

The sustainable location of low income housing development in South African urban areas

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Abstract

Underpinning much of the international and local urban development and form literature, and becoming increasingly entrenched in local development policy, legislation and practice, is the common assertion that our cities are characterised by patterns of sprawl resulting in excessively costly infrastructure, excessive transportation costs and energy consumption, and environmental damage. The solutions offered relate to curtailing outward expansion of the city using urban edges, increasing densities and promoting public transport with associated increasing densities along public transit routes. The South African government's subsidised housing programme has accordingly been criticised for providing low income housing on urban peripheries, far from urban economic and social opportunities, allowing quantity housing targets to be met but at the expense of quality targets in terms of good location.

A sustainable housing development cost – benefit model was developed for measuring and comparing the costs and benefits of alternative low income settlement locations. This model was tested for a number of subsidised housing locations to enable the empirical comparison of locations in terms of the identified sustainability cost-benefit criteria and also to enable the further refinement of the model. It was found that there is significant diversity in low income households and it is not simply a case of “one size fits all”. Different needs and priorities exist which translate into different criteria and levels of importance for different profiles of low income household. Furthermore, access to formal employment nodes are less important for low income households than

access to informal opportunities, predominantly in the informal service industry within or near the low income settlement itself, and access to middle to high income residential areas where unskilled, semi-skilled and domestic occupations are in high demand. In measuring the sustainability of a location it is thus necessary to extend the measure of access to work to include these findings.

1 Unsustainable patterns of urban growth

Underpinning much of the international and local urban development and form literature, and becoming increasingly entrenched in local development policy, legislation and practice, is the common assertion that our cities are characterised by patterns of sprawl resulting in excessively costly infrastructure, excessive transportation costs and energy consumption, and environmental damage. The proposed solutions have been attempts to control and manage urban growth, many of which relate to curtailing outward expansion of the city using urban edges, increasing densities and promoting public transport with associated increasing densities along public transit routes.

Continued peripheral low income housing development in South African cities, including new greenfields subsidised housing and the upgrading of existing peripheral informal settlements, have been criticised for having achieved number targets at the expense of quality targets in terms of good location. The reasons for continued peripheral development have been related to affordability aspects of cheaper, more easily acquired land on the periphery as opposed to expensive land in the more central areas with insufficient subsidy amounts to build at higher densities to offset the higher land costs. The perceived consequences are that poor people are perpetually marginalised in terms of access to jobs, other urban amenities and social networks and need to spend disproportionate amounts of time and cost on transportation with the associated costs to the environment in terms of increased fuel usage and greenhouse gas emissions. It is further argued that infrastructure costs to the local authority are higher due to greater distances which need to be traversed with services.

2 Study purpose

A study was conducted to provide empirical evidence of the comparative development costs and benefits between more centrally-located low income housing developments, perceived in terms of compact city ideals to be “better located”, versus more peripherally-located developments, perceived to be less suitably located. In order to measure the comparative sustainability of settlements, a set of quantifiable measures and indicators was developed and organised into what could form the basis of a decision-making tool. It was further the intention of the study to test and consider the implications of the findings on the further development of such a tool.

In the analysis of empirical findings, one of the key locality cost- and benefit-related questions addressed was whether or not job opportunities are significantly less accessible to residents of more peripheral settlements. The purpose of this paper is to highlight the results and conclusion appertaining specifically to transportation costs and benefits.

3 Study areas

Two case study areas were selected in the Johannesburg metropolitan and a further six in the Durban/Ethekewini metropolitan area. The Johannesburg settlements were selected on the basis of current spatial policy, where Diepsloot, 35 km from the Johannesburg CBD, is considered an isolated location where a policy of consolidation and containment is recommended. Alexandra on the other hand, 11 km from the CBD but virtually on the doorstep of the rapidly expanding Sandton nodal area, is considered an area of opportunity and accordingly been promoted for renewal and regeneration.

In Ethekewini, the selected settlements represent a range of localities throughout the city. Cato Manor is located in close proximity to the Durban CBD (8km along existing transport routes). Quarry Heights and Westrich are 15km from the CBD, while Madiba Valley is 32km away from the Durban CBD but approximately 10km from the Pinetown CBD. Lovu and Waterloo are 35 to 25km from the Durban CBD, to the south and north respectively. Fredville is about 45km west of the city.

