

# **Evaluation of Developable Land within Urban Edge**

Metropolitan Spatial Planning  
Spatial Planning and Urban Design  
City of Cape Town

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## 1 Introduction

The Urban Edge is a city-approved spatial planning policy aimed at limiting urban sprawl and piecemeal development, while encouraging greater urban densities and a more compact urban form. It also plays an important role in the protection of rural and environmentally sensitive land. An Urban Edge line has been demarcated around the city, and urban development is discouraged outside of this line. (See *Cape Town Development Edges Policy: Urban and Coastal Edge* for more details)

While, the aim of this policy is to promote compact urban development and direct growth to appropriate locations, the intention is not to constrain urban growth and development. For this reason the urban edge is not fixed and is subject to periodic review. The draft *Spatial Development Framework (SDF)* and *Urban Development Edges Policy* proposes that this be done every five years.

This document describes a land assessment, conducted by the City of Cape Town between 2008 and 2010, to evaluate whether sufficient developable land exists within the urban edge to accommodate urban growth. In order to evaluate this two essential questions need to be addressed:

1. *How much developable land is there within the urban edge?*
2. *How fast will the city grow in the future?*

This document attempts to provide reasonable estimates for both these questions and interpret the implications of this for the urban edge line.

## 2 PSDF Guidelines

The Provincial Spatial Development Framework (PSDF) Statutory Report (2005) and Explanatory Manual (2009) provide guidelines for analysing vacant land, estimating growth rates and demarcating an urban edge. In determining projected future growth rates, the PSDF emphasises the need to consider current growth rates as well as densification policies.

### 4.3.1(2)

*Establish or confirm current needs and demands with respect to land for commerce, industry, community facilities, open space, and housing according to existing available information. In particular establish the current growth rate of the town and make projections of the future growth rate, using the densification and integration targets of the municipality based on existing growth rates as well as other relevant policy documents (including the densification and integration policies of the municipality), if this has not been explicitly indicated in the IDP and SDF.<sup>1</sup>*

In addition, the documents provide the following guidelines on how much developable land should be included within the urban edge cautioning against the inclusion of too much land.

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<sup>1</sup> PSDF – Settlement Restructuring: An Explanatory Manual, 2009

#### **4.5.6 How much land should be available inside the urban edge?**

*There should be sufficient land within the urban edge to accommodate the medium term growth of the settlement. Including too much land within the urban edge can prove just as detrimental to the development of a town as too little land. While too little land restricts growth through not allowing enough development opportunities, too much land can result in:*

- *Inappropriate forms of development - by releasing too much land the value of the land is reduced and the type and form of development may not be appropriate.*
- *Inability to guide or direct growth into the desired direction – releasing too much land can result in the impetus for a desired direction being diluted.<sup>2</sup>*

#### **2.3.31 URBAN EDGES**

*Thus, the urban edge must restrict the outward growth of urban settlements until such time as average gross densities of 25 dwelling units or 100 people per hectare are achieved.<sup>3</sup>*

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<sup>2</sup> PSDF – Settlement Restructuring: An Explanatory Manual, 2009

<sup>3</sup> PSDF Statutory Report, 2009

### 3. Evaluation of Developable Land

This section looks at how much developable land<sup>4</sup> is available within the urban edge. It both outlines the methodology followed and reports on the findings of a land assessment undertaken by the city between 2008 and 2009.

#### 3.1 Land Assessment Method

All significant vacant and partially developed sites within the urban edge were assessed for their suitability and potential for urban development. This was done using information from different sources.

