



Final Report for The Joint Standing Committee
on the Office of the Valuer General
“Statistical Analysis of Land Valuation Data”



28 March 2013

28 March 2013

Mr John Miller
Acting Inquiry Manager
The Joint Standing Committee of the Valuer General
Parliament House, Macquarie Street
Sydney NSW 2000

Dear Mr Miller,

Thank you for engaging Crowe Horwath to assist the Joint Standing Committee on the Office of the Valuer General with its analysis of land valuation data. We have enjoyed the challenge of managing the complexities with such large amounts of data and reaching conclusions from the detailed analysis we have performed.

Collectively, in the services provided to the Joint Standing Committee in delivery of this project, we have delivered value in:

- Expertise in compiling and creating the necessary data storage solution to hold the relevant information;
- Technical expertise in the use of specialised data analytics and visualisation tools to test, evaluate and draw conclusions from large volumes of data;
- Extensive experience in statistical analysis and data sampling and assessment;
- Experienced team with a proven mature approach to drive outcomes and value for money; and,
- Appreciation of complicated projects, in particular with government agencies.

If there is anything you wish to clarify in this report, or any further information you require to assist you in the Joint Standing Committee's report, please do not hesitate to contact me on 0412 918 863 or Rahavan@CroweHorwath.com.au.

We look forward to working with you in the future.

Yours sincerely,



Rahavan Yoganathan
Partner
Crowe Horwath Sydney Pty Limited

Executive Summary

The Joint Standing Committee on the Office of the Valuer General (the Committee) is reviewing the operations of the Office of the Valuer General, particularly in relation to land valuations. The Committee's report will address key aspects of the valuation system, including:

- i. Predictability of the land valuation,
- ii. Equity of the system,
- iii. Transparency of the system, and
- iv. Efficiency.

As part of the information gathering phase of its report the Committee has received confidential land value data from the Office of the Valuer General for the period 2001-11. The data obtained contains approximately 29 million rows of data covering approximately 2.4 million properties in NSW.

Given the volume and complexity of the data received the Committee engaged Crowe Horwath to assist it in performing data and statistical analysis to test the following two hypotheses:

- Individual property holders experience material volatility in land values (Hypothesis 1)
- Land values on the register have grown materially more than the market (Hypothesis 2).

The procedures to be performed and key definitions of material, volatility, widespread and market were determined by the Committee in consultation with Crowe Horwath. The following is a summary of our key findings:

- The data received was of sufficient quality to enable the analysis requested;
- With respect to Hypothesis 1, we conclude that based on the data provided and procedures performed, individual **property holders experience material volatility** in land values;
- With respect to Hypothesis 2, we conclude that based on the data provided and procedures performed **land values on the register have generally not grown materially more than the market, except in specific years and regions**; and
- Based on the information available it was **not possible to determine the potential cause(s)** of material volatility or material growth more than market in land values on the register.

This report presents our detailed findings from the statistical analysis performed and is set out as follows:

- Overview and validation of the data;
- Hypothesis 1: Objective, testing methodology, results and conclusion;
- Hypothesis 2: Objective, testing methodology, results and conclusion;
- Other considerations; and,
- Appendix: Supporting analysis and schedules.

Overview and validation of the data

The primary source of the data used in testing the two hypotheses was data provided by the Office of the Valuer General consisting of land only (i.e undeveloped property) values from 2000 to 2011. In addition, market data was sourced from Residex consisting of residential property sales values from 2000 to 2012.

With respect to the data provided by the Valuer General:

- On average, there were 2.4 million properties in NSW each year;
- Properties covered 650 postcodes, equating to 3,700 properties / postcode;
- Properties covered 152 LGA's, equating to 15,800 properties / LGA;
- Properties covered 14 NSW regions, equating to 171,400 properties / region.

In order to validate the data provided by the Valuer General the following procedures were performed:

- Checked all records had a property ID
- Identified duplicate property ID's
- Validated postcodes
- Identified duplicate addresses
- Retrieved data from NSW Department of Premier and Cabinet to determine regional areas and LGA relationships for simpler breakdown and identification of areas in NSW.

As a result of the validation procedures performed we concluded that the data was of sufficient quality on which to perform the analysis requested. A summary of the validation results is summarised in the table that is on the following page.

With respect to the data sourced from Residex:

- On average, there were 1.2 million residential properties sold over the period 2001 to 2012;
- Properties covered 601 postcodes, equating to 2,000 properties / postcode;
- Properties covered 152 LGA's, equating to 7,850 properties / LGA;
- Properties covered 14 NSW regions, equating to 85,200 properties / region.

Postcode level comparisons were not available due to most postcodes having too small a sample size for representative analysis, i.e less than 1,000 individual sales in a year.

It was not possible to obtain regional / LGA / postcode level data for property types other than residential as residential properties accounted for the majority (90%) of the market sales data available. As a result, the market data analysis in the report has been performed on residential data only.

Summary of validation results on data provided by the Valuer General

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total number of properties ('000s)	2,306	2,352	2,384	2,402	2,417	2,431	2,446	2,460	2,473	2,478	2,481	2,483
Duplicate property IDs	Nil	1	1	Nil	Nil	1	1	Nil	Nil	Nil	Nil	Nil
No property ID	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Invalid postcodes	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%	< .1%
Duplicate addresses * issue?	2.6%	3.2%	3.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.2%	3.1%	3.1%	3.1%
Properties not existing in 2000 ('000s)	N/A	73 3.1%	115 4.8%	148 6.1%	180 7.4%	209 8.6%	238 9.7%	265 11%	290 12%	307 12%	322 13%	335 14%
Properties not existing in 2011 ('000s)	159 6.9%	157 6.7%	144 6.1%	131 5.5%	115 4.8%	101 4.2%	88 3.6%	73 3.0%	57 2.3%	40 1.6%	21 0.8%	N/A
Average land value (\$'000s)	186	200	232	285	336	349	354	369	380	381	399	403
Standard deviation (\$'000s)	569	578	633	721	827	853	914	1,060	1,050	1,101	1,135	1,109
Properties that changed in land size (000's)	N/A	3	7	7	8	6	11	11	16	8	9	5
Properties that changed zoning (000's)	N/A	3	5	4	6	1	8	5	7	7	32	25
Value per square metre (\$/m ²)	269	287	442	410	477	515	538	554	572	579	605	619
Standard deviation of Value per square metre (\$/m ²)	8,877	9,308	16,268	11,679	12,354	12,670	12,750	13,019	12,604	18,914	19,217	18,340

Hypothesis 1

That individual property holders experience material volatility in land values.

A statistical analysis of volatility in land values to identify:

1. *The level of volatility in land values across the sample; and,*
2. *The extent to which materially high levels of land value fluctuations are widespread.*

This analysis should identify any types of property that have had noteworthy levels of volatility, such as specific LGAs or commercial land.

Approach:

In determining whether the hypothesis has been confirmed or rejected, the Committee has provided the following guiding principles:

- Volatility: where the standard deviation of the annual growth in property value is greater than +/- 5%;
- Materially high: Where the annual change exceeds +/- 5%; and,
- Fluctuations are widespread: Material and volatile change in property value in more than 5% of the population.

Results:

Volatility in land values

Volatility is the amount of uncertainty or risk about the magnitude of the change in land value from year-to-year. Statistically, volatility is measured by standard deviation, which indicates how close or far from the average, values fall in relation to the average. A high standard deviation means there is a wide range of values and therefore significant uncertainty or risk about the magnitude of the change in land values. A low standard deviation means there is a low range of values and therefore low uncertainty or risk about the magnitude of the change in land values.¹

The table below summarises the standard deviation in the change in land values from year-to-year for the period 2001-11 by property type.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Residential	10%	18%	30%	27%	16%	1,807%	25%	1,007%	885%	13%	1,749%
Business	12%	19%	49%	26%	25%	5,221%	29%	21%	19%	15%	16%
Industrial	12%	19%	26%	28%	30%	27%	169,524%	23%	13%	12%	585%
Non-Urban	15%	586%	881%	65%	2,649%	2,061%	1,659%	1,942%	2,069%	1,988%	308%
Other	17%	2,665%	1,810%	561%	45%	2,239%	34%	3,449%	356%	22%	2,683%

¹ See Appendix 2: Standard deviation definition for more information.