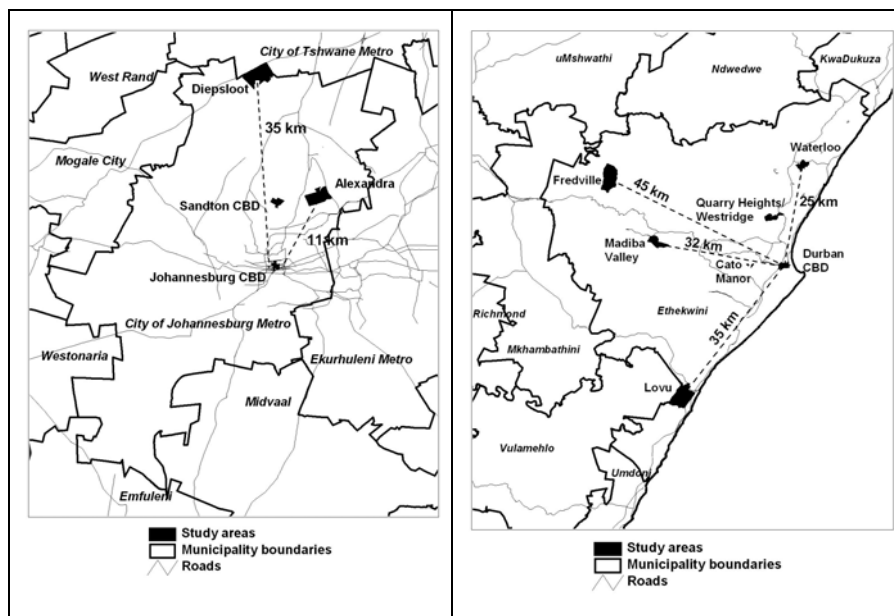


Figure 1: Low income housing settlements in Johannesburg and Ethekwini included in study

4 Transportation costs and benefits

4.1 Transportation component

The study considered a number of locality-related, multi-disciplinary, cost-benefit components in addition to transport: land, social, bulk engineering service infrastructure, economic and biophysical environment. Transport costs included infrastructure cost (constructing and maintaining roads and bus/taxi/rail infrastructure), user costs (energy cost, maintenance cost and capital cost of owning and operating vehicles, as well as the opportunity cost of time spent travelling), and indirect costs (accruing to individuals and society in the form of accident cost). It covered all relevant modes of transport (including private cars, bus, rail, minibus-taxi, and travel by foot and bicycle), and focuses on the three major trip types, namely work, education, and shopping trips.

Data on household expenditure, travel patterns and perceptions, were based on household surveys with the sample sizes varying between 250 (in Johannesburg) and 100 (in Durban) households per settlement, with a total combined sample of 1100 households.

4.2 Total transport costs

Grouping the 8 locations rather arbitrarily into more central and more peripheral locations, the average total transport cost for the more central locations (<15km from CBD) is lower than the average for the more peripheral locations (>25km), suggesting that more central locations are more beneficial in terms of total costs (Table 1). In Johannesburg, the difference between total costs in Alexandra and Diepsloot is only a marginal 6%, despite the difference in distance to the CBD of 24km. A more detailed consideration of the individual cost components, however, reveals a far greater degree of complexity and diversity in the relationship between cost and location. A simple regression analysis to measure the variation in total transport costs which can be ascribed to distance from the CBD, shows that only 6 % of the variation is attributable to distance from the CBD.

If individual settlement's transport costs are considered, there is considerable diversity in costs even within each broad grouping. Waterloo has the highest total transport cost although it is located somewhere between a more central and peripheral location (25km), followed by Alexandra, which, although a more central location, has higher car availability and use, contributing to higher transport costs for the household. Madiba, although 32 km from the CBD,

indicates total transport costs more commensurate with those lower costs found in the more centrally located settlements. Alexandra, although more central, has costs which correlate better with those of the more peripheral sites (Diepsloot, Lovu). With the exception of Waterloo, Diepsloot and Alexandra exhibit much higher total costs than the Ethekekwini settlements