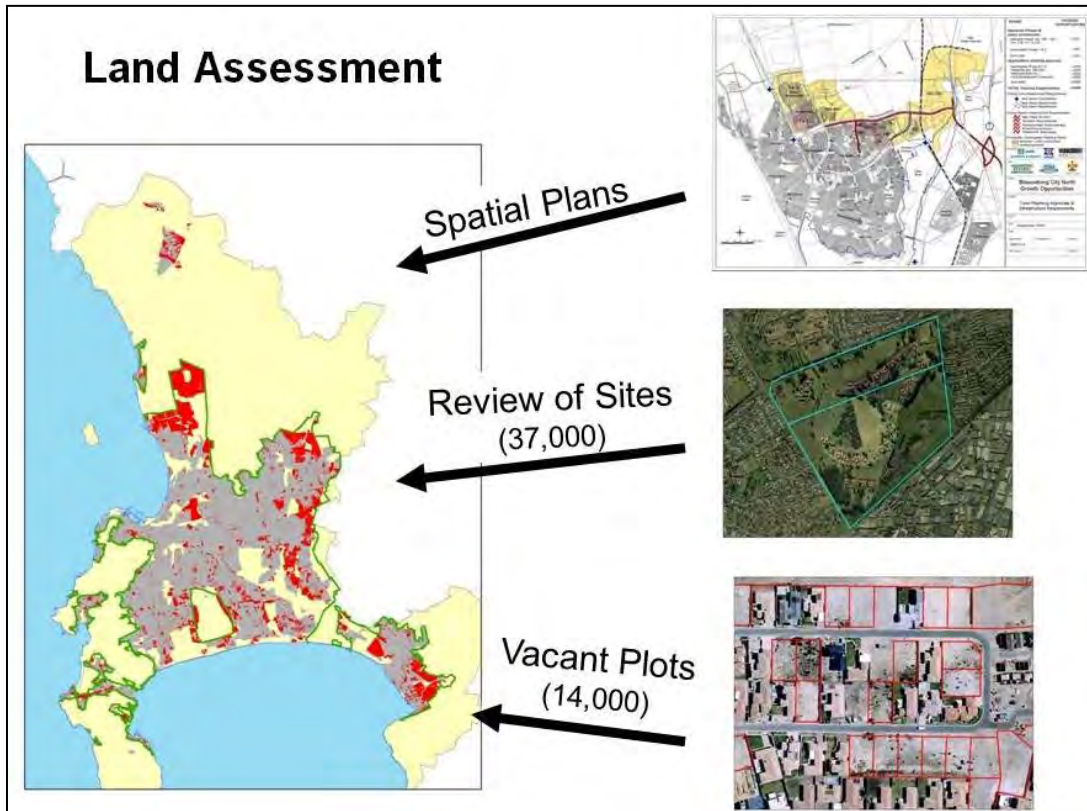


Figure 1: Components of Land Assessment

Firstly, a comprehensive assessment of all significant under-used land parcels within the Urban Edge was undertaken by planners from the Spatial Planning and Urban Design and Planning and Building Development Management Departments of the City of Cape Town.

In this assessment over 37,000 sites were evaluated and each site was considered for its development potential, percentage of the site available for development, suitability for different land uses, appropriate residential density (if proposed for residential use) and the likely timeframe for its development. These judgments were made by planners with local knowledge and was guided by a pragmatic sense of development constraints, development pressures in the area as well as what they considered to be the

<sup>4</sup> This report uses nett densities and nett land. Nett refers to the actual land used for a particular land-use. Nett residential land excludes road space, schools and public open space. See Appendix A for illustration as well as actual examples of nett residential densities in Cape Town.

most appropriate land-use for each site. Spatial information such as bio-diversity, agricultural data and September 2007 aerial photography was made available to assist with this process. 2008 photography was later used to update this information. For pragmatic reasons this assessment was generally limited to sites larger than one ha in size. This was done in several phases and a higher degree of detail was captured for potential residential sites than for other potential sites.

Secondly, vacant plots with residential or industrial zoning were identified in a separate process. A total of 12,260 residential sites accounting for 718 hectare, and 491 industrial sites accounting for 163 hectares were identified. As these sites are typically well under one hectare in size they were mostly not covered by the above describe review.

Thirdly, land identified in the District Spatial Development Plans (SDPs) for future urban development (New Development Areas) was incorporated. This includes large tracts of rural land, mostly on the city periphery. This information was then reconciled with information on under-developed land.

Fourthly, information from more detailed planning exercises was incorporated and was used to replace earlier estimates. This was done for the area north of Parklands, the “North-East Development Corridor” (north of Kraaifontein) and the AECl site (Heartlands).

Finally, additional information from various sources was captured. This included information on informal settlements, site ownership, development application status and proposed subsidy housing sites.

### 3.2 Calculating Land Totals

Land totals were firstly calculated for all proposed land uses using site extent and the estimated percentage of site available for development. Secondly, development timeframe estimates were used to quantify the amount of land expected to be development both before and after 2021. Where such estimates were not available a rate of development, based on development application status, ownership and type of site, was assumed<sup>5</sup>. In addition, dwelling unit totals were calculated for land identified for residential purposes.

