Synergistic density: A strategy for residential densification developed in relation to community preferences

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ABSTRACT
A recent Perth survey concerning housing preferences reveals that a number of the strategies for residential densification currently being pursued in Perth are not necessarily well aligned with community preferences. In light of this the paper questions the dominance of such strategies and proposes an additional strategy which correlates residential densification with upgraded public open space. It is argued that through this process upgraded public open space could be used to incentivize community support for densification. The potential yield of this approach, at the sub regional scale, is established in a design projection exercise.

Keywords:
Infill development, community, greyfields, public open space

Introduction
A recent Perth study of housing preferences "The Housing We'd Choose"\textsuperscript{1} (Curtin University & Hames Sharley, 2013) reveals that certain aspects of strategies for residential densification currently being pursued in Perth are not necessarily well aligned with community attitudes. In light of this the paper questions the dominant strategies for residential densification and proposes an additional strategy which correlates densification with upgraded public open space; adjacency to public open space being a highly desired dwelling attribute for survey respondents.

The broader context of this paper is the need for residential urban infill development expressed in the current planning policies of all of Australia's capital cities. Residential densification is being mandated to conserve both rural and biodiversity rich land on city edges (NSW Government, 2010) and lessen infrastructure costs, commuting times, and the continued concentration of economic and social vulnerabilities on the outer suburbs of our cities (Kelly, Weldmann, & Walsh, 2011). Collectively, capital city

\textsuperscript{1} Commissioned by the Departments of Housing and Planning.
planning policies stipulate that 60%\(^2\) of all new residential development should be infill and yet only 30% is being typically accomplished (Bolleter & Weller, 2013, p. 56).

Urban planning strategies for achieving residential densification in Perth and other Australian capital cities include Activity Centres, which are the densification of public transport nodes, and the potential of greater residential density along major urban corridors (City of Melbourne, 2010; Duckworth-Smith, 2012; Woodcock, Dovey, Wollan, & Beyerle, 2010).\(^3\) While these fundamental approaches are valid, we believe for Australian cities to be resilient a greater diversity of infill strategies is required.

**Community preferences and implications for infill strategies in Perth**

The recent study entitled 'The Housing We’d Choose' was conducted to explore the relative importance of a wide range of housing attributes so as to establish what Perth households desire from their housing (Curtin University & Hames Sharley, 2013). A subset of this study was an online survey entitled 'What Matters Most' in which 866 people were asked to rate the features of a home they placed the highest priority on. 76 attributes, arranged into five broad categories; convenience, local amenities, local environment, dwelling design and dwelling features, were ranked by respondents.

Significantly 69.9% survey respondents ranked being ‘near a shopping centre’ as the most important dwelling attribute. This reveals that dwellings in Activity Centres planned around shopping centres will be relatively desirable, at least in this particular respect. However, 65.2% of respondents regarded a dwelling being ‘away from busy roads’ as being important (2013, p. 67), this dwelling attribute ranking as the 4\(^{th}\) most important. Arguably densification produced in relation to urban corridors therefore will not be desirable to communities unless this issue can be mitigated through design.\(^4\)

Many of the proposed Activity Centres are also bisected by major roads such as those in Morley, Midland, Stirling and Cannington. Further to this the benefits of an urban lifestyle as promoted in Activity Centres don’t seem to be that popular. Being near cafes and restaurants ranked 12\(^{th}\), easy access to the city (presumably in part through

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\(^2\) The current infill targets are at the time of writing are Sydney 70%, South East Queensland 49%, Melbourne 53%, Adelaide 70%, Hobart 50%, Darwin 50% and Perth 47%.

\(^3\) In fact much of the infill development that has been achieved in recent years is through opportunistic subdivision of individual lots resulting in the loss of the Australian backyard and its replacement with typically unusable residual spaces (Hall, 2010).

