176). Secondly, the definition includes private urban green space, as domestic gardens and allotments, where access is restricted by private ownership (Kabisch et al., 2015: 25; Mosina & Maroij, 2016: 181; You, 2016: 176). Thirdly, the definition includes generally unconsidered spaces such as vacant stands, railway sidings, utility easements, corridors between buildings and canal sides that are often overgrown with spontaneous vegetation (Ward-Thompson, 2002; Rupprecht & Byrne, 2014: 597). Whilst all three categorisations are recognised as components of an urban green space network, this article focuses specifically on those urban green spaces deliberately established by planners through urban design, layout and zoning categories to accommodate desired land uses. In this regard, this article engages primarily with the first two categories, as urban green spaces intended to provide amenity, or recreational uses (Cilliers & Cilliers, 2016: 12) in the case study, as public
green spaces including the Bridgton Pavilion and local playgrounds, and the private green spaces constituted by domestic gardens.

Public and private green spaces provide both shared and unique functions within the urban environment, providing urbanites with primary contact with biodiversity and the natural environment (Barbosa et al., 2007: 187). The quality of such spaces may vary significantly, gauged according to the subjective ideals, expectations and perceptions of those who regularly use them. The quality of public green spaces is of specific concern to planners, as they are directly impacted by their design and policy decisions. As minimum quality considerations, public green spaces may be expected to deliver on basic requirements of size, amenity, vegetation cover, safety, social opportunities, maintenance and appearance, as generally influenced by the public authorities who own them. Where expectations on such requirements are exceeded, perceptions on quality may increase in return. Quality is paramount, as some argue that quality and not quantity of urban green space is most important in planning for such spaces (Haaland & Van den Bosch, 2015: 766). In addition, the level of access provided to prospective users of public green space is an essential consideration. Various standards have been developed globally to guide appropriate area of, and distance to the nearest public green space (Barbosa et al., 2007: 187; Byrne & Sipe, 2010: 21; McConnachie & Shackleton, 2010: 247). Elaborating on detailed standards falls beyond the scope of this article. It is important to acknowledge that such guidelines exist, and that contextualized variances may make the extrapolation of such standards inappropriate. Furthermore, studies have shown that physical accessibility, as proximity, is often favoured as an accessibility measure, whilst perceived access may, in fact, be more significant than geographic proximity (Wan & Shen, 2015: 93). Perceptions on access to urban green space may depend on issues such as admission charges, operating hours, social constraints, or physical barriers such as walls and fencing. Notwithstanding such obstacles, public green spaces are still regarded as public goods accessed more freely by the community as a whole (Haaland & Van den Bosch, 2015: 765; You, 2016: 176).

Public green spaces are often viewed through a social lens as physical spaces in which diverse people meet and interact in surroundings that provide facilities and services they could not access without public aid (Bernardini & Irvine, 2007; Houssay-Holzschuch & Teppo, 2009: 353). Public green spaces may be especially valued by those who cannot access private green space, with those public spaces that are more intimate and familiar and part of daily routines being most valued (Bernardini & Irvine, 2007; Coolen & Meesters, 2012: 52). Private green spaces, or domestic gardens, conversely hold several meanings related to escapism, identity and ownership, and are regarded as places of control, retreat, creativity, privacy, relaxation and freedom (Francis, 1990; Bhatti & Church, 2000; Gross & Lane, 2007; Coolen & Meesters, 2012: 52). Private green space depends on stand sizes conducive to the establishment and maintenance of aesthetically pleasing and productive domestic gardens (McConnachie & Shackleton, 2010: 244) that may provide home owners and the broader community with certain services and benefits, also directly related to urban design and planning policies.

Urban green spaces are often considered part of urban green infrastructure (Lubbe, Siebert & Cilliers, 2010: 2901; Cilliers & Cilliers, 2016:10; Nolon, 2016: 1), as “all natural, semi-natural and artificial networks of multifunctional ecological systems within, around and between urban areas, at all spatial scales” (Tzoulas et al., 2007: 169), that provide specific functions, managed with the aim of conserving ecosystem values and providing associated benefits to human populations (Hoctor, Carr, Zwick, Huntley, Smith, Maehr, Buch & Hilsenbeck, 2008: 92). Accordingly, urban green spaces may play a significant part in supporting urban communities in ecological and social terms (Barbosa et al., 2007: 192; Kabisch et al., 2015: 26), substituting grey infrastructure services and expenses, effectively counteracting many of the negative environmental impacts levied by urbanisation (Chen & Hu, 2015: 32), and advancing sustainability (Byrne & Sipe, 2010: 7). Such services are often conceptualised around the ‘ecosystem services’ (ES) approach, with ecosystem services defined as ecosystem goods and services representing the benefits that human populations derive, directly or indirectly, from ecosystem functions (Kremen & Cowling, 2005: 468; Cilliers, Cilliers, Lubbe & Siebert, 2013: 682; Haaland & Van den Bosch, 2015: 760). Urban green space has been singled out as the most significant environmental resource available to planners through which green infrastructure and related ecosystem services and benefits may be accommodated via the range of planning instruments available to establish such spaces.