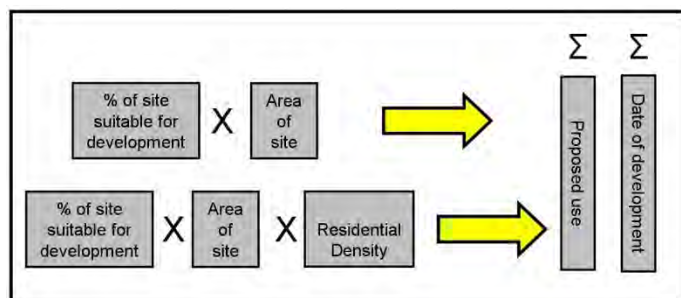


Figure 2: Schematic representation of land calculation

The calculation made allowance for two further considerations. Firstly, when a land parcel is developed a proportion of the site is used for roads, road reserves, facilities and open space. This proportion varies depending on the site. For example large rural tracks of land require a relatively large proportion of the site to be retained for such uses while individual vacant residential plots do not require this. To allow for this, nett residential densities were used (number of residential units / residential plot size) and a “gross-

<sup>5</sup> This mostly does not apply to land identified for residential purposes where development timing estimates are available for 80% of such land.

to-nett” conversion factor was applied. Different factors were applied to different site sizes as shown in the table 1. Two sets of conversion factors were used: a conservative estimate and a higher estimate.

Table 1: “gross-to-nett” conversion factors

Land Parcel Size (hectare)	Factor (Conservative Estimate)	Factor (Estimate)
< 1 ha	0.8	0.9
1 – 10 ha	0.65	0.72
10 – 20 ha	0.56	0.65
> 20 ha	0.49	0.62

Secondly, residential densities were calculated differently for different areas. Vacant residential plots were calculated using a flat rate<sup>6</sup> (instead of applying a residential density). While, dwelling unit totals taken from more detailed spatial plans were used where available.

### 3.3 Findings

Estimates were calculated for 1) nett land identified for residential purposes and 2) nett land identified for general urban use (residential, industrial, commercial and mixed use) but excluding land needed for roads, schools, sports fields and public open space. In addition, two estimates (high and low estimates) were calculated for each (see table 2). These were influenced by the two sets of “gross-to-nett” factors as outlined above.

Table 2: Estimated nett land available within Urban Edge

Land Identified	Low Estimate (conservative) (Nett Hectare)	High Estimate (Nett Hectare)
Residential Land	7,767	8,673
General Urban Development	9,827	11,432

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<sup>6</sup> An estimated flat rate of 1.2 dwelling units per site was used

## 4 Estimation of City Growth

Future city growth was estimated using two methods:

1. Using past urban growth trends to project future growth
2. Modelling future development

<b>Past growth trends</b>	<b>Modelled future residential development</b>
Estimated total growth (Ha nett)	Estimated land (Ha nett) consumption for: 1. Informal settlements 2. Subsidy housing 3. Market housing
Total area identified for development (Ha nett)	Total area identified for residential development (Ha nett)

Estimated growth projections from both of these methods are calculated in nett hectares and compared with the amount of land identified within the Urban Edge.

Population projections can also be used to model future urban growth. However, this approach was not followed for several reasons. Population growth is not directly related to urban expansion as this is highly influenced by urban densities. Population growth is also strongest in poorer communities, which have relatively little impact on urban expansion, as they generally live in higher residential densities. In addition, urban growth is affected by subsidy housing delivery which is dependent on housing delivery programmes rather than population growth. Furthermore, the growth of non-residential land-uses such as industrial land is influenced more by economic growth than population growth.

However, population projections provide useful insights into long term growth trends. Here it is important to note that population projections show declining growth rates. This can be seen in Figure 3 that shows Dorrington's Population Growth Projections (1999 and 2005).