Conclusion: The table shows that in all periods and for all property types the standard deviation is greater than 5%. Given some of the extreme standard deviations presented, further analysis was conducted to determine whether volatility still existed if some of the extreme properties were removed.

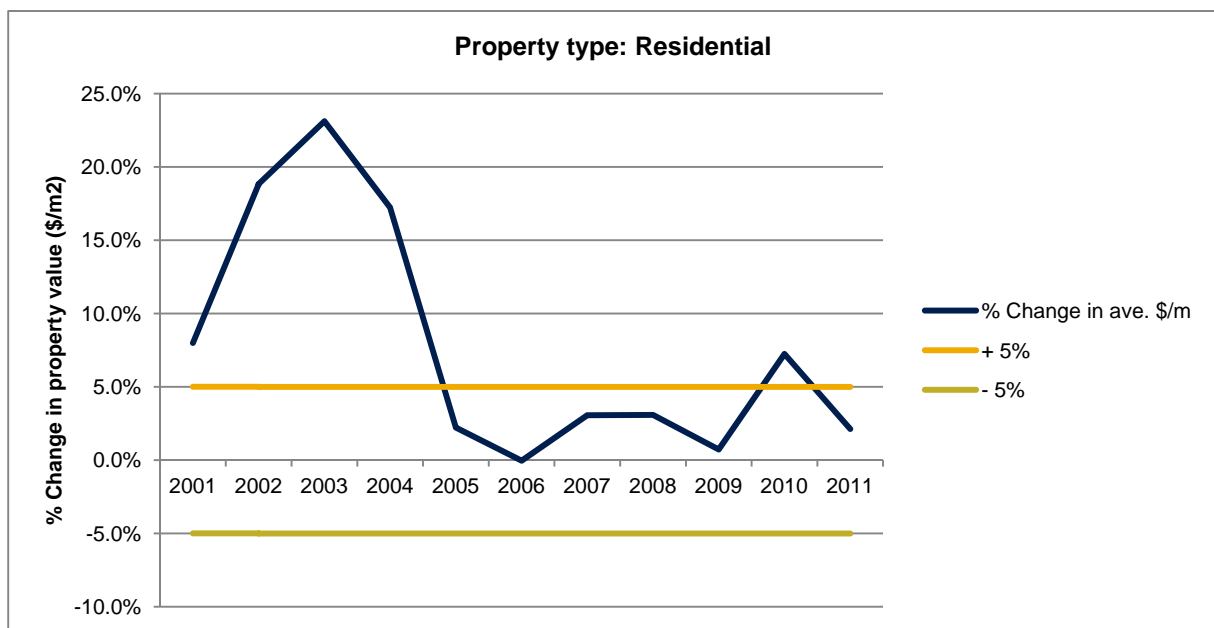
Specifically, we excluded any properties that had any information change about it during the period other than value. For the purposes of this analysis, it meant 500,000 records (approximately 25% of all records) were removed, and then standard deviation was re-calculated. The 500,000 were removed to reduce the number of variables involved, so that the calculation would be on records where the only variable was land value. The re-calculation resulted in the following table:

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Residential	10%	17%	29%	24%	15%	16%	24%	10%	9%	8%	6%
Business	10%	18%	26%	20%	23%	21%	24%	16%	10%	14%	9%
Industrial	12%	16%	23%	27%	29%	26%	25%	22%	12%	11%	10%
Non Urban	15%	638%	24%	36%	23%	18%	21%	19%	21%	16%	15%
Other	16%	28%	35%	52%	41%	49%	30%	27%	32%	20%	19%

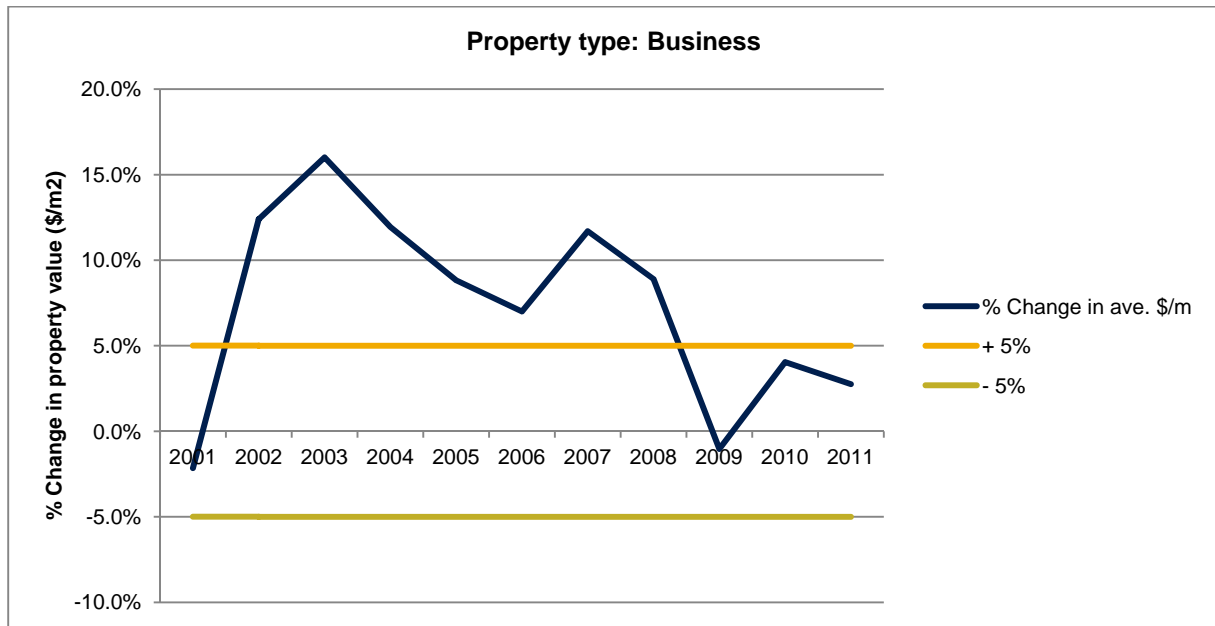
Conclusion: Even when all known variables were removed so that the only variable that existed in the population was land value, the standard deviations were still found to all be above 5% for all periods and property types. Based on the information available, it is not possible to attribute a potential cause(s) for this volatility. However, it is possible to conclude that there is significant volatility in the change in land values experienced by property holders. Given that this has not changed the conclusion the rest of the analysis presented with respect to Hypothesis 1 includes the 500,000 records excluded for the purposes of the above table.

Materially high levels of land value fluctuations

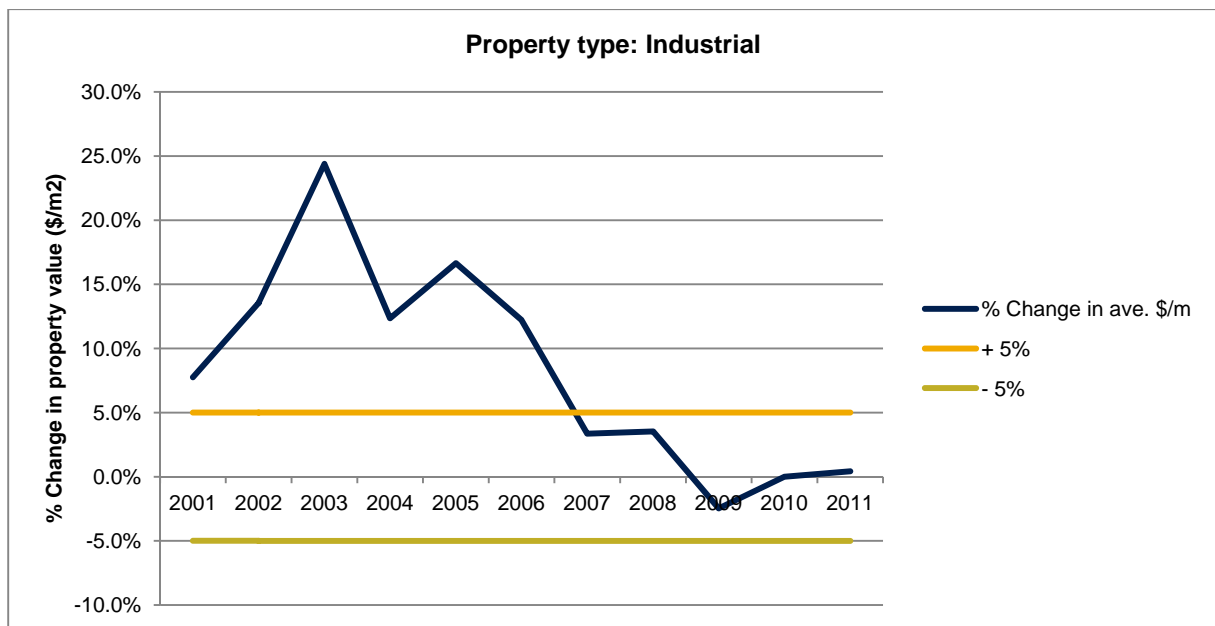
Fluctuation in land value is measured by the percentage change in average land value per square metre. The following graphs show the percentage change in average land value per square metre by property type for the period 2001-11.