When this resource is mindfully designed and managed, inherent ecosystem services and related benefits may be harnessed and augmented (Byrne & Sipe, 2010: 9; Lin et al., 2015: 952). In more detail, such ecosystem services may include environmental benefits such as climate mitigation, air and water filtration, improved carbon sequestration, energy conservation, wind and noise filtration, promoting biodiversity and providing natural habitat, storm-water attenuation and flood mitigation, enhancing water-table catchment and erosion control (Byrne & Sipe, 2010: 9; Ward, Parker & Shackleton, 2010: 49; Odindi & Mhangara, 2012: 653; Chen & Hu, 2015: 32; Kabisch et al., 2015: 26; Lin et al., 2015: 952; Cilliers & Cilliers, 2016: 17; Mosina & Maroyi, 2016: 181; Nolon, 2016: 1).

In addition to these environmental and social benefits, certain tangent economic/financial benefits may also be realised in relation to such
ecosystem services. These benefits may include reducing services expenditure and maintenance costs, reducing health-care expenses, generating income via tourism and related revenue streams, increased retail sales, improved marketability, increased production, augmented neighbourhood values and increased recoupable tax revenue, the last facilitated by the effects urban green spaces may have on property value, with increased real estate values generally attributed to properties located next to, or within the proximity of urban green space affecting tax revenue and property sales (Byrne & Sipe, 2010: 9; Cilliers et al., 2013: 684; Kabisch et al., 2015: 26; Cilliers & Cilliers, 2016: 16; Nolon, 2016: 1). It should also be noted that the association between increased real-estate prices and proximate location to urban green space has not been proven consistently.1 In addition, urban green spaces may provide several social benefits (Tengberg, Fredholm, Eliasson, Knez, Saltzman & Wetterberg, 2012: 16; Cilliers et al., 2013: 693; Chen & Hu, 2015: 32; Haaland & Van den Bosch, 2015: 760; Kabisch et al., 2015: 26), _inter alia_, providing locales for social interaction and a shared focus to diverse communities and neighbourhoods in support of social integration (Odindi & Mhanga, 2012: 653), social cohesion (Mosina & Marowy, 2016: 181), and assimilating values and moral attitudes (Barbosa et al., 2007: 187; Cilliers & Cilliers, 2016: 17).

Social gains are accommodated, as public green spaces attract users through the recreational opportunities provided (Ward et al., 2010: 49; Cilliers et al., 2013: 683; Mosina & Marowy, 2016: 181), or the prospect of access to nature (McConnachie & Shackleton, 2010: 244) and/or aesthetically pleasing surroundings where identity of space, sense of place and liveability are enhanced (Cilliers & Cilliers, 2016), and opportunities for reflection, access to cultural heritage and identity, spiritual enrichment; cognitive, emotional and social development provided (MEA, 2005; Tengberg et al., 2012: 16). As such, urbanites who access urban green space may improve both their mental and physical health related to the potential to reduce health expenses noted previously (Barbosa et al., 2007: 187; Tzoulas et al., 2007: 168; Byrne & Sipe, 2010: 9; Haaland & Van den Bosch, 2015: 760; Kabisch et al., 2015: 26; Lin et al., 2015: 956; Wan & Shen, 2015: 93). It is further important to recognise that many of the social and psychological advantages provided by urban green space are not necessarily dependent on direct physical access to such venues. Even viewing greenery may provide restorative opportunities and establish more stable domestic environments (Byrne & Sipe, 2010: 22).

When considering ecosystem services, it is also apt to acknowledge certain damages on the other side of the spectrum, termed ecosystem disservices. Ecosystem disservices, through which “the same natural functions and structures that provide beneficial services in urban areas are also responsible for detrimental disservices” (von Döhren & Haase, 2015), may have negative effects on wellbeing (Cilliers et al., 2013: 683). Ecologically speaking, ecosystem disservices may include the establishment of invasive species that overrun urban green space to the detriment of indigenous species and systems, influencing populations, community interactions, abiotic variables, and ecosystem processes (Charles & Dukes, 2007: 233; Lyytimäki & Sipilä, 2009: 310) as well as the production of volatile organic compounds (VOCs) that decrease air quality (Escobedo, Kroeger & Wagner, 2011; von Döhren & Haase, 2015). Ecosystem disservices in the social realm may include safety and security concerns (Cilliers et al., 2013: 696), for example, when urban green spaces provide venues for illicit activity, discord, nuisance or health impacts such as allergy attacks, safety hazards from tree falls, habitats for poisonous plants and pests, and opportunities for littering (Lyytimäki, Petersen, Normander & Bezák, 2008: 165; von Döhren & Haase, 2015: 491; Cilliers & Cilliers, 2016: 9).