\(^4\) A PhD study by Anthony Duckworth-Smith (2012) offers design strategies for potentially mitigating this negative perception of busy roads as living environments.
public transport) ranked 22\textsuperscript{nd}, having a range of local employment opportunities also rated comparatively lowly at 35\textsuperscript{th} and easy access to bars/ pubs and nightlife ranked 39\textsuperscript{th}. It would seem in Perth the benefits of urbanity are not as widely accepted as may have been anticipated. Based on the evidence from this survey, the question therefore becomes: what could be a strategy for residential densification which engages with prevailing community dwelling preferences in Perth?

**The potential of densification adjacent to public open space (POS)**

Significantly a dwelling being ‘near a park or reserve’ ranked as the second most important dwelling attribute with 69.3\% of respondents regarding this as being important (Curtin University & Hames Sharley, 2013). Despite the apparent desirability of living adjacent to parks residential densification around existing POS has not been proposed as a key infill strategy in Directions 2031 (Department of Planning Government of Western Australia, 2010). Further to this, according to our mapping, the proposed primary Activity Centres only contain 2.64\% parkland POS in their current undeveloped state.\(^5\) (Fig 1) While the policy stresses the importance of Perth’s ‘green network’ this constitutes primarily natural spaces, the network is not correlated with residential densification to any degree. In contrast we believe densification around parks could provide an additional and important infill strategy for Perth, one which is potentially closely aligned with community preferences.

Studies internationally have shown that residents are willing to trade off paying higher prices for houses adjacent to good quality POS (Crompton, 2007; Lutzenhiser & Netusil, 2001). Findings have confirmed that a positive impact of 20\% on property values abutting a good quality park is a reasonable starting point for estimating a park’s impact (Crompton, 2007, p. 203). A study of 14 neighbourhood parks in a suburban development in Dallas-Fort Worth Metroplex\(^6\) indicated that parks continue to exert an influence of real estate prices at a significant distance from the park. Indeed about 75\% of the real estate value associated with the parks occurred within 180m of the park and effects on values only became negligible at 400m, the conventional estimate of a 5 minute walk (Crompton, 2007, p. 209).

\(^5\) Undoubtedly new public open spaces will be provided to accommodate the increased density of Activity Centres. The point being made here is the densification in Activity Centre sites does not have a significant supply of existing POS to graft onto.

\(^6\) There does not appear to be any comparable studies which have been conducted in the Australian context.
Given the apparent appeal of living near POS, as evidenced by real estate values and 'The Housing We’d Choose' study it is our hypothesis that people will potentially accept trade-offs such as living in a higher density setting or allowing higher residential densification\(^7\) in their neighbourhood if it ensures them access to good quality POS.

We propose that the process for densification around parks in middle ring suburbs could occur in the following manner. Initially the area within a 5 minute walkable catchment of existing parks\(^8\) could be up-zoned to a range of higher densities. The increased rate base and required developer contributions resulting from this up-zoning process could then be directed to the upgrading of parks so that they can provide greater amenity to residents living at higher densities (Bolleter, 2013). This is an important step in that existing parks in Perth’s greyfield suburbs are typically generic, cheap and mono-functional, catering largely for organised team sports, and as such has not to date provided real incentives for residential densification. According to a process referred to as ‘hedonic uplift’ (Pracsys, 2012) the proposed upgrading of the parks will stimulate further development in the walkable catchment areas resulting in increased land rates and developer contributions (Bolleter, 2013).\(^9\) These can be then directed back to the ongoing maintenance of the parks at a high standard.

In this model the upgraded POS needs to perform a nuanced role; this is to offer greater amenity for a greater number of different user groups but not to do this to the detriment of people living adjacent to the park. Studies suggest that ‘urban parks,’ in which more than 50% of the park is manicured and developed for active recreation (e.g. sports fields) do not produce as significant uplift on real estate values, and as such are arguably less desirable adjacent to dwellings, than ‘natural area' parks; natural area parks being defined as those in which more than 50% of the park is vegetated (Lutzenhiser & Netusil, 2001). This is confirmed by the 'Housing We’d Choose' survey in which 69.3% of respondents felt that it was important that a dwelling

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7 Haphazard 'do it yourself' (DIY) subdivision of suburban backyards typically achieves a doubling to tripling of current densities but with reduced amenity. Through a planned, precinct based approach it is reasonable to expect this density increase would be higher and with improved amenity.