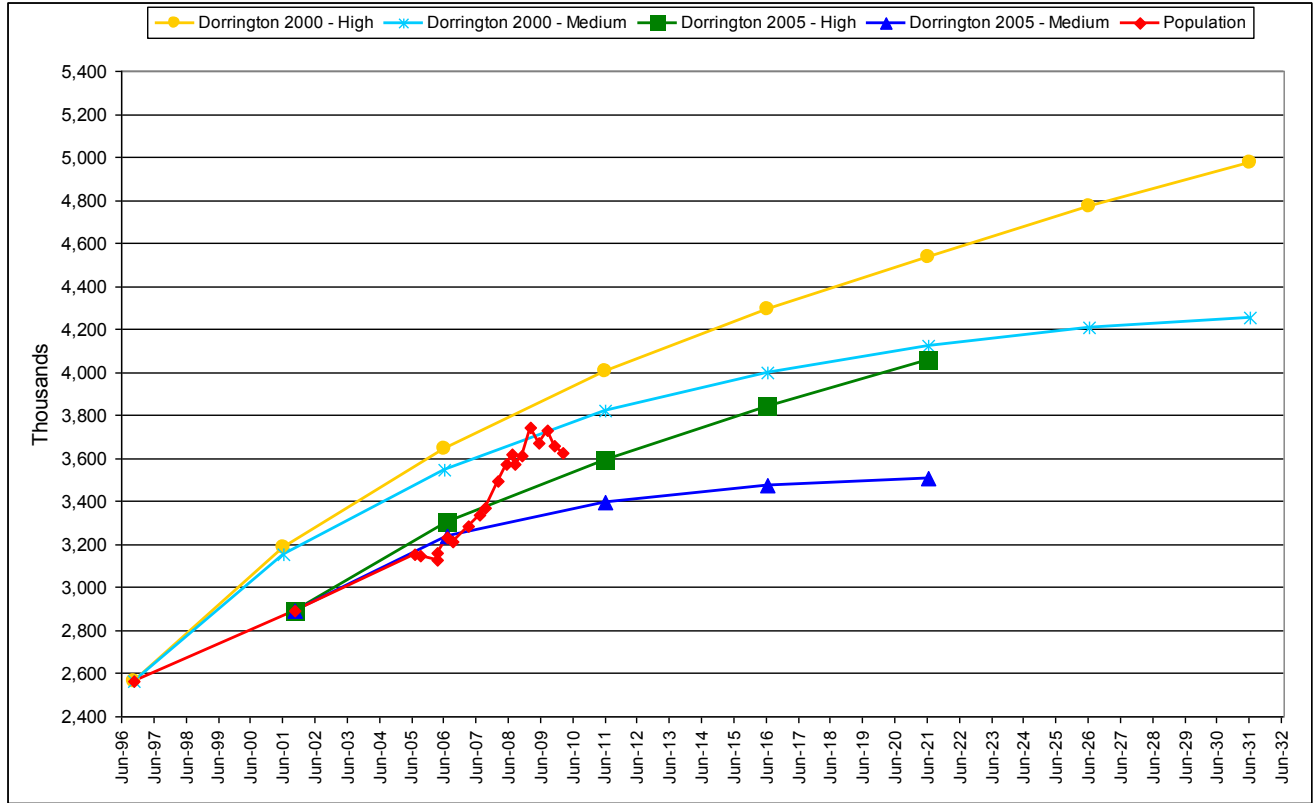


Figure 3: Population figures (Statistics SA) and Dorrington's Population growth Projections (1999 & 2005)

#### 4.1 Growth Projection 1 – Projecting Past Urban Growth Trends

This estimate uses past urban growth rates to project future city growth. City information on urban growth indicates that the city was growing at an average rate of approximately 650 hectare per year (nett) between 1996 and 2007 (see figure 4). This is based on all urban land-uses such as housing, industry, schools, clinics, infrastructure and informal settlements, however, excludes parks, open sports fields, public open space and roads.

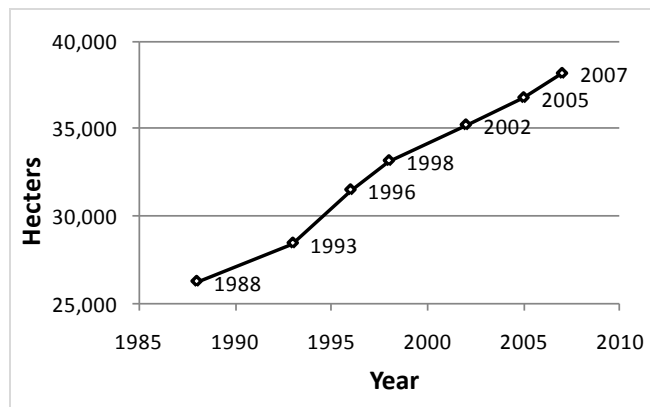


Figure 4: Nett Urban Growth

Nett land required by 2021 for all urban land-uses was calculated by projecting growth (at the 650 hectare per year growth rate) from 2007 (the base year of the model) to 2021. This provided a figure of 9,100 hectare nett.

### Results and comparison

This land growth projection was then compared with the estimates for nett land within the Urban Edge available for general urban development<sup>7</sup> (see figures 5). This suggests that there is sufficient land availability for development within the Urban Edge until 2021.