Where the economic impacts of ecosystem disservices are considered, damage caused to infrastructure by tree roots, preventing more profitable uses for the sake of maintaining green space, and constant maintenance costs, may be included (Lyytimäki et al., 2008: 166). Another tangent negative outcome may be considered in the risk of gentrification and dislocation. As provided earlier, access to urban green space may increase property value. Where urban greening projects are instituted and property prices in proximity to newly established or upgraded public green spaces increased, gentrification may take place (Dale & Newman, 2009: 672), through which lower income residents may be unfairly displaced. Low-income communities require especially sensitive approaches to urban green space planning in order to address potential ecosystem disservices and general accessibility issues. Lower income groups are less likely to access distant urban green space, given the cost of transportation, entrance fees and other expenses such visits may require (Haaland & Van den Bosch, 2015: 765; Kabisch et al., 2015: 26). As such, lower income groups need improved access to urban green space within their immediate areas (Byrne & Sipe, 2010:4).

Despite such realisations, inequitable access to urban green space remains a common feature of urban life across the globe, between different cities and within them (Byrne & Sipe, 2010: 7; Kabisch & Haase, 2014; Chen & Hu, 2015: 32; Haaland & Van den Bosch, 2015: 764; You, 2016: 176), often based on socio-economic variables such as wealth, education and race (McConnachie & Shackleton, 2010: 244; Cilliers et al., 2013: 693; Lin et al., 2015: 956; You, 2016: 178). In South Africa, such variables are conflated as a result of the country’s colonial and more recent apartheid past, with race continuing to represent a significant determinant of access to urban green space. The following section provides some insight into urban green space provisions in South Africa, highlighting persistent inequalities.

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1 For a South African example, see Cilliers et al. (2013).
2.2 Urban green space and South Africa's low-income communities

During apartheid, suburbs designated for the privileged White population were pleasant and green, resembling the well laid-out, adequately serviced and maintained leafy suburbs found in the developed world. Impoverished African and Coloured urban and homeland townships, on the other hand, were left bleak and poorly serviced with a high proportion living in informal settlements (shanty towns) and informal backyard lodgings (Houssay-Holzschuch & Teppo, 2009: 351; McConnachie & Shackleton, 2010: 245). Such inequalities have remained ingrained in the post-apartheid era, despite efforts to redress past injustices through low-cost housing projects. Subsidised low-cost housing units have been delivered in staggering volumes across the country (Robins, 2002: 525; Shapurjee et al., 2014: 20), following the Reconstruction and Development programme of 1994 (RDP) (RSA, 1994) and the 2004 Breaking New Ground Strategy for Sustainable Human Settlements (BNG) (RSA, 2004). Green-space planning in these low-income suburbs, as for the rest of South Africa, is guided by Habitat and Local Agenda 21 initiatives, the Green Paper on Development Planning (1999), the National Environmental Management Act (Act 107 of 1998), and Spatial Development Frameworks (SDFs) (Cilliers et al., 2013: 696), among other instruments and guidelines. Despite commitments to sustainable development and redressing past injustices and inequalities, disparities in access to urban green space remain.

As such, former homeland towns, urban townships and RDP settlements continue to present fewer green spaces of lower quality and fewer street trees compared to more affluent urban areas (Gweda & Shackleton, 2015: 17). McConnachie and Shackleton (2010: 247), for example, found that public green area per RDP household is nearly five times less than in older township areas and 15 times less than in more affluent suburbs. Public green space provisions are severely limited in low-income housing projects. Green land uses compete against other land uses, constrained budgets and limited human resources prevent increased provisions of green spaces considered a luxury and not a priority (Cilliers et al., 2013: 694; Cilliers & Cilliers, 2016: 22). In addition to lower proportions of public green space, RDP settlements and older townships, in particular, tend to display increased densities, further reducing the green space available to each household (McConnachie & Shackleton, 2010: 246). Densities are augmented exponentially by the addition of informal backyard rental accommodation (Gardner, 2009: 14; Shapurjee & Charlton, 2013: 663; Tshangana, 2013: 12).