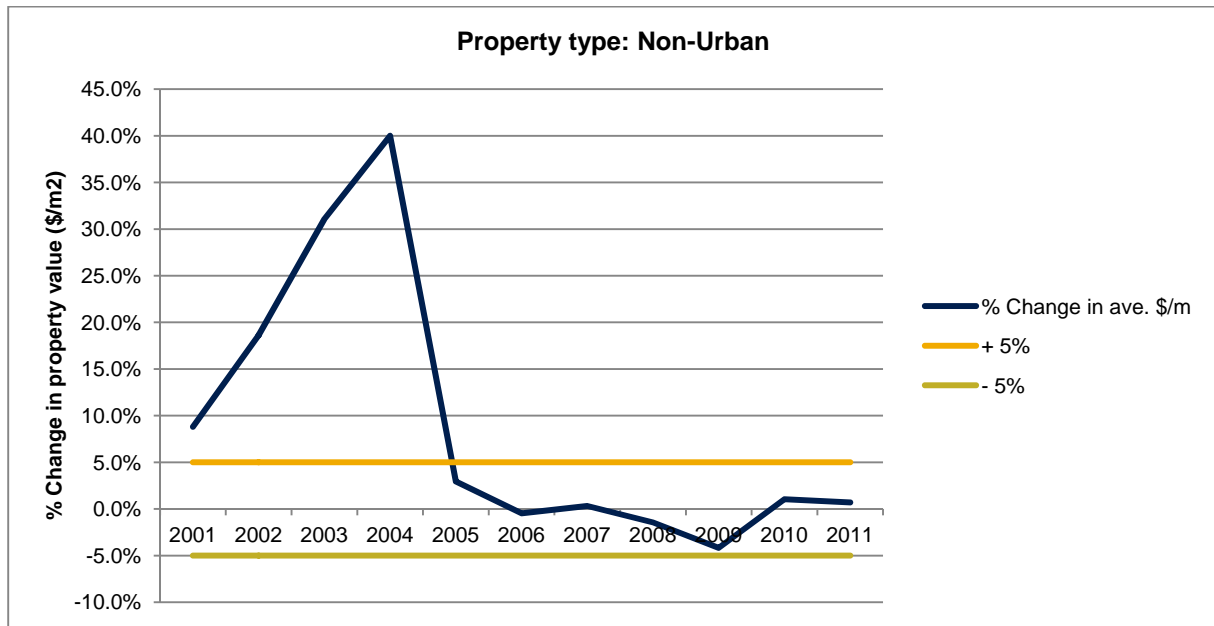
Conclusion: The above graph shows properties zoned as Residential experience materially high changes in value year-to-year between 2001-04 and in 2010.



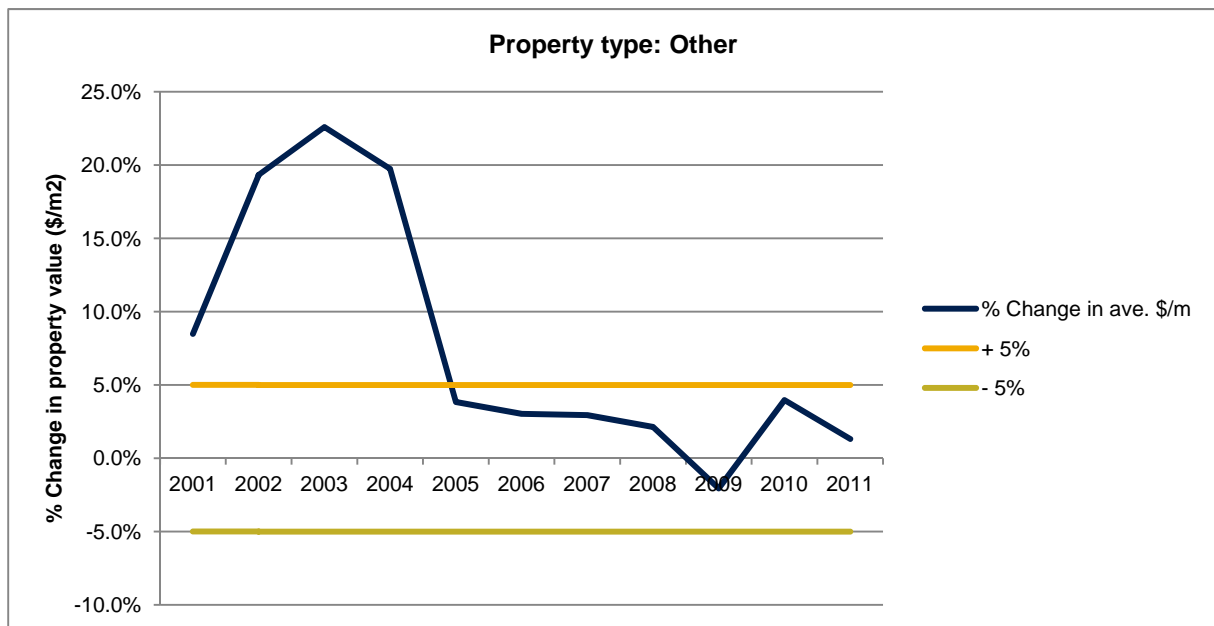
Conclusion: The above graph shows properties zoned as Business experience materially high changes in value year-to-year between 2002-08.



Conclusion: The above graph shows properties zoned as Industrial experience materially high changes in value year-to-year between 2001-06.



Conclusion: The above graph shows properties zoned as Non-Urban experience materially high changes in value year-to-year between 2001-04.



Conclusion: The above graph shows properties zoned as Other experience materially high changes in value year-to-year between 2001-04.

The above graphs for zones all indicate a material high change before 2005, and relatively low change during the more recent years. Although this is correct, recent years have still indicated high levels of material change and volatility. To illustrate this material volatility, the analysis looked at how many properties had very high growth.

		2007		2008		2009		2010		2011	
		Count	%	Count	%	Count	%	Count	%	Count	%
Residential	50-100%	6,405	0.50%	11,207	0.90%	1,005	0.10%	1,789	0.10%	1,292	0.10%
	100-1000%	12,288	1.00%	929	0.10%	628	0.00%	1,532	0.10%	641	0.10%
	1000+%	144	0.00%	36	0.00%	67	0.00%	40	0.00%	373	0.00%
Business	50-100%	1,314	0.30%	930	0.20%	24	0.00%	345	0.10%	203	0.10%
	100-1000%	544	0.10%	258	0.10%	128	0.00%	151	0.00%	86	0.00%
	1000+%	10	0.00%	11	0.00%	8	0.00%	4	0.00%	8	0.00%
Industrial	50-100%	1,314	4.50%	787	2.70%	10	0.00%	160	0.50%	90	0.30%
	100-1000%	325	1.10%	346	1.20%	63	0.20%	82	0.30%	54	0.20%
	1000+%	8	0.00%	7	0.00%	5	0.00%	3	0.00%	16	0.10%
All zones	50-100%	17,466	0.82%	18,966	0.89%	6,323	0.30%	5,783	0.27%	3,307	0.15%
	100-1000%	16,100	0.75%	4,496	0.21%	3,190	0.15%	3,163	0.15%	2,460	0.12%
	1000+%	257	0.01%	143	0.01%	175	0.01%	121	0.01%	607	0.03%

Conclusion: Over the period 2007-11, a large number of records experienced very high growth.