A consideration of who pays, reveals that much greater cost accrue to the individual than to government. Only between 8 and 15% of total costs are borne by government. Diepsloot and Madiba Valley have the highest proportion of government cost as a result of bus subsidies. Residents of more peripheral localities in Ethekekwini – those with generally higher travel distances – consume almost no subsidised transport. They have no access to subsidised bus services, and make very little use of rail. This is in contrast to more central localities. The higher transport costs of more distant housing, is borne almost exclusively by the household itself. In the case of Diepsloot, it is the bus mode, education trip, which contributes mostly to the higher government cost (bus subsidy) thus to total transport cost, which suggests that providing improved education facilities in Diepsloot would significantly reduce the transport cost rather than some transport solution. Highest individual costs are to households in Waterloo which is by no means the most peripheral location – it is located at a fairly modest 25km from the CBD. Individual costs are higher to households in the more central Alexandra, than to households in the more peripheral Diepsloot

Price discrimination appears to affect transport costs. For instance, Alexandra passengers pay on average R157 per month for taxi service, but travel shorter distances than Diepsloot passengers who pay only R137 per month. It is suggested that taxi operators can charge slightly more in Alexandra because passengers are able to pay more (have higher incomes).

Variations in transport infrastructure cost seem largely unrelated to location, mainly by virtue of the methodology used to calculate infrastructure costs, but are relatively insignificant, comprising between 6 and 7% of total transport cost.

Table 1: Average transport costs per person (R/month)

	>25km from CBD					<15km from CBD		
	Lovu	Fredville	Madiba	Diepsloot	Waterloo	Q.Hts/W'ridge	Cato Manor	Alex
<i>Infrastructure Costs</i>	8.58	7.26	6.47	10.42	9.86	6.15	5.99	9.82
<i>Direct operating costs</i>								
Operating costs: private cars	23.21	28.06	9.15	18.36	57.39	14.58	18.83	26.30
Operating subsidies: buses	0.00	0.00	7.64	11.41	0.00	4.72	2.26	1.81
Operating subsidies: rail	0.76	0.18	0.01	0.00	1.10	0.45	0.20	0.00
Public transport fares	64.81	50.26	44.74	75.67	46.64	41.03	39.42	66.49
Journey time costs	32.49	24.29	29.82	31.35	34.49	26.54	24.21	4.28
<i>Indirect operating costs</i>								
Accident costs	1.29	0.92	1.03	1.67	1.30	0.60	0.63	1.60
TOTAL COSTS	131.14	110.97	98.87	148.88	150.77	94.07	91.54	140.30
Average	127.75					108.64		
<i>Government cost</i>	10.63	8.36	15.15	23.50	12.26	11.92	9.08	13.23
<i>Individual cost</i>	120.51	102.61	83.72	125.38	138.51	82.15	82.46	127.07

4.3 Multi-nodal travel destinations

The multi-nodal structure of both cities means that most trips are not to the urban core, but to other more accessible locations around them (Figure 2). 72% of Fredville commuters travel to nearby Hammarsdale and Pinetown; most Lovu commuters travel to Amanzimtoti and Kingsburgh; almost 40% of Diepsloot work trips are to Sandton and Randburg and only 11% to the Johannesburg CBD.