2.3 South African shanty towns, informal backyard rentals and environmental considerations

Post-apartheid South Africa has witnessed significant growth in informal settlements (Gilbert, Mabin, McCarthy & Watson, 1997: 134; Durand-Lasserve & Royston, 2002: 3-4). As elsewhere, open green spaces, but not always on the urban periphery, are often besieged in these informal conquests (McConnachie & Shackleton, 2010: 245; Haaland & Van den Bosch, 2015; Odindi & Mhlanga, 2012: 653). Whilst Huchzermeyer (2009: 63) states that such land grabs are generally limited to areas where settlements may be less opposed and settlers regard themselves as least invasive, informal settlements inevitably exert severe environmental impacts due to their inappropriate locations. These impacts may include air pollution, littering and dumping, surface and groundwater contamination, disturbing fragile ecosystems such as aquifers, forests, estuarine or wetland areas, deforestation and land degradation, removing natural defence systems against floodwaters and storms (Ferguson, 1996: 171; Napier, 2002: 16; Goebel, 2007: 297; DEAT, 2015). Effects may be especially harsh where shanty towns are established on ecologically sensitive parcels or land of agricultural value (Morange, 2002: 11), where the loss of green space may be very invasive indeed (Napier, 2002: 20; Kilian, Fiehn, Ball & Howells, 2005: 4). Yet, we should not regard the loss of fertile farmland and other green resources as penalties restricted to the informal housing sector alone. Formal low-density residential developments may be equally, if not more, responsible for such losses in South Africa, especially when land of agricultural value is considered (Geyer, Schloms, Du Plessis & Van Eeden, 2011: 41).

Given market dynamics, the low-density, low-income housing projects noted in the previous section are habitually located on the urban periphery (Goebel, 2007: 292; Lategan, 2012; Klug, Rubin & Todes, 2013: 668; Turok, 2013: 169; Chobokoane & Horn, 2015: 3). Along with the unfavourable locations secured for these residential developments, additional impacts are levied once they have been established. The emergence of informal backyard rental dwellings are of particular concern in this regard. An informal backyard rental dwelling is defined 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 with partial or full access to the basic services provided to the main dwelling (Gilbert et al., 1997: 140; Crankshaw, Gilbert & Morris, 2000: 852; Morange, 2002: 11; Gardner, 2009: 5). Though “there is a dearth of current, accurate data on backyarding in South Africa” (Rubin & Gardner, 2013: 79) as census and statistical indicators vary (Carey, 2009: 8; Watson, 2009: 4), it is generally agreed that informal backyard rentals have become a major housing submarket in South Africa (Tshangana, 2013: 2). The proportion of people accommodated in informal backyard dwellings is growing...
faster than the proportion housed in shanty towns (Lemanski, 2009: 473; Govender, Barnes & Pieper, 2011a: 336). By 2014, in excess of 756,000 informal backyard rental households were recorded (StatsSA, 2014), thus densifying low-income suburbs exponentially in terms of both dwelling unit and population densities (Poulsen & Silverman, 2005: 23; Shapurjee & Charlton, 2013: 663; McGaffin, Cirolia & Massyn, 2015: 63).

Densification is generally revered as an instrument of sustainable urban development, bolstered by planning paradigms such as “new urbanism” (McConnell & Wiley, 2010: 3; Sivam & Karuppannan, 2012: 6), “the compact city” (Gardner, 2009: 9) and “smart growth” (Brunner, 2012: 7; Sivam & Karuppannan, 2012: 2; Rubin & Gardner, 2013: 20). In accordance with such shifts in planning thought, official densification strategies have regularly been employed to convert open land to residential use by means of infill development (Kabisch et al., 2015: 26) generally focused on available open space within the urban envelope. Such spaces are often unplanned for areas covered by vegetation or more formal public green spaces regarded as underutilised. By contrast, informal backyard infill densifies private property through unsanctioned and illegal mechanisms in which authorities play no part. Informal densification practices hold several benefits closely related to the motivations that drive formal infill strategies, but also present certain challenges. In this regard, South African scholars have recognised the potential of informal backyard rentals in providing the capacity of basic services and infrastructure in order to cope with the increased demand produced by the addition of informal backyard rentals (Carey, 2009: 17; Lemanski, 2009: 482). Within such arguments, urban green spaces are rarely referenced explicitly, with authors such as Rubin & Gardner (2013: 81), for example, simply noting the need to retrofit “social facilities”. Another strong theme in the literature on addressing informal backyard rentals is the need to plan proactively for the generally inevitable emergence of informal backyard rental units in new low-cost housing projects within the primary phases of settlement planning in terms of service capacity, layout and urban design (Carey, 2009: 24; Gardner, 2009: 21; Watson, 2009: 11; Rubin & Gardner, 2013: 72; Tshangana, 2013: 16; Shapurjee et al., 2014: 20). In this regard, calling for human settlement plans to integrate backyarding and make provision for environmental improvement initiatives and related investment opportunities, including provisions for “social services” (Tshangana, 2013: 16). Incurring extra capital cost will accommodate planned and desirable incremental backyard densification, without the need for modifications to service future capacity in established areas (Rubin & Gardner, 2013: 23), where it may be impossible to add such services without significant redevelopment and evictions.