Fluctuations are widespread

Fluctuations are considered widespread if the percentage of property holders who experience material and volatile changes in land value is greater than 5% of the total population.

The table below shows the percentage of the population that experienced material increase in land value from year-to-year for the period 2001 to 2011.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
% of population above 5% change in value	61%	83%	91%	91%	39%	28%	31%	24%	21%	38%	24%

Conclusion: As shown in the table above, greater than 5% of the population experienced greater than 5% percentage change in land value throughout the period 2001-11, peaking in 2003 and 2004 when 91% of properties experienced more than 5% growth. Therefore we can conclude based on the guidance provided by the Committee that the growth experienced by property holders is material and widespread.

Conclusion from hypothesis testing:

Based on the data provided, parameters agreed with the Committee and the analysis performed above, we conclude individual property holders experience material volatility in land values. However, based on the information available, it is not possible to attribute a potential cause(s) for this volatility

Hypothesis 2

That land values on the register have grown materially more than the market.

A comparison of land values to market values. This analysis should be performed:

- *For the State;*
- *For major population centres (Sydney, Newcastle, Wollongong, etc); and,*
- *For local areas (postcode or LGA).*

Where a statistically significant sample size is available, the analysis should also be segmented by property type:

- *Residential;*
- *Commercial; and,*
- *Industrial.*

Approach:

In determination of whether this hypothesis has been confirmed or rejected, the Committee has provided the following guiding principles:

- Major population centres: as defined by the Australian Bureau of Statistics – statistical divisions;
- It was not possible to obtain regional / LGA / postcode level data for property types other than residential as residential properties accounted for the majority (90%) of the market sales data available. As a result, the market data analysis in the report has been performed on residential data only;
- As there is minimal vacant land sales, comparison of land value changes and market values changes (which include building and land values) are assumed to be completely proportional;
- Correlation: Compute the correlation between the rate of change in land value as per the Valuer General register to the rate of change in land value as per Residex market data; and,
- Materially more than market: Where the annual rate of change in land value as per the Valuer General register exceeds +/- 5% the rate of change in land value as per Residex market data.

Results:

Correlation

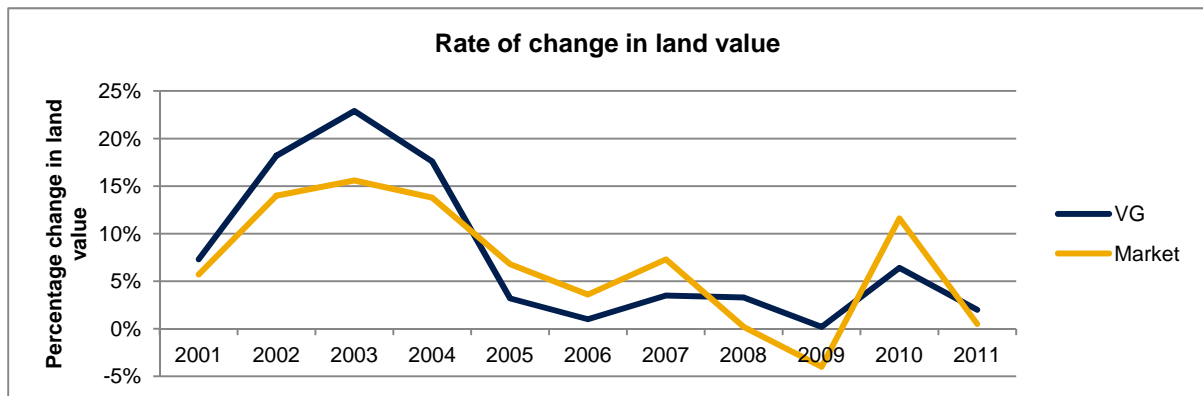
Correlation is the measure of how closely 2 values move in respect to each other. A high correlation, indicated by a value of 1, means 2 values move together at the same rate. A low correlation, indicated by a value of -1, means 2 values move completely opposite of each other. A value of 0, indicates no correlation exists, and that the 2 values move in randomly compared to each other.

The table below shows the correlation between the rate of change in land value as per the Valuer General register to the rate of change in land value as per Residex market data at the NSW state level (residential only).

	Valuer General (\$/m ²)	Market (\$/m ²)	Valuer General	Market
2000	234	347		
2001	251	367	7.3%	5.7%
2002	297	418	18.2%	14.0%
2003	365	484	22.9%	15.6%
2004	429	550	17.6%	13.8%
2005	443	588	3.2%	6.8%
2006	447	609	1.0%	3.6%
2007	463	654	3.5%	7.3%
2008	479	655	3.3%	0.2%
2009	479	629	0.2%	-4.0%
2010	510	702	6.4%	11.6%
2011	520	705	2.0%	0.5%
2012		698		-1.1%
Correlation	0.991		0.858	

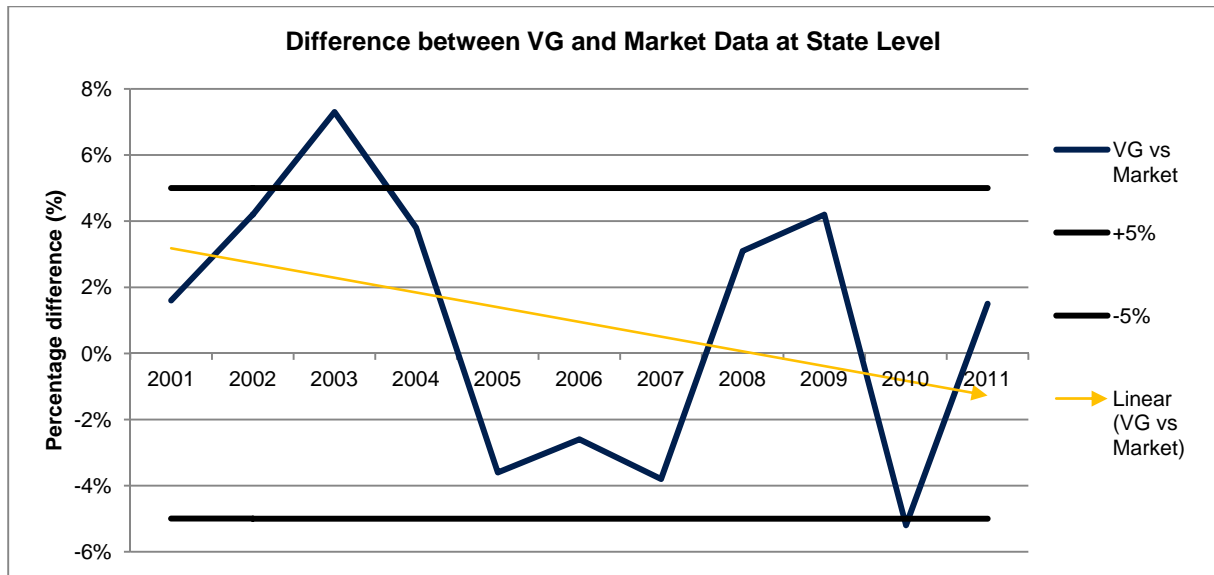
Conclusion: As shown in the table above, at a NSW state level, the correlation between the rate of change in land value as per the Valuer General register to the rate of change in land value as per Residex market data is positive and close to 1. This indicates that the two are highly correlated.

The following graph visually confirms the correlation and it can be seen that generally the two have moved together over the period 2001 to 2011.