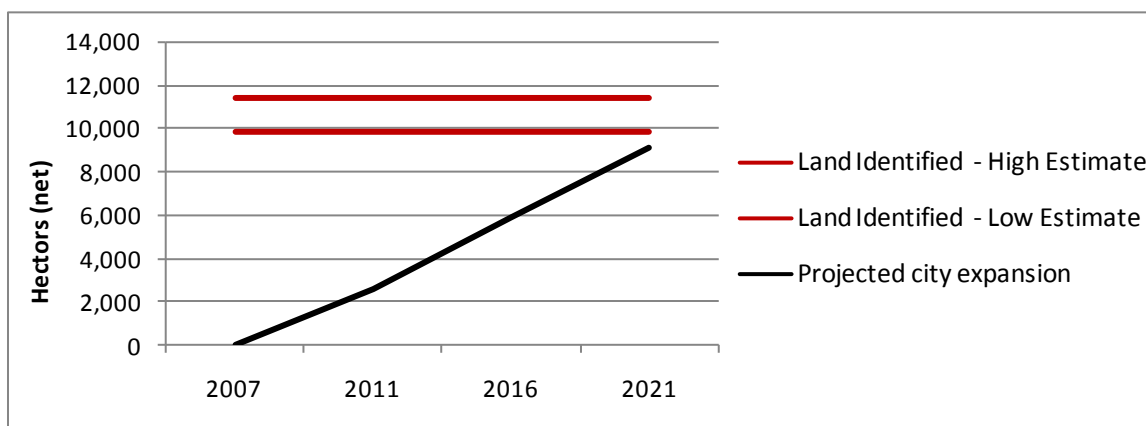


Figure 5: Projected city expansion compared with developable land within the Urban Edge (General urban development)

While, the growth projection approaches the low estimate for available land within the urban edge in 2021, it should be noted that this projection is conservative for two reasons. Firstly, the growth projection may be overestimated as it uses past growth trends and does not allow for the higher residential densities generally being realised in recent residential developments. Secondly, the growth projection includes land required for facilities such as schools, while this has been excluded from the nett figures calculated for land available within the Urban Edge.

## 4.2 Growth Projection 2 – Growth Modelling for Residential Land

As residential land accounts for the majority of urban land it is an important driver of urban expansion. This second growth estimate was generated from modelling growth scenarios for informal, subsidy housing and market housing.

### Informal Dwelling Growth

Informal dwelling surveys from the City of Cape Town’s Corporate GIS Department (see figure 6) were used to project an informal growth rate. This rate was applied to the total land area currently used for informal housing to provide projected informal growth in hectare.

<sup>7</sup> As described in section 3

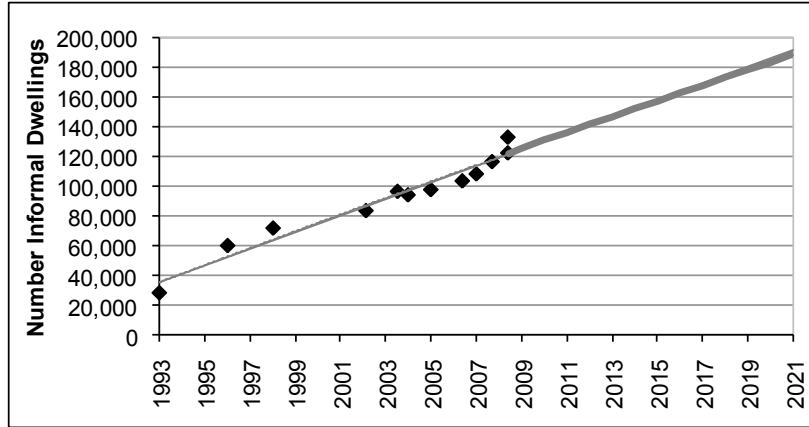


Figure 6: Informal Dwelling Counts and Projection to 2021

Source: City of Cape Town, Corporate GIS

### Subsidy Housing

Two scenarios were developed for subsidy housing (see figure 7). The first scenario assumes 10,000 subsidy houses with an average erf size of 100m<sup>2</sup> will be delivered per annum. This is based on current housing delivery and current housing budgets.

The second scenario assumes a change in housing delivery policy that results in 2,500 subsidy houses and 17,000 site-and-service sites being delivered per annum. It was further assumed that this policy change would take effect from 2016. This is based on a scenario outlined in the City of Cape Town Housing Department's Five Year Integrated Housing Plan 2009/10 – 2013/14 where one third of the housing budget is spent on subsidy housing while the remaining two thirds are spent on site-and-service.

