Report

Processes for developing affordable and sustainable medium-density housing models for greyfield precincts

# **Appendix 1**

authored by

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for the

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## 1 GEO-SPATIAL SURVEY: MELBOURNE

The geo-spatial analysis provided information for two major components of the multicriteria assessment framework described in the main report: firstly, data relating to the existing physical attributes of landholdings, and secondly, data relating to their urban context. The detailed material generated is presented in Sections 1.1 and 1.2.

#### Method

The public housing register provided by the Victorian Department of Human Services (DHS) was collated with a series of spatial, economic, social and infrastructural datasets in a geographic information systems (GIS) platform. The GIS model enabled several layers of information to be over-laid and considered together; the GIS software also enabled the necessary shifts in scale required for the assessment of potential precinct-scaled redevelopment opportunities.

#### Data sources

Geo-spatial property information, urban indexes and other indicators used by this survey include:

→ Metropolitan Melbourne public housing assets

Victorian Government, Department of Human Services (DHS)

The data provided was not the official corporate data. It included assets owned by the Director of Housing in metropolitan Melbourne only. The data extract was current as of August 2012.

Data inclusions: public housing; vacant land (NB approx. 360 are encumbered, 540 committed to projects/under development & the remainder at feasibility stage); transitional housing; community managed housing owned by the Director of Housing; Aboriginal housing; crisis housing.

Data exclusions: social housing which is not owned by the Director (e.g. owned by registered Housing Associations); commercial dwellings; Joint Ventures with third parties; properties leased in but owned by an external party; movable units; secure family violence properties; properties that have come into ownership since August 2012; disability housing, or Children Youth and Families' properties owned by the Secretary of DHS.

Data integrity issues: in some instances, information relating to the age of properties reflects the date of purchase as opposed to the date of construction. The proportion of properties affected by this distinction is unknown.

#### → Brisbane metropolitan public housing assets

Queensland Government, Department of Communities, Child Safety and Disability Services

Data includes the following Housing Service Centres only: Woodridge, Ipswich, Caboolture, Inala, Chermside, Capalaba, Buranda, Fortitude Valley and Redcliffe.

#### → Housing Development Data (HDD) (DPCD 2013)

A database providing information on the number and location of existing dwellings, vacant residential land, and recent residential development across all land within metropolitan Melbourne. The HDD provided the cadastral basis (property map) for the GIS model, as well as information on lot size and distance to activity centres. It also enabled verification of whether the lot was mixed tenure—if the total number of dwellings reported to be on a lot exceeded the number reported in the DHS

asset list, this was taken as an indication that there are private dwellings on the property.

- → PTAL, Swinburne University, based on information by the Victorian Department of Transport
- → SEIFA, Australian Bureau of Statistics (ABS 2013)
- → Effective job density, SGS Economics and Planning
- → Median house prices, Valuer-General of Victoria, 2011.

#### Parameters of the geo-spatial analysis

→ Spatial definition of the 'middle suburbs'

There is no single definition for the middle suburbs in Melbourne. The parameters describing the various regions within the metropolitan boundary differ depending on the context in which they are used. For example, the boundary of Melbourne's statistical areas and local government areas differ. The age of suburbs and patterns of development can distinguish regions within the metropolitan area. More colloquial understandings of the city are also relevant. For example, the property market commonly uses a 7 kilometres radius to describe 'inner city living' which can affect the value of suburban land prices.

For the purposes of this research, we have defined the middle suburbs as those areas located 7–25 kilometres from Melbourne's CBD. The urban morphology and built form typologies within this band are characterised by post-WWII development forms—large residential allotments with low density, detached dwellings. These areas demonstrate good access to service and amenity, representing high-impact opportunities for intensification.

#### Figure 1: Middle suburbs in Melbourne



→ 'Dwellings' versus 'properties'

Analysis and reporting has been undertaken for two different but related categories. 'Dwellings' refers to actual domiciles—an individual house or apartment which may be part of a larger complex or building. The database of public housing assets provided by the DHS accounted for housing stock in this manner. 'Properties' refers to allotments or land titles, on which there may be one or more 'dwellings', or indeed no dwellings if the land is vacant. This database was produced through cross-referencing the database of 'dwellings' with the DPCD's housing development data, using GIS coordinates for dwellings to join the 'dwelling' dataset to individual lots in the HDD dataset.