The following section investigates issues related to informal backyard rentals and urban green-space planning and use in such an established area, as a case study of the Bridgtown and Bongolethu townships in the town of Oudtshoorn.

3. EMPIRICAL INVESTIGATION

3.1 Case study: Introducing Oudtshoorn, Bridgtown and Bongolethu

The town of Oudtshoorn is the main seat of the Oudtshoorn Local Municipality (OLM), located within the Eden District Municipality (EDM) in South Africa’s Western Cape province. Oudtshoorn is known globally as the epicentre of the ostrich-farming industry (Mambo, 2012: V; Wisner, Pelling, Macarenhas, Holloway, Ndongo, Faye, Ribot & Simon, 2015: 174) and has more recently become a major eco-tourism destination, given its location within the biodiverse fynbos and succulent Karoo biomes (Hoffman, Carrick, Gillson & West, 2009: 54). Oudtshoorn is a place of dichotomy. Whilst neighbouring areas...
enjoy significant winter rainfalls, Oudtshoorn is located in a rain shadow, thus receiving markedly less precipitation. Yet, whilst the area has regularly battled extreme drought, torrential rains have also caused severe floods in the not too distant past. In addition, the climate is marked by extreme temperatures, ranging between -2.1ºC and 46.6ºC (Mambo, 2012: 36; Wisner et al., 2015: 176). Dualities are not confined to the natural environment and climate, with the human settlements of Oudtshoorn, De Rust, Dylseldorp and the rural hamlets that constitute the OLM showing marked disparities. The approximately 61,500 residents who reside in the town of Oudtshoorn present significant divides and dualities, reflecting maintained apartheid inequalities. As such, the majority of Oudtshoorn’s White residents (12.49% of the population) have remained in the areas designated for them under apartheid rule, whereas the bulk of Black and Coloured residents (86.46%) still call apartheid-era townships such as Bridgton and Bongolethu and the recently established informal settlement of Rose Valley home (Lategan & Cilliers, 2013: 306; Wisner et al., 2015: 174) (see Figure 1).

In 2010, the sudden founding of the Rose Valley informal settlement on an environmentally sensitive parcel of land located on Oudtshoorn’s eastern boundary (Lee, 2012) provided several research opportunities. A 2012 survey in the settlement indicated that 61% of the respondents had relocated from informal backyard lodgings in the townships of Bridgton and Bongolethu (Lategan, 2012). Given the relatively underresearched nature of South Africa’s informal backyard rental sector (Lemanski, 2009: 474; Rubin & Gardner, 2013: 7), the dearth of research on the subject focused on smaller municipalities (Zwaig, 2015: 2) and the neglect of established studies to recognise the impacts of informal backyard rentals on planning for urban green space, a case study within Bridgton/ Bongolethu was sought that could incorporate these elements. In a review of satellite imagery in 2013, one particular urban green space was accentuated, identified as the green heart of the community, given both its size and location within the area, as the Bridgton Pavilion (see Figures 1 and 2), described in greater detail throughout the article. Closer inspection revealed a significant number of informal backyard structures in the properties surrounding the Pavilion, thus meeting the criteria of presenting both public green space and proximate informal backyard dwellings for analysis.

### 3.2 Methodology

This research predominantly draws on two methods to inform the empirical investigation. First, the article references semi-structured interviews conducted with selected officials in the OLM and other relevant experts, cited with pseudonyms throughout, who provided more nuanced information and supplemented shortcomings in the literature with regard to the local context. Secondly, data retrieved from a quantitative research survey distributed in the study area in 2013 provides statistical evidence. The survey was conducted by dispensing 101 questionnaires to residents of 101 properties surrounding the Bridgton Pavilion. Properties were included when home owners, or adult representatives, were home at the time of the survey and willing to participate. Prospective respondents were approached, informed of the purpose of the study and provided with general instructions. Informed consent was described in terms of the requirements of participation. Confidentiality statements and statements of voluntary participation

![Figure 1: The town of Oudtshoorn and the Bridgton/Bongolethu case study](image1)