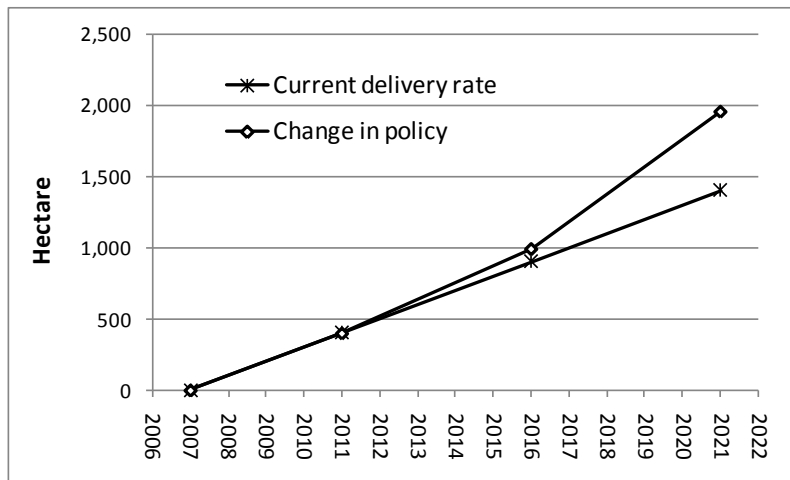


Figure 7: Estimates for land required for subsidy housing

### Market Housing

Information on past trends was obtained using the Urban Growth Model developed by the City of Cape Town's Strategic Development Information and GIS Department in 2008. This model makes use of a number of sources including electricity connections, solid waste registration and building plans information. This indicates that on average 15,700 dwelling unit per year has been developed between 2002 and 2008 (see figure 8).

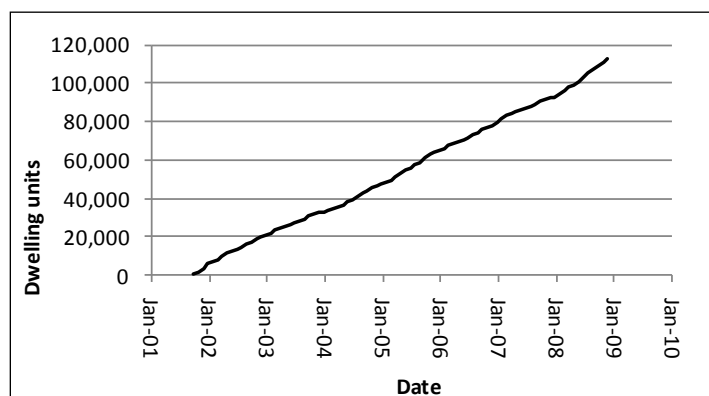


Figure 8: Formal Dwelling Units Developed. Source: Urban Growth Model, City of Cape Town

This is in agreement with formal dwelling figures taken from Statistic South Africa which indicates an average annual growth rate of 16,362 per annum over the period 1996 to 2007 (see table 3).

Table 3: City of Cape Town Formal Houses

Census / Survey	Formal Houses
October 1996 Census	527,989
October 2001 Census	634,429
July 2007 Community Survey	707,972

Source: Statistics South Africa

However, as these figures include subsidy housing, annual subsidy housing delivery figures (table 4) were subtracted in order to obtain formal market housing estimates. These estimates were then used to project market housing growth trends (see figure 9). This was translated into a land consumption rate for market housing growth using an average nett residential density of 30 dwelling units per hectare. This is relatively low compared to recently developed areas on the West Coast that achieve much higher densities<sup>8</sup>. It was further assumed that 90% of future residential units are developed on "green-field" sites. The remaining 10% allows for new residential units established on previously developed land as a result of sub-divisions, re-developments and the development of second dwelling (granny flats).

<sup>8</sup> See appendix A

Table 4: City of Cape Town Annual Housing Delivery

Year	Annual subsidy housing delivery*
2002	4,110
2003	9,728
2004	1,808
2005	3,469
2006	4,585
2007	7,519
2008	6,439
2009	9,576

Source: City of Cape Town Housing Department (February 2010).

\* 2007-2009 including low numbers of GAP, Social & Incremental housing

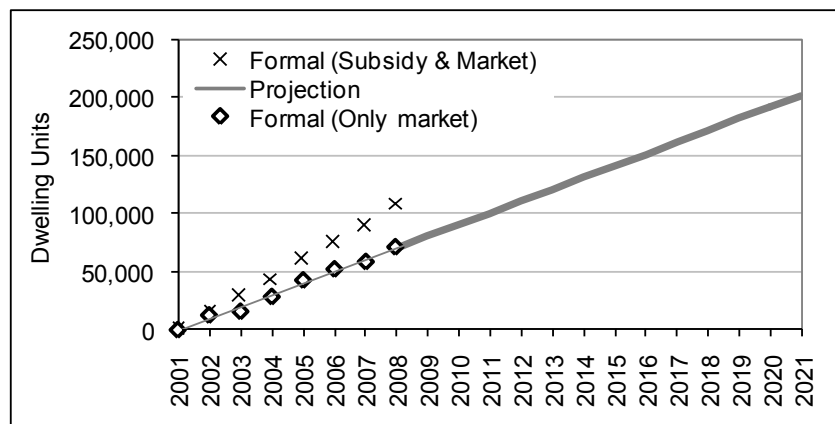


Figure 9: Projected Market Housing

### Results and comparison

The projected land “requirement” in nett hectares for informal settlements, subsidy housing (two estimates) and market housing were combined to result in two projections<sup>9</sup>. These were then compared with the estimates for nett land within the Urban Edge available for development and identified for residential use<sup>10</sup>. These suggest that there is sufficient land availability for development within the Urban Edge until 2021 (see figures 10 and 11).