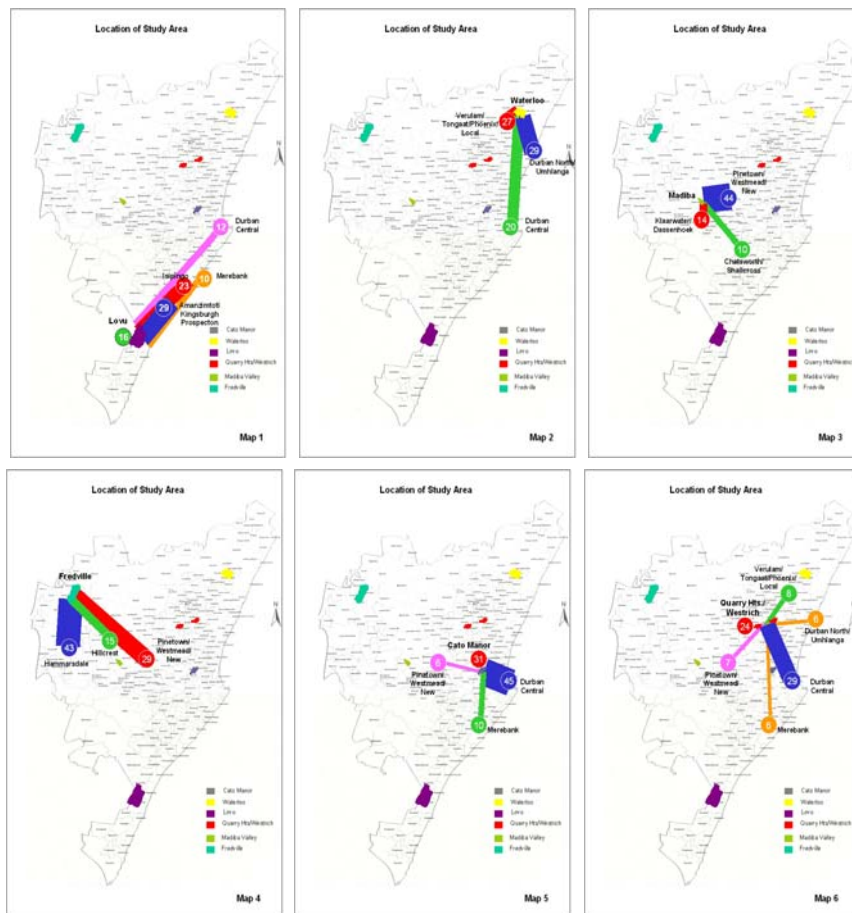


Figure 2: Number of work trips made to employment areas

4.4 Access to employment

The importance of access to work as an important sustainability criterion was singled out for a deeper level of investigation due to the perceived importance of this criterion within the study reference group but also due to the prominence of this criterion in urban policy and practice. The analysis was performed for the Ethekwini area as this issue emerged strongly in a consideration of the Johannesburg study outcomes in preparation for the Ethekwini work and a finer grained questionnaire was accordingly used in the interviews in Ethekwini.

It was found that access to formal employment nodes are less important for low income households than access to informal opportunities, predominantly in the informal service industry within or near the low income settlement itself, and access to middle to high income residential areas where unskilled, semi-skilled

and domestic occupations are in high demand. Instead of trying to locate all low-income households near the city centre or near manufacturing locations, it may be better for them to be located near middle and high income households.

The argument submitted as to why access to formal employment nodes may be less important for some low income households relates to aspects of macro economics and the actual nature and location of low income household employment. The current macro-economic situation in South Africa, means that currently there are just not enough formal jobs to employ all economically active people and although a recent evaluation of the Ethekewini economy concluded that real economic growth needed to be raised to the 7% per annum level, the present average annual growth rate is only between 2,5% and 3,0%.

Notwithstanding the slight differences between locations, on average, more than 50 percent of the population of employable age are unemployed (Figure 3). Of the 50 percent employed, about 20% again are employed informally or are self-employed and mostly walk to work which implies a local destination. The other about 30% of the 50% employed, are formally employed but predominantly as unskilled, semi-skilled or domestic workers (Figure 4). In addition, only around 70% of the economically active population travel to work daily. Furthermore, a significant proportion of those formally employed are in occupations not fixed to a single work place – e.g. drivers, security. These facts coupled with the fact that most destinations for work are those nodes closest to the settlements has significant implications for the measure of access to work in terms of the location model but has more profound implications for transportation planning in general.