![Figure 2: Aerial view of the Bridgton Pavilion and surrounding urban green space](image2)
were also provided. Accordingly, the 101 questionnaires were distributed, based on convenience sampling, and a 100% return rate achieved. Convenience sampling is a nonprobability sampling technique where members of the target population meet certain practical criteria such as easy accessibility, geographical proximity, availability at a given time, or willingness to participate and are thus included (Dörnyei, 2007). Convenience sampling has various limitations due to its possible subjectivity in choosing the sample, but is especially useful when randomisation is impossible (Explorable.com, 2009), as in the case of Bridgton and Bongolethu townships in Oudtshoorn where surveys were conducted with the assistance of chaperones, supporting the researchers in terms of points of entry to the community. As such, limited time periods provided restrictions in terms of the availability of prospective participants and the necessity of including only respondents within proximity of the Bridgton Pavilion compelled convenience-sampling methods. There was no self-selection of respondents. It is doubtful that a random sample would have presented drastically different results, except in feasibly reducing the number of respondents, as there was no way of identifying which households would be both available and willing to participate from which to generate a random sample. It should be noted that the presence or absence of informal backyard rental components was not a determinant in respondent selection. Survey questions focused on respondents’ access to, and use of public green space, domestic green space (gardening) trends and informal backyard rental particulars, where applicable. Questionnaires were drafted in collaboration with the North-West University’s Statistical Consultancy Services, who also captured data and aided in statistical analyses and interpretation. As a convenience and not a random sample was used, p-values are reported for the sake of completeness, but not interpreted.

4. FINDINGS AND DISCUSSION
This section discusses case study findings in two main subsections. The first reports on findings related to public green spaces, whereas the second focuses on domestic gardens in Bridgton and Bongolethu.

4.1 Findings on public green spaces in the Bridgton/ Bongolethu case
Respondent properties accommodated a total of 708 people, of whom 510 (72%) were housed in formal dwellings and 198 (27.96%) called informal backyard rentals home. In total, 53% of the respondent properties accommodated informal backyard rental structures, with a total of 71 informal backyard dwellings recorded. A Spearman’s rank-order correlation (r) was run to determine the relationship between number of informal backyard structures and number of informal backyard tenants. Results showed a strong positive and significant correlation (r=0.867, p<0). A weaker positive correlation (r=0.221, p=0.035) could also be established between the number of informal backyard tenants and the number of occupants in the main dwelling. The intensity of backyard activities uncovered increased both population and dwelling unit densities substantially (Lategan & Cilliers, 2016), presenting an increase of 38.82% in the number of people who accessed basic services and public green space in the area.

The Bridgton Pavilion is the principal public green space in this part of town, followed by sporting fields attached to local schools and smaller playgrounds dispersed throughout the townships (see Figure 2). The Bridgton Pavilion presents an especially pertinent centre around which to concentrate research on urban green space in low-income communities, owing to the extensive refurbishment of its facilities and amenities in the recent past. The refurbishment process was largely instigated in the hopes of providing a quality green recreational space within an impoverished community that could host events to draw people from all tiers of Oudtshoorn society, according to an interview with Westen (2013). In terms of the use of the facility by those in direct proximity to the Bridgton Pavilion, survey findings suggest that 50.5% of the respondents claimed that they made increased use of the facility following its refurbishment; 27.7% claimed no change in regularity of use, and 21.8% reported using the facility less than previously. It should also be noted that, overall, 82.4% of the respondents claimed access to public green spaces, as captured in Figure 3.

Figure 3 shows that the majority of the respondents did not make routine use of proximate public green spaces. The high proportion of respondents claiming only ‘occasional’ and no use (‘never’) could be related to the restricted access provided to playgrounds and the Bridgton Pavilion, as detailed in the ensuing paragraph. In support, 68.3% of the respondents claimed that they could only access their closest public green space when public events were hosted there, whilst a contrasting 28.7% of the respondents claimed that proximate public green spaces were always accessible. Statistical analysis showed that those claiming access to public green spaces only when attending public events, accessed these spaces only occasionally, whereas those who reported access at all times, only visited parks once a month.

This article posits that perceptions regarding perpetual access may be attributed more to the ingenuity and determination of users than to the real uninhibited access provided by these spaces. The Bridgton Pavilion is fenced with a corrugated metal wall; the majority of the other playgrounds have also been closed off, fenced, gated and even aggressively topped with razor wire. At the request of the community, playgrounds were enclosed to protect facilities from salvagers scavenging for steel and timber to
sell or use in the construction of informal dwellings and to prevent criminals from meeting there, as expressed in interviews with Westen (2013) and Wire (2015). When public green spaces were accessible at any time, these facilities often became venues for gang meetings and drug abuse, understandably of considerable concern to residents, especially when the youth are considered (Captain, 2013). Data showed that 63.4% of the survey participants still rated substance abuse as a daily problem related to their nearest public green space. A Phi test for preference of living within walking distance of a park and willingness to pay more for a property, because it is located closer to a park, provided an effect size of 0.261 (p=0.033), as a small to medium effect and practically significant association.