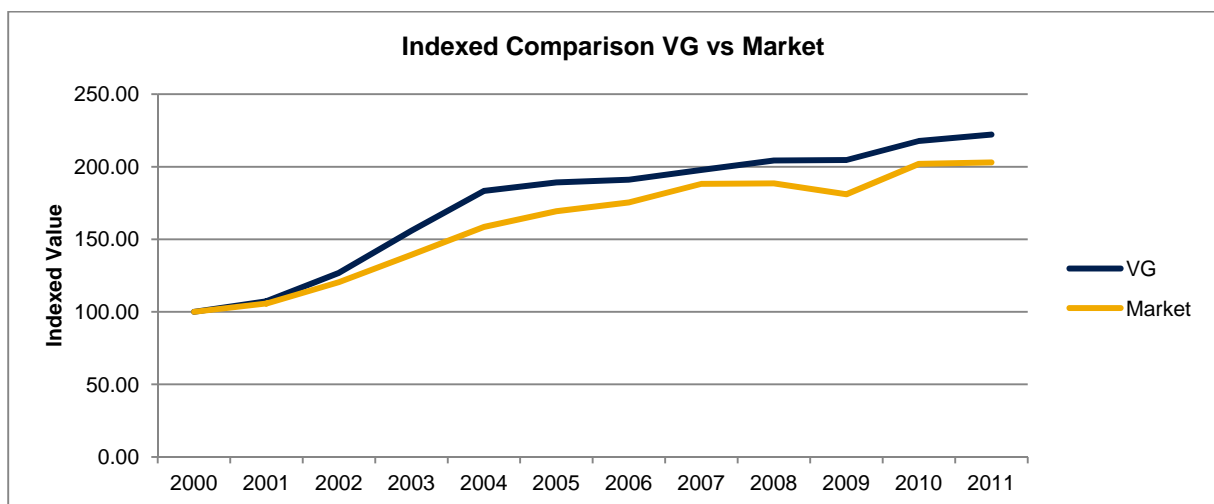
Materially more than market

The following graph shows at a State level where the annual rate of change in land value as per the Valuer General register exceeds +/- 5% the rate of change in land value as per Residex market data.



Conclusion: The graph demonstrates that at State level, the difference between the rate of change in land value as per the Valuer General register and market data have not been materially different, except in 2003 and 2010. Additionally, the trend has shown a general convergence in the rate of change over time.

Although this convergence of rates has shown that Valuer General and market data has had a 'to and fro' relationship, over time, with an indexed comparison, the result is as follows.



Conclusion: The graph demonstrates that at State level, during the 2000-11 period, that a \$100 residential investment in land would have resulted in a Valuer General valuation of \$222 in 2011, whereas market would have valued the land at \$203. Although this result demonstrates a difference of 19% at the end of the period, when viewed on an annual basis, represents an average difference of 1.7%, which by definition, is not a material difference.

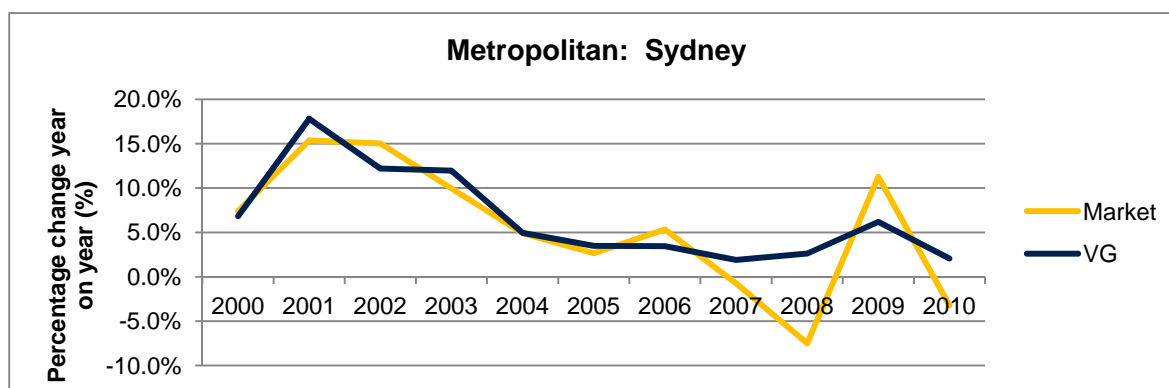
For the Metropolitan Areas

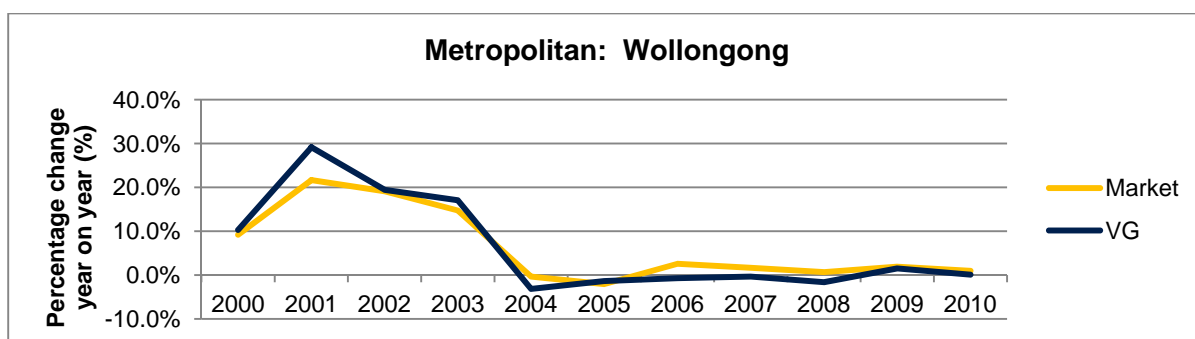
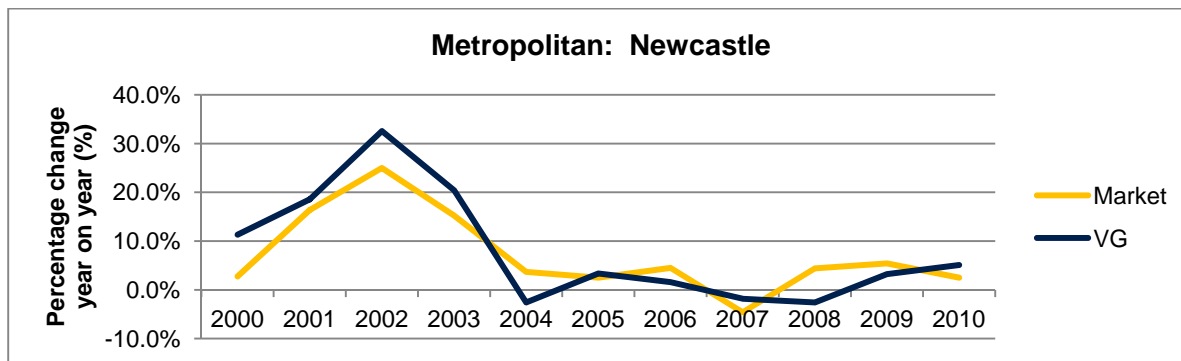
The analysis of the metropolitan areas began with the correlation measures.

	SYDNEY				NEWCASTLE				WOLLONGONG			
	VG	Market	VG	Market	VG	Market	VG	Market	VG	Market	VG	Market
2000	410	520			128	224			177	299		
2001	440	562	6.8%	7.4%	144	230	11.3%	2.8%	198	329	10.3%	9.2%
2002	535	664	17.8%	15.4%	177	276	18.6%	16.4%	279	420	29.1%	21.6%
2003	609	781	12.2%	15.0%	262	367	32.6%	25.0%	346	519	19.4%	19.1%
2004	692	868	12.0%	10.0%	330	433	20.4%	15.2%	418	609	17.1%	14.7%
2005	728	912	5.0%	4.9%	321	450	-2.6%	3.7%	405	607	-3.2%	-0.4%
2006	755	937	3.5%	2.7%	333	461	3.4%	2.5%	399	595	-1.4%	-2.1%
2007	782	990	3.5%	5.3%	338	483	1.6%	4.5%	396	610	-0.7%	2.6%
2008	797	983	1.9%	-0.7%	332	462	-1.8%	-4.6%	395	621	-0.4%	1.7%
2009	818	914	2.6%	-7.5%	324	483	-2.6%	4.4%	389	625	-1.6%	0.7%
2010	872	1030	6.2%	11.3%	334	511	3.2%	5.4%	395	637	1.5%	1.9%
2011	891	998	2.1%	-3.2%	352	524	5.1%	2.5%	395	643	0.1%	1.0%
2012		1043		4.3%		523		-0.2%		636		-1.2%
Correlation	0.978		0.837		0.982		0.907		0.984		0.984	