 $\rightarrow$  Age of housing stock

With a focus on the regeneration of ageing, underperforming housing stock, the research worked with a nominal expected life-span of buildings of approximately 50 years (also used by DHS in their operational models). As such, properties built prior to 1990 are differentiated by the analysis, as they are likely to reach their operational end-of-life sooner.

→ Building and allotment types

Large, consolidated properties (more than three hectares in area) or properties with existing high-rise buildings were also differentiated by the study. The size and nature of these sites would likely attract alternative intensification approaches to that proposed by this project.

→ Ownership

Allotments that are not in full ownership by DHS are also differentiated in the analysis as they are not considered 'developable' or represent more complex (thus more costly) development scenarios for precinct-scaled strategies. For example, multi-residential properties in which DHS owns one dwelling/apartment or suburban residential parcels that have already been subdivided and DHS owns only one of the smaller subdivisions.<sup>1</sup>

#### 1.1 Existing physical attributes

#### 1.1.1 Geographic distribution, type and age of housing

More than 50 per cent of DHS properties are located in the middle regions of Melbourne, representing 42 per cent of all DHS dwellings and 50 per cent of the total area of landholdings.

Location	Dist. from	DHS dwellings		DHS properties		DHS property area	
CBD		(N)	%	(N)	%	(Ha)	%
Inner	7km	16,584	34%	2,717	12%	233	10%
Middle	7–25km	20,167	42%	12,263	52%	891	50%
Outer	25+km	11,590	24%	8,524	36%	669	37%
Total	All metro	48,341	100%	23,504	100%	1,793	100%

Table 1: Distribution of public housing in metropolitan Melbourne

<sup>&</sup>lt;sup>1</sup> Examination of the DHS asset data against housing development data suggests only 7 per cent of lots with DHS dwellings in the middle suburbs also contain one or more private dwellings.



Figure 2: DHS dwellings, properties and land area by distance from CBD

A single house on an allotment and medium density attached housing types comprise the majority of all DHS stock; in the middle suburbs these classifications represent 83 per cent of dwellings (Figure 3, Table 2).



Figure 3: Distribution of properties by housing type

Housing type	All dw	ellings	Middle subur	Middle suburban dwellings		
	(N)	%	(N)	%		
House	12,888	26%	6,810	33%		
Med. density detached	1,038	2%	576	3%		
Med. density attached	19,280	40%	10,157	50%		
Low-rise flat	6,340	13%	1,823	9%		
Multiple unit facility	90	0.2%	20	0.1%		
Multiple unit facility unit	1,074	2%	237	1%		
High-rise flat	6,854	14%	280	1%		
Other	777	2%	264	1%		
Vacant land	0 (389)	0%	0 (197)	0%		
Total	48,341	100%	20,364	100%		

#### Table 2: Number of dwellings by housing types

Note: the database of metropolitan public housing assets included 389 entries described as 'Vacant land'. While these have been included in figures relating to DHS properties, they are parenthesised and shown as nil here as they do not represent actual housing stock.

Figure 4 describes the age of the DHS housing portfolio; 80 per cent of the dwelling stock was built within a 50-year period from 1946–1995.<sup>2</sup> A large proportion of this stock is likely to be reaching the end of its life-span or in need of significant upgrade (Figure 5).



Figure 4: Number of dwellings by age

<sup>&</sup>lt;sup>2</sup> Note data provided by DHS relating to age of developments can indicate either the date of development or the date of purchase. Piecemeal checking of the dataset suggests it is seldom the latter.

Figure 5: Examples of ageing housing assets



Figure 6 below shows the distribution of public housing properties differentiated by stock built pre/post 1990. A mix of older and newer housing is dispersed across the metropolitan area, indicating different levels of redevelopment of and/or spot purchasing of newer stock over time. Within this broad mix, smaller clusters of ageing properties can be observed in established middle suburban areas while newer stock form concentrations in growth areas.



Figure 6: Spatial distribution of all DHS properties (pre/post 1990)

The type, age and distribution of public housing stock in Melbourne indicate a strong potential for effective precinct-scaled redevelopment strategies in middle suburban areas.