In terms of particular public green space features, respondents rated the elements captured in Figure 4 as critical attributes expected from a quality public green space. Figure 4 demonstrates that the community regarded nearly all features listed as critical, with both green attributes (grass and trees) as well as recreational elements (play equipment, sporting facilities and seating) regarded as critical by upwards of 88% of the respondents each. Whilst recreational amenities predominantly require direct physical access to realise advantages, green elements may provide at least partial advantages through visual access alone (Wire, 2015), as also provided in the preceding literature. Whilst the chain-link fencing around most playgrounds provide some visual access to the vegetation inside, the impermeable corrugated metal barrier encircling the Bridgton Pavilion obstructs virtually all views of the greenery within (Figure 5). These corrugated metal sheets, baptised by the community as ‘die plate’, were not replaced during the refurbishment process, as they have become intricately bound with the heritage and identity of the community, according to an interview with Westen (2013).

Whilst the heritage and cultural benefits offered to the Bridgton Pavilion by the corrugated metal wall is recognised as part of an important service delivered by the facility as a whole, there are also other concerns. The preservation of the corrugated metal wall may recall Turner’s work (Turner, 1963; 1968), in endorsing an appreciation of informality as the antithesis of soulless and monotonous modernity, described by terms such as ‘vernacular, innocent and authentic’. However, such romanticised conceptualisations
have also been condemned, notably for aestheticizing poverty (Roy & AlSayyad, 2004) and glazing over the often chaotic and violent characteristics of more informal features (Van Ballegooijen & Rocco, 2013: 1795-1802). The landmark wall continues to create a harsh and uninviting obstruction, mirroring the informality found in the backyards of adjacent properties. Elsewhere, informal backyard rentals have been accused of "blighting the visual landscape" by introducing the unwanted aesthetics of informal settlements into formal housing areas (Lemanski, 2009: 475-476), being indicative of "backward rural life" (Robins, 2002: 541) and detracting from urban quality and dignity (Shapurjee & Charlton, 2013: 663). The cumulative effect of the informal backyard dwellings that dot the landscape surrounding the Pavilion, often visible from the street, and 'die plate' may present adverse psychological effects, ultimately decreasing pride in the environment, further marginalising an already disadvantaged community, and deterring wealthier patrons from attending events hosted at the Pavilion.

The local authority must be applauded for the manner in which the Bridgton Pavilion refurbishment was sensitised around both community heritage and the outcomes of stakeholder engagement processes that articulated a desire to maintain ‘die plate’, within a development context traditionally directed at eradicating all traces of informality (Del Mistro & Hensher, 2009: 338; Lemanski, 2009: 477; Bradlow, Bolnick & Shearing, 2011: 272; Huchzermeyer, 2011: 3; Rubin & Gardner, 2013: 68; Huchzermeyer, 2014: 43). Yet, the ultimate impact cannot be denied in detracting from general neighbourhood aesthetics.

In the case study, aesthetics was furthermore severely affected by incidences of littering and dumping, identified as a sign of neighbourhood decline (Marais, Armitage & Pithey, 2000: 5; Marais & Armitage, 2004: 485; Goebel, Dodson & Hill 2010: 576), even as higher income groups tend to display a higher mean per capita waste generation rate than lower income groups (Napier, 2002: 20; Nshimirimana, 2005: 13; Oyekale, 2015: 15888). Site visits revealed severe incidences of littering from pedestrians and piles of household waste dumped mainly on marginal green spaces. In relation, questionnaire results showed that 57.1% of the respondents rated littering as a daily problem related to their nearest public green space. Gusts of wind spread litter around further and the fences surrounding public green spaces and the perimeters of some yards act as nets, catching scraps of paper and plastic, as also recognised in Dikgang, Leiman & Visser (2010). Waste levels are increased dramatically by the addition of consumers accommodated in informal backyard rental structures. Whilst household waste is removed by the local authority (Lategan & Cilliers, 2016) backyard dwellings are generally not provided with additional refuse bins or liners in Oudtshoorn. As a result it is deduced that informal backyard rentals exacerbate littering and dumping challenges, in keeping with Lemanski (2009: 477); Govender (2011); Govender et al. (2011a: 339; 2011b: 29). In recognition of such challenges, the City of Cape Town, for example, distributes additional refuse bins to informal backyard tenants as part of its Backyard Essential Services Improvement Programme, expressed in an interview with Cameron (2015).