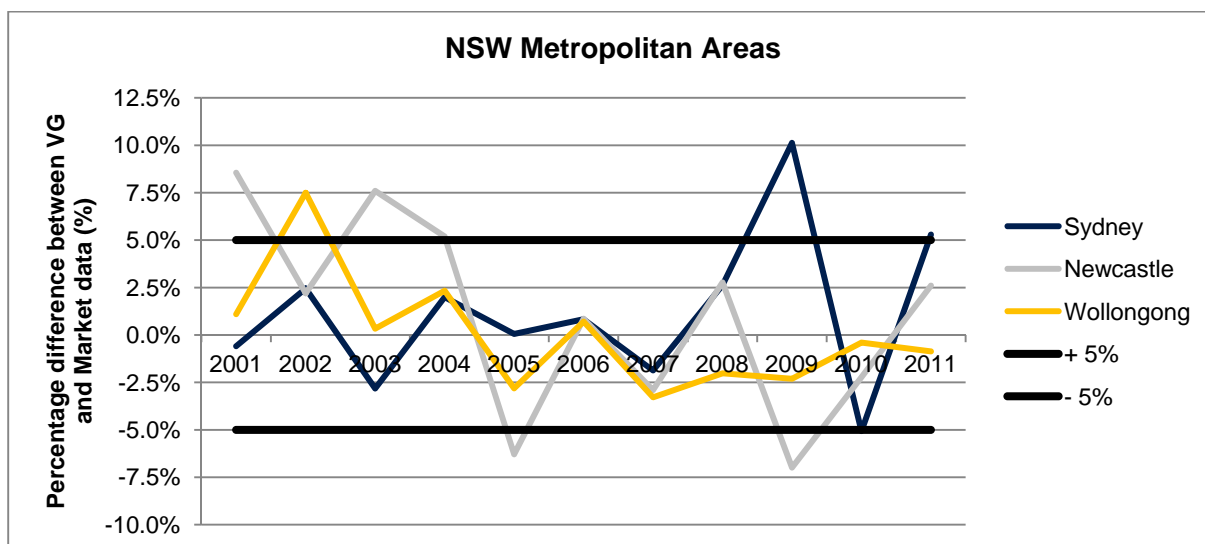
Conclusion: As shown in the table above, at a metropolitan level, the correlation between the rate of change in land value as per the Valuer General register to the rate of change in land value as per Residex market data is positive and close to 1. This indicates that the two are highly correlated.

Visually, the representations of the metropolitan areas are as follows.





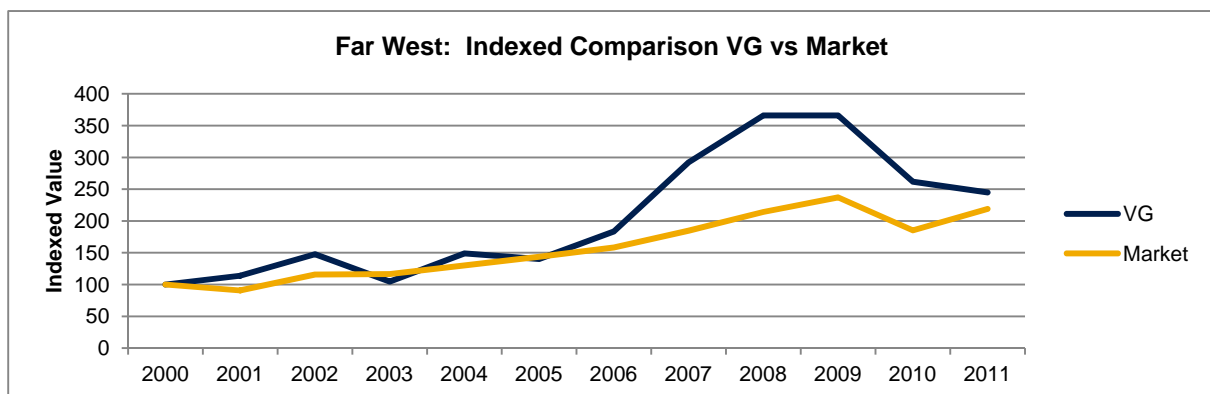
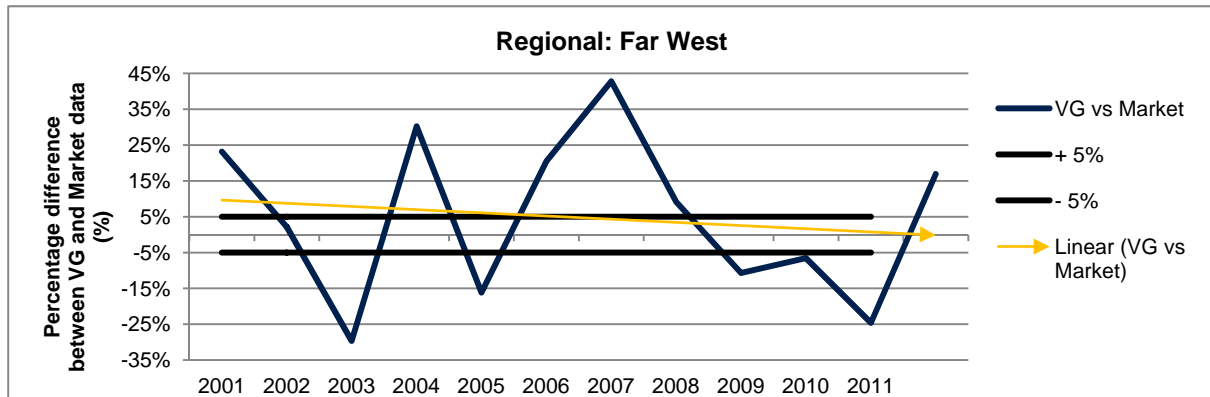
Conclusion: Again, from correlation and visual effect, the Valuer General and market data have trended in the same direction for most years. To better understand whether a material difference exists, the difference in values between Valuer General and market data is represented as follows:



Conclusion: In looking at the percentage differences in metropolitan areas, Sydney and Wollongong have both experienced minimal material differences between Valuer General and market data. They have each only experienced one year of difference, 2009 and 2002 respectively. In comparison, Newcastle has experienced multiple years of material growth differences in 2001, 2003, 2005 and 2009.

For regional areas:

At a regional level, we have found that material differences between Valuer General and market data exists, however it has not been possible to determine that in a particular region the land values as per the Valuer General has consistently outgrown the market or vice versa over time. This is consistent with the fact that over time, there is a strong correlation in land values. An analysis by region is included in Appendix 7, but by way of illustration, we have included the graph below for the Far West region where the correlation was lower (0.57).



Conclusion: In comparison on an annual basis, material differences can be found in the annual growth rates for some chosen years. However, as a general trend, and this exists for all regions, the comparison between Valuer General and market information shows that there is a balancing effect over time.

Conclusion from hypothesis testing:

Based on the data provided by the Valuer General and market data sourced from Residex, we have concluded that overall at the State and Metropolitan level, the land values as per the Valuer General register have not grown materially more than the market. This has been evidenced by the generally high levels of correlation between the sets of data at this level.

At the regional level, however, we have found correlation to be lower and that material differences between the land values as per the Valuer General and market data exists on an annual basis. However, over time it has not been determined that a particular region where the land values as per the Valuer General has consistently materially outgrown the market or vice versa over the period 2001 to 2011. And so, even though the correlation is lower at regional level, Valuer General valuations still have not materially outgrown the market.

Other Considerations

Extreme outlying property valuations

Properties which had growth higher than 20 times its value in 2000 or decreased in value by more than 90% have been separately identified as extreme outliers. The reasons for extreme variance cannot be deduced from the data set provided, but can be summarised as below.

Properties that grew by more than 20 times their value:

Region	Greater than 20 times growth			Greater than 100 times growth		
	Count	Average Value 2000	Average Value 2011	Count	Average Value 2000	Average Value 2011
Central West	74	5,984	222,272	Nil	Nil	Nil
Far West	168	1,499	59,880	8	618	105,087
Hunter	111	8,952	361,147	13	1952	331,092
Illawarra	62	16,733	532,552	5	4400	504,800
Mid-North Coast	17	3,543	109,964	1	100	25,000
Murray	24	17,252	649,320	Nil	Nil	Nil
Murrumbidgee	28	6,282	178,718	Nil	Nil	Nil
North Western	22	2,013	73,368	1	400	46,000
Northern	86	6,441	190,703	1	500	55,000
Richmond - Tweed	55	19,857	587,343	4	1180	275,500
South Eastern	62	5,265	160,942	5	1478	170,600
Sydney Inner	42	44,142	1,800,452	5	506	1,528,540
Sydney Outer	85	39,723	1,449,196	14	4295	945,607
Sydney Surrounds	40	4,541	174,385	2	160	28,500

Conclusion: As a consequence these properties have been excluded from the population so as not to distort the analysis.