8 A distance which is commensurate with the area of real estate values which are potentially uplifted by the presence of a park (Lutzenhiser & Netusil, 2001).

9 The concept in which increments of enhanced value attributable to a parks is used to fund park development is known as the ‘proximate principle’ and was considered conventional wisdom amongst planners and park advocates in the late 19th and early 20th centuries. The proximate principle provided the rationale for John Nash’s development of London’s Regent’s Park, Birkenhead park and Central Park. (Crompton, 2007). This principle has been explored by the author in a previous paper (Bolleter, 2013).
was near a park or reserve but only 24.5% considered it important to be near a sports field (Curtin University & Hames Sharley, 2013). These findings begin to suggest that the upgrade to the park should entail a heavily treed perimeter which provides a buffer to adjacent residents from more active recreation occurring in the centre of the park. The exact nature of the actual park upgrades, however, is not part of the scope of this paper due to it being the focus of a proposed research project which has been submitted to the Australian Research Council for funding. This project, to be run by the AUDRC in conjunction with the University of Western Australia Centre for Built Environment and Health (CEBH), aims to understand community preferences for various different park upgrades with respect to incentivizing density in the adjacent community. This said, in broad terms, the upgrades should engender greater multi-functionality, providing a greater range of recreational, ecological and social infrastructure for a greater number of people at a range of times (American Society of Landscape Architects, 2009).

Figure 1: Perth’s planned Activity Centres contain approximately 2.6% parkland POS in their current undeveloped state
Calculating the yield of densification adjacent to POS

The following section of this paper explores, through a ‘design projection’ exercise (Swaffield & Deming, 2011), the spatial potential of residential densification occurring adjacent to upgraded parks in Perth’s greyfield\(^{10}\) suburbs. (Fig 2) Greyfield suburbs have been chosen as a study area for this research as they are typically ripe for redevelopment due to significant under-utilised property assets (Newton et al., 2011).\(^{11}\) Through a GIS scenario analysis the development capacity of residential densification adjacent to parks in the study area will be established. A number of assumptions, as illustrated and set out below, were made in determining the potential for future development in these areas.\(^{12}\)

*Figure 2: The greyfield study area encompasses the Local Government Areas (LGAs) of Bassendean, Bayswater, Belmont, Canning, Melville, South Perth, Stirling, Victoria Park and Vincent (in grey).*

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10 Greyfield suburbs are the middle ring of suburbs and can be found in all Australian cities. They are characterized by a typically failing housing stock, ageing infrastructure and high redevelopment potential (Newton et al., 2011).

11 The study area is also roughly commensurate with the Central Sub Region identified in Perth’s overarching planning document ‘Directions 2031’ (Department of Planning Government of Western Australia, 2010)

12 The ‘Transforming Australian Cities’ report produced by the City of Melbourne (2010) will form a guide for this design projection exercise; this report analysed the development capacity of Urban Corridors to establish their potential yield.
Step 1: Selecting significant parks in close proximity to major public transport nodes

While we propose the importance of potential synergies between upgraded parks and densified urban form we believe this densification should occur principally in areas with reasonable access to public transport. We have determined that ‘reasonable access’ can be understood as within a 1400m, or a 5 minute cycle-shed\(^{13}\) around train stations\(^{14}\) in the greyfield study area. This decision and its subsequent mapping has allowed us to select parks which could be the potential focus for densification. (Fig 3) We have, for the purposes of this study, elected to use Christopher Alexander’s specification that a park must be at least 5500m\(^2\) in size so that in the middle of the park ‘you feel you are in touch with nature, and away from the hustle and bustle’ (1977).\(^{15}\) Although somewhat arbitrary this provides a guide to the relative amenity a park can provide and the degree of support it may offer to densification in a larger urban context.

\(^{13}\) The 5 minute cycle-able catchment has been proposed as an alternative to the orthodox 5 minute walkable catchment as it is better suited to the study area’s sprawled suburban urban form. Cyclists travel at average about 17km per hour (Deakin University Australia, 2013) as such a cyclist takes about 5 minutes to travel 1400m.