#### 1.1.2 Spatial distribution: consolidation and clustering

Two different aspects of the spatial distribution of properties were quantitatively analysed in order to understand their prevalence across the DHS portfolio. The first aspect, contiguity, literally describes how many abutting lots or neighbours are also 'DHS owned', and thus offers a strong indication of the degree of land consolidation. Properties with one or more 'DHS neighbours' make up 39 per cent of all metropolitan properties and 41 per cent of all middle suburban properties, indicating a reasonable degree of consolidation (Figure 7).



Figure 7: Number of properties forming contiguous land assemblies

'Clustering' as a concept is defined by the propinquity or 'nearness' of a given number of otherwise discrete properties. It differs from contiguity in that properties do not necessarily need to touch each other, but simply be near each other. A basic measure of this is to calculate the number of other DHS properties within 200m of a given property. Figure 8 represents this data for all middle suburban properties, and indicates that only 8 per cent of properties are not within 200 metres of another DHS property. Although this indicates a strong degree of clustering, if other criteria are applied (e.g. stock being dated 1990 or older, and land parcel sizes being larger than given minimum) the amount of stock that may form clusters is reduced.





Minimum thresholds for cluster formation, and analysis of clustering among middle suburban DHS properties is described in the main report.

### 1.2 Urban context

#### 1.2.1 Median house prices

Figure 9 below maps the distribution of DHS properties against median house prices in metropolitan Melbourne. Among middle suburban properties, the median value is \$500 000, while for all metropolitan properties the median is slightly lower at \$433 000. 75 per cent of middle suburban properties are in suburbs with median house prices above \$400 000.





Table 3: Median suburb house prices for DHS properties

Median house price	All DHS properties		edian house price All DHS pr		Middle suburk	oan properties
	(N)	%	(N)	%		
More than \$1M	828	4%	559	5%		
\$801K–\$1M	1141	5%	555	5%		
\$651K-\$800K	3,017	13%	1,437	12%		
\$501K-\$650K	4,695	20%	3,513	29%		
\$351K-\$500K	10,402	44%	5,280	43%		
\$200K-\$350K	3,420	15%	919	7		
Insufficient data	1	0.004%	0	0%		
Totals	23,504	100%	12,263	100%		

#### 1.2.2 Proximity to transport services

Access to public transport is an essential service and can be measured by PTAL (Public Transport Access Level), a public transport metric that quantifies the level of access that the occupants of a dwelling have to train, tram and bus services, not only in terms of distance, but also in relation to the frequency of services (10 = high access; 0 = no access). Figure 10 below maps current public housing land holdings against the PTAL index for metropolitan Melbourne. Figure 11 shows that the majority of DHS properties in the middle suburbs have a PTAL classification of three or less.



Figure 10: Distribution of public housing stock relative to PTAL Index





#### 1.2.3 Access to employment and urban productivity

Figure 12 below depicts the distribution of DHS properties relative to an Effective Job Density (EJD) index for Melbourne. Table 4 shows 50 per cent of DHS properties in the middle suburbs have an EJD score equal to or above 55 000. This is equivalent to the dormitory suburb of Doveton, 2.5 kilometres from Dandenong railway station. By way of comparison, Melbourne's CBD has an EJD score ranging from 190 000– 165 000, while a score of 40 000 is representative of the outer-suburb of Cranbourne, 43 kilometres from the CBD.





Source: EJD index information provided by SGS Economics and Planning

EJD classification	DHS properties		
	(N)	%	
70,001–95,000 (better access)	2,405	19.6%	
55,001–70,000	3,895	31.8%	
40,001–55,000	5,102	41.6%	
25,000–40,000 (worse access)	861	7.0%	
Total	12,263	100%	

Table 4: EJD classification for middle suburban properties

#### 1.2.4 Socio-economic context

Figure 13 below maps the distribution of DHS properties against the SEIFA 2011 index of Relative Socio-economic Disadvantage and Advantage in Melbourne (ABS 2013). Table 5 shows the SEIFA classification for middle suburban properties. The two analyses demonstrate that DHS properties are located in a broad mix of socio-economic advantage/disadvantage, which is regionally biased across the metropolitan area (i.e. north and west regions are significantly more disadvantaged than east and south regions). The majority of middle suburban properties have IRSAD deciles of four or less.