Properties that declined in value by more than 90%:

Region	More than 90% decline			More than 98% decline		
	Count	Average Value 2000	Average Value 2011	Count	Average Value 2000	Average Value 2011
Central West	9	39,592	3,009	1	6,580	85
Far West	Nil	Nil	Nil	Nil	Nil	Nil
Hunter	45	175,302	7,015	7	324,828	1,573
Illawarra	619	16,580	921	Nil	Nil	Nil
Mid-North Coast	7	40,342	931	1	138,000	520
Murray	11	25,836	1,247	1	24,300	1
Murrumbidgee	1	15,800	500	Nil	Nil	Nil
North Western	Nil	Nil	Nil	Nil	Nil	Nil
Northern	2	47,450	3,080	Nil	Nil	Nil
Richmond - Tweed	1	50,000	3,600	Nil	Nil	Nil
South Eastern	8	34,756	1,178	5	19,150	1
Sydney Inner	10	647,820	42,735	1	38,000	100
Sydney Outer	64	678,154	22,025	3	5,135,033	3,684
Sydney Surrounds	21	71,171	4,614	1	8,140	120

Conclusion: As illustrated, a number of properties have experienced extreme growth or decline in value. For approximately 50% of these records, they have changed value within a year of a change of zoning type, which on the face of it could be a reason for change in value. However, even after allowing for change in value as a result of a change in zoning utilising market data the change in value of these extreme growth or decline in value properties cannot be explained. Therefore, it is unlikely that the change in value is attributable to a change in zoning despite the change occurring within a year of a change in zoning.

Without speculation, reasons or patterns for the growth and decline cannot be determined from the data and therefore no further investigation can be made into these properties. As a consequence these properties have been excluded from the population so as not to distort the analysis.

Use of construction index as an input to market data to deduce land value

As it was considered that the majority of properties in NSW were market valued including house or building values, the testing of the hypotheses investigated the use of construction prices in an attempt to remove building price from market values.

Using information sourced from:

<http://www.homedesigndirectory.com.au/calculators/ConstructionCostEstimatorPage2.shtml>

It indicates cost of construction is \$1,759/m² of constructed housing property. This is based on an average home, with standard construction material and average land condition, in the ratio of 76.2% of internal living space (rooms, halls, kitchen, and bathrooms), 4.8% of outdoors space (verandas, patios) and 19% garage / storage space.

However, given that each building has a different ratio of size in relation to property – that is, urban homes are more likely to take up more area per property than country homes – it is difficult to understand the relationship between construction area and property area.

Also, construction value will vary depending on factors of the constructed property. As noted by tax laws, constructed property is depreciated at a different rate depending on age of property, type of property and other reasons. This depreciated value represents a realistic figure of constructed value, however without details such as age and construction type in the data, it is unknown how to value the constructed building. As such, constructed value has not been included in the hypotheses testing.

Duplicate Records

Four duplicate properties were identified in the data provided by the Valuer General and have been excluded from the analysis. It is recommended that these properties be investigated to identify the reason for their occurrence. The system should prevent such instances from occurring.

Appendix 1A – Data Manipulation Steps

In receiving the data from the Committee, we have detailed the procedures used in manipulating the data into a workable format below:

1. Received information from the Committee in .dat format
2. Loaded data into SQL Server database
3. Checked count of records matched count from raw files from the Committee.
4. Validated data
 - a. Checked all records had property ID. No null property ID's found.
 - b. Identified duplicate property ID's. Removed duplicate from analysis
 - c. Validated postcodes. Less than 0.1% of records found to not have a valid postcode as either non-sensical (ie. Postcode of 0, 9999, alphabetic) or not in NSW according to census data (ie. In Victoria 3xxx or Queensland 4xxx). Removed records from analysis.
 - d. Identified duplicate addresses. Approximately 3% of records found to have duplicate addresses. Noted for record, not removed from analysis.
5. Retrieved data from NSW Department of Premier and Cabinet to determine regional areas and LGA relationships for simpler breakdown and identification of areas in NSW.

Appendix 1B – Consultation

During the course of the engagement, the identified Committee members and staff have been recorded as below.

Role	Stakeholder	Title
Committee Members	Mr Matt Keane (Chairman)	Member for Hornsby
	Mrs Leslie Williams	Member for Port Macquarie
	Mr Clayton Barr	Member for Cessnock
	The Hon Scot MacDonald	Member of Legislative Council
	The Hon Adam Searle	Member of Legislative Council
Committee Staff	John Miller	Acting Inquiry Manager
	Helen Minnican	Clerk-Assistant (Committees)
	Rachel Simpson	Director (Committees)
	Jenny Whight	Committee Officer
Project Team	Rahavan Yoganathan	Partner
	Karl Adolfsson	Partner
	Eddy Moh	Senior Manager

Crowe Horwath, where appropriate, has met and engaged the members with the understanding to only contact as necessary due to time constraints and commitments of parliament sittings for the Committee members.

Date	Attendees	Reason for meeting
15-February	John Miller Karl Adolfsson Eddy Moh	Pick up data from the Committee
21-February	Matt Keane Leslie Williams Helen Minnican Rachel Simpson John Miller Rahavan Yoganathan Eddy Moh	Kick- off meeting and validation of scope
25-February	John Miller Eddy Moh	Status update. Decision made to put engagement on hold to wait for updated data set.
5-March	John Miller Eddy Moh	Status update.
12-March	John Miller Eddy Moh	Meeting to retrieve new data set.
18-March	John Miller Rahavan Yoganathan Eddy Moh	Conference call to update status and finalise time for deliverable

Date	Attendees	Reason for meeting
21-March	Matt Keane Clayton Barr Scot MacDonald John Miller Helen Minnican Rachel Simpson Jenny Whight Rahavan Yoganathan Eddy Moh	Meeting to discuss details in the report and answer questions from the Committee

Appendix 2 – Standard Deviation Definition

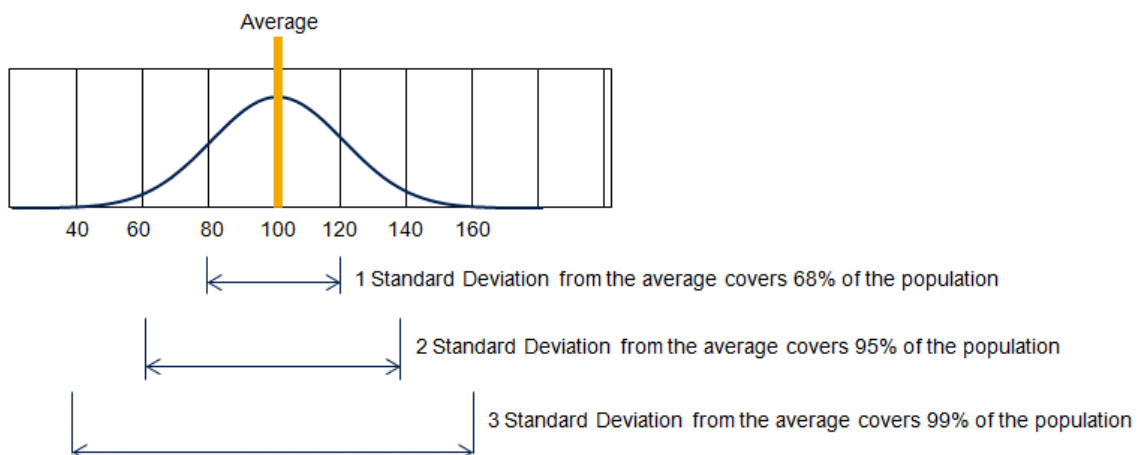
Standard deviation has been used as the main calculator to determine volatility. This definition of volatility has been taken from InvestorWords.com.