\(^{14}\) Perth has an electrified suburban train system which covers 173km of track with 21 stations on 4 principal lines which run thru the study area. Perth has a proposed light rail link which is to run north from Perth to Mirrabooka. This has been excluded from this exercise because the proposal is still being studied.

\(^{15}\) This figure is also commensurate with parks bigger than a ‘neighbourhood park’ as defined in Perth’s Liveable Neighbourhoods planning guide (West Australian Planning Commission & Infrastructure, 2007).
Figure 3: Significant parks (5,500m² +) in reasonable proximity to public transport nodes
Step 2: Establishing an area for densification around the parks

In this step we have established a 5 minute walkable catchment around the previously identified parks which we propose is up-zoned. (Fig 4) A 5 minute walkable catchment, or 400m, is regarded as being the distance the people will walk to access everyday amenities (West Australian Planning Commission & Infrastructure, 2007). This catchment is also commensurate with the area in which property values could be expected to be uplifted by an upgraded park (Lutzenhiser & Netusil, 2001). It is intended that this would be the area which could undergo significant infill development.

Figure 4: Areas for potential densification around parks (in yellow)
Step 3: Calculating the number of lots which could be potentially densified

In this step the total number of lots in the aforementioned zones is measured in GIS. (Fig 5) Subtracted from this are lots with heritage listed buildings and all land uses other than ‘urban’ as defined in the Metropolitan Region Scheme (MRS). This process results in 2662 lots which fit the criteria established and could potentially be redeveloped. We propose that the lots immediately adjacent to the selected parks could be developed at a reasonably high density ~R70\(^{16}\) in the form of 3-4 storeys walk up apartments. This will provide a level of occupancy sufficient to activate the park and give a maximum number of residents a view over the park. (Fig 6) The lots further back from the park, but still within the 400m catchment, we propose could be developed at R25-40 density to reflect prevailing community preferences for semi-detached dwellings.\(^{17}\) Hypothetically if these lots were all redeveloped at an average of R40 then overall 170,000 dwellings could be accommodated. While this is an unlikely outcome, if only a fraction of these lots were redeveloped then this could make a significant contribution towards the 121,000 number of infill dwellings which are targeted in Perth’s planning document ‘Directions 2031’ (Department of Planning Government of Western Australia, 2010).

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16 R70 refers to 70 dwellings per hectare which relates to Western Australian Planning Commission ‘Residential Development Codes.’ The density of R70 in this instance is proposed to equate to 3-5 story apartment buildings.

17 We propose however that these semi-detached dwellings would differ from those that the market is currently delivering, so as to produce more useable outdoor space, and better response to the climate. Examples of such building typologies can be found in ‘Take 7 Housing Australia: How Architects Can Make a Difference (London & Anderson, 2008).
Figure 5: Lots available for potential redevelopment

Figure 6: Densification of the walkable catchment of upgraded parks
Conclusions

This paper has proposed an additional strategy for achieving infill development in Perth’s greyfield suburbs, but is potentially generalizable to the greyfields of other Australian cities. This strategy in which upgraded POS is correlated with increased residential densification could create synergies including the garnering of community acceptance for infill, positive economic effects, and the provision of amenity for residents living at higher densities (Bolte, 2013). Arguably this strategy, according the results of the ‘Housing We'd Choose’ survey, is aligned with community preferences for dwellings in close proximity to parks, and as such could potentially be popular. While transit orientated development planning (TOD) principles have informed the existing strategies for densification in Perth the author questions their dominance in attempts to densify Perth’s sprawling suburban form. While architectural theorist Rem Koolhaas identified Atlanta as being a landscape ‘not a city’ (1995, p. 835), this same analogy is perhaps even more apt for Perth with its incredibly thin density of 6 dwellings per Hectare (Weller, 2009, p. 181). It is in this context that infill strategies which build upon Perth’s ‘landscape’ condition appear to have validity. This is not proposed as a replacement of existing state government endorsed strategies for densification but as a much needed additional complementary strategy which perhaps relates more closely to Perth’s existing morphology and housing preferences.
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