The informal construction materials that constitute the majority of informal backyard rental dwellings further levy impacts on tenants, the broader community and the environment. The timber used as construction material in the majority of informal backyard structures in the case study is generally sourced from the discarded stock of local timber yards, with most of the fragments being tarred, releasing fumes and rendering structures highly flammable, according to an interview with Daughters (2015). Informal backyard rentals have been branded as fire risks in the literature (Crankshaw et al.,...
Where less than three backyard tenants were housed, respondents were more likely to report that backyarding did not limit their outside space and privacy. Statistical testing revealed a significant difference between feelings of limited outside space and privacy and both number of occupants in the main dwelling and number of backyard tenants. As such, perceptions on reduced outside space and privacy were related to an increased number of people in both fields. Overall, 57.5% of the respondents who accommodated informal backyard rentals were of the opinion that backyard structures on their properties limited privacy and outside space. Yet, 82.8% of all the respondents revealed that their children still played in their backyards, of which 51.8% did so frequently. Data showed that 79.2% of children used front yards to play, of which 27.5% did so frequently. Thus, domestic gardens continued to provide primary venues for play, even as small stand sizes, probable overcrowding and informal backyard densification reduced the space available for such activities.

The survey also showed that 60.6% of the respondents had planted trees, whereas 76.2% had planted some sort of shrubbery. Trees may be especially valued to provide shade in the scorching heat of a Klein Karoo summer. The gardens of 42% of the respondent properties also contained flowerbeds, realising aesthetic values, especially in front yards where they could be viewed and admired by passers-by. Furthermore, nearly two thirds (67%) of the respondents had planted fruits and vegetables. Various authors have commented on the value of domestic gardens in producing food and income-generating opportunities, especially for vulnerable, low-income households through such cultivations (Lindemann-Matthies & Brieger, 2016: 33; Mosina & Maroyi, 2016: 181). It should be noted that, although the study area displayed a diversity of plant species, it is permissible to suggest that the area remains less species rich than more affluent, generally White parts of Oudtshoorn, as noted elsewhere by Lubbe et al. (2010: 2907) and Cilliers et al. (2013: 692). A glaring disparity is apparent in green area cover between apartheid-era townships and traditionally White suburbs mostly on the opposite side of the Grobbelaars River in Oudtshoorn (see Figure 1), further underlining differences in the number of species feasibly established.

5. Conclusion
Findings in the Bridgton/Bongolethu case study seem to disprove the ’compensation hypothesis’ as an assumed increase in the use of public green space in compensation for private green space lost. The case study presented fairly small stand sizes, with outside space decreased further by informal backyard densification in over half of the respondent properties. Yet, whilst over 80% of the respondents claimed to make use of proximate public green spaces, the majority did so infrequently, not as part of their daily or even weekly routines. Statistical analysis revealed that even those respondents claiming that proximate public green spaces were always accessible, only visited these spaces about once a month. In addition, only an insubstantial number of respondents regarded public green spaces as their children’s primary play locales, with the majority still playing in domestic green spaces (private gardens), in both front and backyard spaces. As such, this article concurs that public and private green spaces may have dissimilar functions and meanings and that generally public green space cannot be provided as a substitute for access to private green space (Coolen & Meesters, 2012; Haaland & Van den Bosch, 2015).

The insignificant association established between the number of informal backyard rental structures and perceptions of limited outside space and privacy, considered against the significant association proven between the number of informal backyard tenants and perceptions of limited outside space and privacy, further seems to downplay the impacts of informal
backyard rental structures on reducing available yard space and the need to venture to public green spaces in compensation in the case study. Such findings are further supported by the extent of cultivation still taking place in the respondents’ gardens, especially in terms of fruits and vegetables. Yet, the effects of increased population densities need to be considered and addressed and the value of accessible, quality public green spaces realised in providing places of escape from crowded yards. As such, the active use of public green spaces must be encouraged, potential ecosystem services, disservices and benefits managed, and barriers to accessibility redressed. The latter is especially evident in the case study and its fenced playgrounds and heritage-sensitive, but ‘informally’ enclosed Pavilion, where disservices have impeded access and detract from aesthetic quality in conjunction with the effects of informal backyard structures.

Whilst this article has provided an important preliminary investigation into a previously neglected aspect of South Africa’s informal backyard rental sector, there are still numerous aspects to consider in future research related to urban green spaces. With adequate policy intervention in mind, future investigations may focus on other smaller towns and importantly on highly consolidated low-income suburbs in larger cities and metropolitan areas, where extreme informal backyard densities may realise the ‘compensation hypothesis’ and underscore the need to redress existing shortcomings and make adequate provision for quality public green spaces, that meet and exceed minimum requirements in new developments in anticipation of informal backyard infill. Ultimately, findings highlight the need to reconsider urban green space planning within low-cost areas in terms of accessibility, form and function as part of broader spatial planning approaches.

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