<sup>9</sup> One projection for each subsidy housing option: 1) current delivery and 2) change in policy

<sup>10</sup> As described in section 3

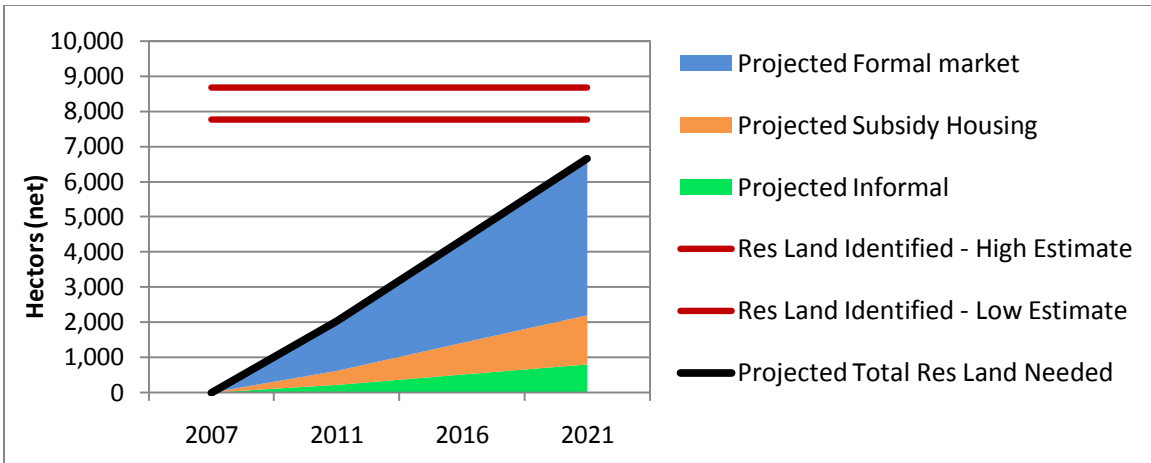


Figure 10: Projected residential land demand compared to residential land identified within Urban Edge (Current subsidy housing delivery rate)

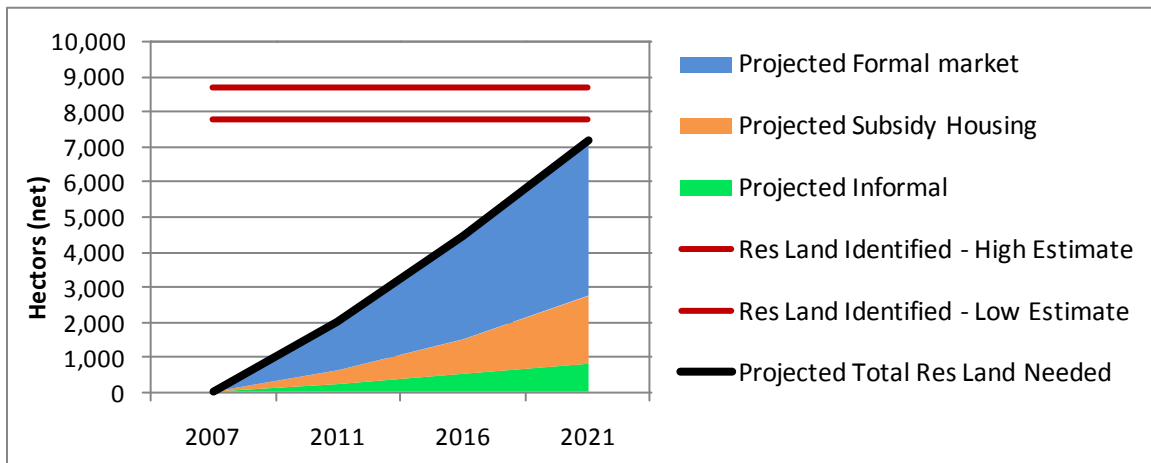


Figure 11: Projected residential land demand compared to residential land identified within Urban Edge (Change in subsidy housing policy)

## **5. Conclusion**

Both models used to project growth are conservative estimates of the land required to accommodate Cape Town's growth as they are based on "business as usual" trends and do not reflect the higher densities achieved by most new residential developments in recent years (see figure 8). The estimates also do not make significant provision for the densification of existing developed properties within the city. The results show that, on aggregate, enough land is available for urban growth until 2021 (figures 5, 10 and 11). Should there be a substantial increase in the Department of Housing's delivery of housing opportunities (figure 7) pressure will be placed on the land inside the urban edge sooner rather than later.