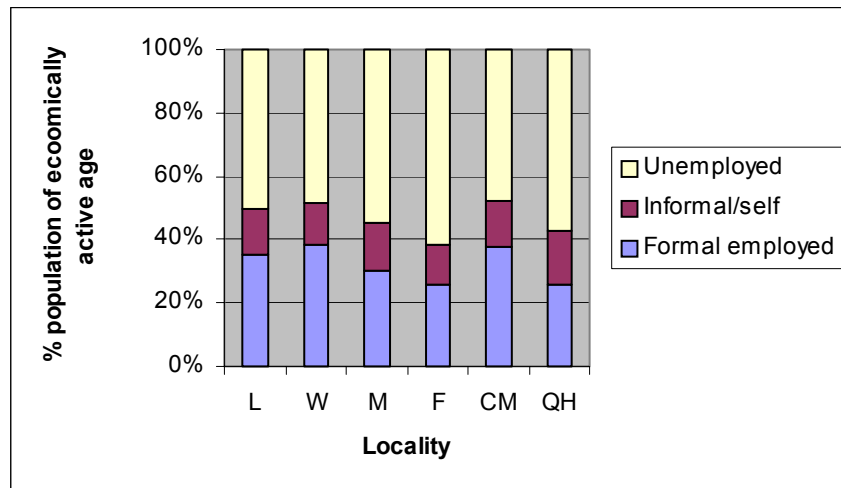


Figure 3: Employment status

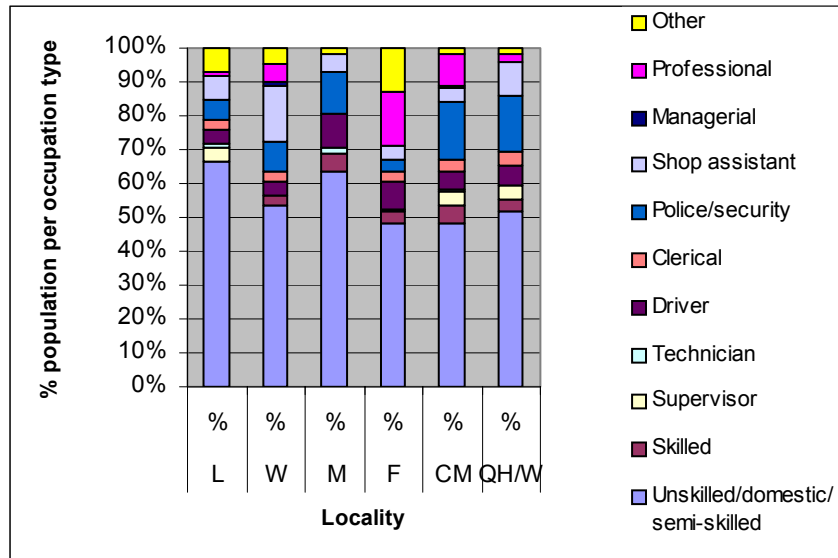


Figure 4: Occupation levels

5 Conclusions

From this more empirical consideration of the costs and benefits of low income settlement locations, no clear evidence has emerged which conclusively supports the assertion that central locations are better than peripheral locations. For each piece of evidence which suggests a relationship between centrality and least cost and greater benefits, there are as many, if not more, pieces of evidence which negate that relationship. What is clear is that the relationships are complex. It is certainly not clear that a compact city alone will be significantly better for poor households than a more sprawled pattern of development. There are differences between cities and also between locations within cities, but not clearly attributable to the degree of compactness or centrality. It is recognized that the sample base is limited but it is submitted that there is sufficient evidence to suggest that the best locations for low income housing are not necessarily within the urban core and that the urban peripheries are not necessarily the most costly and least beneficial locations for all low income households. These findings have significant implications for the local and international urban form policy agenda.

Any further development of the base sustainable development location model developed during the course of the study would need to consider the two most significant findings of the study. Firstly, in the case of low income housing location, it is not simply a case of "one size fits all". There is significant diversity in low income households which each have different needs and priorities which translate into different criteria and levels of importance for different profiles of low income household. Attempting to find one type of good urban housing

location, which will serve all household's current and future needs, which in addition, is affordable to household and government alike, is certainly not a sustainable solution. Secondly, the element of access to work is far more complex than simply mapping access to the major formal employment centres. Access to all formal work nodes is important, but not only the central node. Access to the closest formal node should be given more significance as most trips are made to the closest nodes. Access to higher income residential areas for domestic and unskilled opportunities is important. Access to within-settlement informal service opportunities should not be ignored. The longer term development direction of the urban area should be an important consideration in the location of low income areas now, in view of the potential in immediate construction-related work opportunities, permanent opportunities in new formal jobs and more lower skilled jobs in related high income residential areas.

A generic option for the further development of the model would be not to develop generic settlement profiles comprising set description of each profile component but rather to have criteria and criteria weightings linked separately to each profile component so that no matter how many varieties of settlements exist, each can be modelled. The model used in this way would be useful to determining priorities for in-situ upgrading and for relocation. If the model is used for assessing the suitability of greenfields land for development (no current population), it is proposed that a diversity of typical settlement profiles are used so that a diversity of settlement types are catered for.