#### Figure 13: Distribution of properties relative to SEIFA 2011 index

Table 5: SEIFA classifications for middle suburban properties

SEIFA (IRSDAS) classification	Middle suburban propertie	
	(N)	%
9 or more (greatest advantage)	479	3.9%
7–8	1,687	13.8%
5–6	2,018	16.5%
3–4	2,600	21.2%
2 or less (greatest disadvantage)	5,478	44.7%
Insufficient data	1	0.008%
Total	12,263	100%

#### 1.2.5 Proximity to public amenity and services

In addition to public transport, several other forms of amenity and services are essential for supporting daily living needs of residents. Precinct selections should consider the walkable proximity of:

→ Activity centres and/or principle activity centres in Figure 14 and Table 6 which show that the majority of DHS properties in the middle suburbs are within a walkable/rideable distance from major and principal activity centres.

Image: Contract of the contract

Figure 14: Distribution of properties in relationship to activity centres

Distance to an activity centre	Middle suburban properties			
-	(N)	%		
Less than 500m	4,339	35%		
500m–1km	3,752	31%		
1–2km	3,449	28%		
2–3km	641	5%		
More than 3km	82	1%		
Total	12,263	100%		

Note: includes Principal and Major Activity Areas only. Neighbourhood centres excluded due to inadequate data.

#### → Open space and recreation facilities

Geospatial information on the distribution of recreation facilities was not readily available. However, GIS analysis of areas of zoning classifications pertaining to public space made it possible to study the position of landholdings in relation to parks and reserves.

Distance to public open space	Middle subur	oan properties
	(N)	%
200m or less	6,531	53%
200m–400m	3,941	32%
400m–600m	1,295	11%
600m–800m	292	2%
800m or more	204	2%
Total	12,263	100%

Table 7: Proximity of middle suburban properties to public open space reserves

#### **1.3** Integrated assessment framework

The assessment framework and GIS model developed by this research allows multiple criteria to be considered simultaneously, incorporating qualitative and quantitative concerns across several scales. A key benefit of the integration of data in this manner is the ability to make strategic selections that control and balance a range of different factors. This may enable particular clusters of stock to be targeted and redevelopment approaches to be fine-tuned, in line with long-term portfolio objectives.

A basic set of preconditions were identified as necessary for precinct redevelopment to be at all possible. The filtering of the DHS portfolio against these criteria facilitated the production of an initial selection (see Figure 13 of main report). The criteria properties needed to meet were:

- → Location between 6.5–25.5 kilometres from the GPO (a 0.5 kilometre buffer zone was included so as not to exclude clusters that straddle the 7–25 kilometres boundaries).
- → Stock built in 1990 or earlier.
- → Unmixed tenure (land titles that are fully owned by the Director of Housing).
- → Lot size of at least 300 square metres, or contiguity with at least one other DHS lot.
- → Clustering such that there are at least four lots meeting these criteria within a 200 metres radius.

As described in the main report, 6672 properties were found to meet these basic criteria.

The research avoided producing a more limited selection of DHS landholdings through applying additional criteria, as this was deemed overly prescriptive. Instead it was considered that numerous selection studies could be undertaken to identify stock appropriate to different redevelopment strategies. For this reason, the multi-criteria evaluation was proposed as a 'live' apparatus that could be iteratively adjusted to balance different factors, in the manner of a mixing desk.

For demonstration purposes, one possible selection may seek to identify older stock that performs comparatively well on key indexes of urban utility. In this scenario, the upper age bracket of the building date is lowered to 1980, and minimum thresholds for PTAL (Public Transport Access Level) and EJD (Effective Job Density) are applied. If the minimum thresholds are set so as to exclude properties at the bottom 25 per cent of these indexes (Figures 15 and 16), the selection yields a total of 2765 middle suburban properties.









Targeted selection yields 2765 middle suburban properties in a total of 112 distinct clusters with a combined total area of 188 hectares.