Land values, patterns of land ownership, social considerations and the required nature and scale of subsidised housing delivery suggest that the land inside the urban edge is generally more suited to private sector development than the large scale delivery of subsidised housing. The subsidised housing market will therefore be more susceptible to land supply pressures than the private market.

To ensure an adequate supply of land for development it would be prudent to review the alignment of the Urban Edge in 2016.

## Appendix A - Examples of nett residential densities

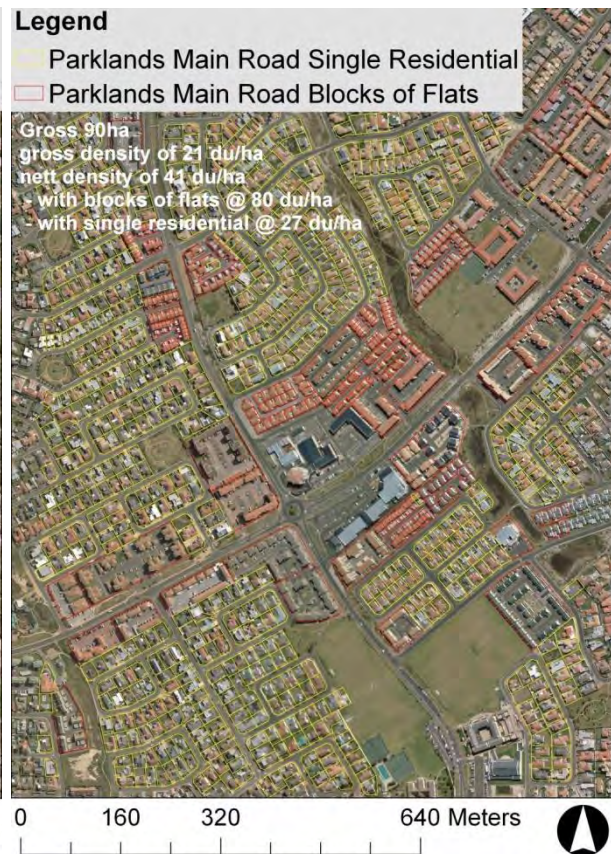
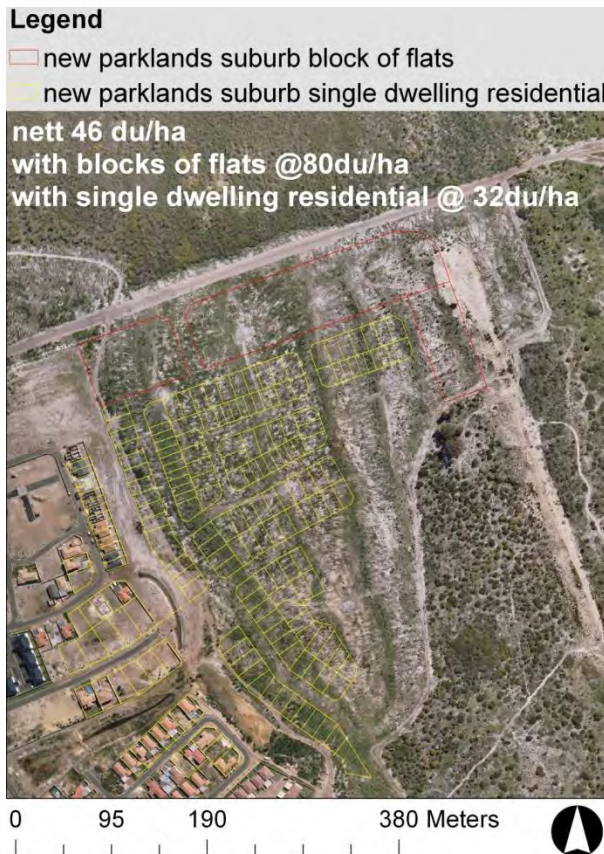
It should be noted that average nett residential densities need to be calculated from a mix of residential accommodation including single residential (separate dwellings), cluster housing and flats.

The following list provides examples (some illustrated with photos) taken from different areas.

Area	Nett Density (dwelling units/hectare)
Parklands (a)	46
Parklands (b)	41
Rosebank	17
Langeberg Ridge (a)	23
Langeberg Ridge (b)	31
Blue Downs	58
Blouberg Sands	56
Big Bay (low density)	16
Kraaifontein	37
Parklands (single residential)	22



Example of area used to calculate nett density



Parklands (a)



Rosebank

Parklands (b)



Lange berg Ridge



Blue Downs

Legend

- Erven
- Blouberg Sands

276 m<sup>2</sup>  
nett 56 du/ha



Blouberg Sands



Big Bay (low density)