## 2 NATIONAL RELEVANCE

### 2.1 Public housing survey: Sydney, Melbourne, Brisbane

A general survey of public housing assets in metropolitan Sydney and Brisbane revealed similar patterns of dispersed public housing properties to that in Melbourne.<sup>3</sup> The proportion of public housing properties located in the inner, middle and outer suburbs of Melbourne and Brisbane differ due to the significantly smaller area considered 'middle ring' in Brisbane (Table 8). More research is required to determine a comparative *greyfield* area in Brisbane as that for Melbourne.

Inner		Middle		Outer		Total	
(N)	%	(N)	%	(N)	%	(N)	%
2,717	12%	12,263	52%	8,524	36%	23,504	100%
576	3%	4,261	24%	13,281	73%	18,118	100%
N/A (refer footnote and Figure 17)							
	Inner (N) 2,717 576 I/A (refer fo	Inner     (N)   %     2,717   12%     576   3%     I/A (refer footnote	Inner   Middle     (N)   %   (N)     2,717   12%   12,263     576   3%   4,261     //A (refer footnote and Figure	Inner   Middle     (N)   %   (N)   %     2,717   12%   12,263   52%     576   3%   4,261   24%     //A (refer footnote and Figure 17)	Inner   Middle   Outer     (N)   %   (N)   %   (N)     2,717   12%   12,263   52%   8,524     576   3%   4,261   24%   13,281     //A (refer footnote and Figure 17)	Inner   Middle   Outer     (N)   %   (N)   %     2,717   12%   12,263   52%   8,524   36%     576   3%   4,261   24%   13,281   73%     //A (refer footnote and Figure 17)	Inner   Middle   Outer   Total     (N)   %   (N)   %   (N)     2,717   12%   12,263   52%   8,524   36%   23,504     576   3%   4,261   24%   13,281   73%   18,118     //A (refer footnote and Figure 17)

Table 8: Public housin	g properties	oy location—Melbourr	ne and Brisbane
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Note: this research has adopted a common definition of suburban areas in Brisbane. Distance from the CBD: Inner <4.5km; Middle 4.5km–11km; Outer >11km. The size of the metropolitan area in Brisbane is comparable to that in Melbourne, however, the majority of the urban footprint in Brisbane is considered 'outer' due to the differing urban structure, age and nature of urban growth in Brisbane.

# Figure 17: NBESP SHI redevelopment projects on State Housing Authority land in Fairfield, NSW



Source: Nearmap.com, Housing NSW (2009), Housing NSW 2010

<sup>&</sup>lt;sup>3</sup> A full register of public housing in metropolitan Sydney was not available for this research. As such the statistical analysis undertaken for Melbourne and Brisbane could not be completed in Sydney. Preliminary review of a limited number of properties indicated that the age, type and distribution of public housing in Sydney follows similar trends and patterns to that in the other two cities. Stage 1 analysis of the NBESP SHI revealed potential opportunities for coordinated precinct redevelopment (Error! Reference source not found.).

The age of dwelling stock in Melbourne and Brisbane demonstrate similarities; 54 per cent and 43 per cent of all dwellings were constructed between 1946–1985 in Melbourne and Brisbane respectively (Figure 18). Detached houses are the most common housing type in Brisbane, representing nearly half of all dwellings (Table 9). While the proportion of stock they represent in Melbourne is comparatively less, the total number is similar to that of Brisbane. In both cities, very little housing diversity is offered.





Melbourne Brisbane

Melbourne dwellings			Brisbane dwellings		
Housing types	(N)	%	Housing types	(N)	%
Detached house	12,888	26%	Detached house	15,462	48%
Med. density detached	1,038	2%	Dual occupancy	86	0.3%
Med, density attached	19,280	40%	Cluster housing	776	2%
Low-rise flat	6,340	13%	Attached housing	2,556	8%
Multiple unit facility	90	0.2%	Duplex	789	2%
Multiple unit facility unit	1,074	2%	Senior unit	2,598	8%
High-rise flat	6,854	14%	Apartment	5,950	18%
Other	777	2%	Boarding	224	1%
Vacant land	0 (389)	0%	Hostel	42	0.1%
Total	48,341	100%	Total	32,229	100%

Table 9: Public housing types—Melbourne and Brisbane

The analysis suggests that the opportunities for potential precinct redevelopment of public housing assets that have been identified in Melbourne are likely to have national relevance.

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