<http://www.investorwords.com/5256/volatility.html>

Volatility is the relative rate at which price moves up or down. It is found by calculating annualised standard deviation of change in price. If the price moves and up rapidly over short time periods, it has high volatility. If the price hardly changes, it has low volatility.

Consequently, standard deviation has been used during the course of the analysis. To assist with the understanding of standard deviation, the following example has been developed.

If a sample population has an average value of 100, and a standard deviation of 20, then 68% of the sample population have a value between 80 and 120. The values of 80 and 120 are said to be one standard deviation away from the average, as calculated by the average minus one standard deviation ($100 - 20 = 80$) and average plus one standard deviation ($100 + 20 = 120$). Additionally, 95% of the sample population fall within 2 standard deviations from the average, which in this example, means 95% of sample fall between 60 and 140. Lastly, 99.7% of records fall within 3 standard deviations, meaning in this example, 99.7% of records exist between 40 and 160. The summary of how this example looks is below.



Appendix 3 – Data summarised by LGA

The attached file contains data for the period 2000-12 for each LGA.

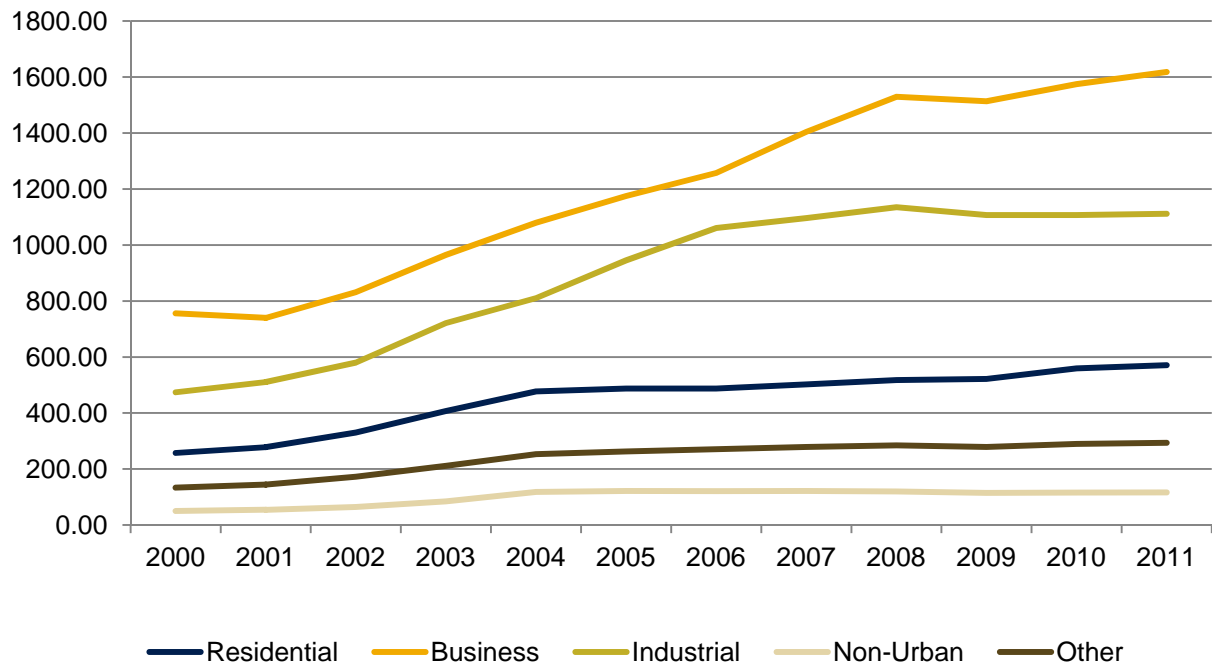


JSCOVG - LGA level
data.xlsx

- **VG % Growth:** For Valuer General provided data, the percentage growth from year to year for each LGA and zone.
- **VG % Std Dev:** For Valuer General provided data, the standard Deviation of the year to year growth for each year, by LGA and zone
- **VG \$m:** For Valuer General provided data, the value of each square metre of property for each year, by LGA and zone.
- **VG 50-100% increase:** For Valuer General provided data, the number of properties that increased by 50-100% for the given year by LGA.
- **VG 100-1000% increase:** For Valuer General provided data, the number of properties that increased by 100-1000% for the given year by LGA.
- **VG more than 1000% increase:** For Valuer General provided data, the number of properties that increased by more than 1000% for the given year by LGA.
- **Market % Growth:** For Market provided data, the percentage growth from year to year for each LGA.
- **Market \$m:** For Market provided data, the value of each square metre of property for each year, by LGA.
- **VG vs Market:** From both Valuer General and Market data, the difference in growth rate for each year by LGA.

Appendix 4 – Property Type Comparison of Valuer General data

Price per Square Meter by Property Type (\$/m²)



Appendix 5A – Residential Market data

Year	Number of Sales	Average Sale Price	Standard Deviation Sale Price	Average Land Area Sold(m ²)	Standard Deviation Land Area Sold (m ²)	Average Sale Price per Square Metre (\$/m ²)
2000	111,461	280,995	629,056	881	1,868	319
2001	111,735	304,395	529,810	887	2,077	343
2002	151,110	350,532	593,960	1,038	3,149	338
2003	144,935	408,309	639,978	1,123	3,559	363
2004	104,835	453,426	725,087	994	2,733	456
2005	93,674	468,400	735,785	915	2,179	512
2006	98,116	476,432	716,929	883	1,972	540
2007	107,474	534,102	929,101	878	2,010	608
2008	87,399	520,290	784,870	882	1,912	590
2009	108,165	510,596	947,668	876	1,972	583
2010	100,236	596,958	1,219,303	954	2,546	626
2011	94,437	560,076	740,060	935	2,503	599
2012	91,629	554,254	665,676	899	2,254	617

Appendix 5B – Commercial Market data

Year	Number of Sales	Average Sale Price	Standard Deviation Sale Price	Average Land Area Sold(m ²)	Standard Deviation Land Area Sold (m ²)	Average Sale Price per Square Metre (\$/m ²)
2000	2,662	887,542	2,660,501	1,096	2,489	810
2001	2,473	880,991	1,943,190	1,209	3,213	729
2002	3,698	1,026,067	2,191,610	1,176	3,273	872
2003	3,825	1,046,259	1,991,616	1,318	3,429	794
2004	2,985	1,160,677	2,499,681	1,297	3,788	895
2005	2,543	1,418,731	3,087,357	1,554	4,613	913
2006	2,587	1,476,885	3,181,243	1,366	4,106	1,081
2007	3,227	1,778,012	4,049,968	1,214	3,340	1,465
2008	2,166	1,537,635	3,630,336	1,298	3,621	1,185
2009	1,996	1,286,546	2,996,404	1,057	2,232	1,217
2010	2,577	1,570,417	3,456,294	1,277	3,232	1,230
2011	2,416	1,737,724	3,891,993	1,369	3,543	1,269
2012	2,291	1,862,756	4,047,582	1,400	3,512	1,331

Appendix 5C – Industrial Market data

Year	Number of Sales	Average Sale Price	Standard Deviation Sale Price	Average Land Area Sold(m ²)	Standard Deviation Land Area Sold (m ²)	Average Sale Price per Square Metre (\$/m ²)
2000	2,076	891,042	2,332,133	4,084	8,453	218
2001	1,795	1,111,835	3,036,528	3,918	7,547	284
2002	2,680	1,111,940	2,677,940	3,949	7,270	282
2003	2,805	1,045,082	2,316,094	3,953	7,499	264
2004	2,655	1,303,899	3,259,612	4,388	7,507	297
2005	2,125	1,413,539	3,258,694	4,505	8,107	314
2006	2,467	2,005,531	5,174,530	4,349	8,031	461
2007	2,752	1,844,428	4,214,006	4,303	8,168	429
2008	1,856	1,712,709	3,685,551	4,182	7,806	410
2009	1,592	1,753,225	3,927,988	4,227	7,530	415
2010	1,857	1,567,592	3,308,040	4,310	7,853	364
2011	1,660	1,605,855	3,647,710	3,992	7,506	402
2012	1,611	1,520,178	3,440,371	4,347	8,080	350

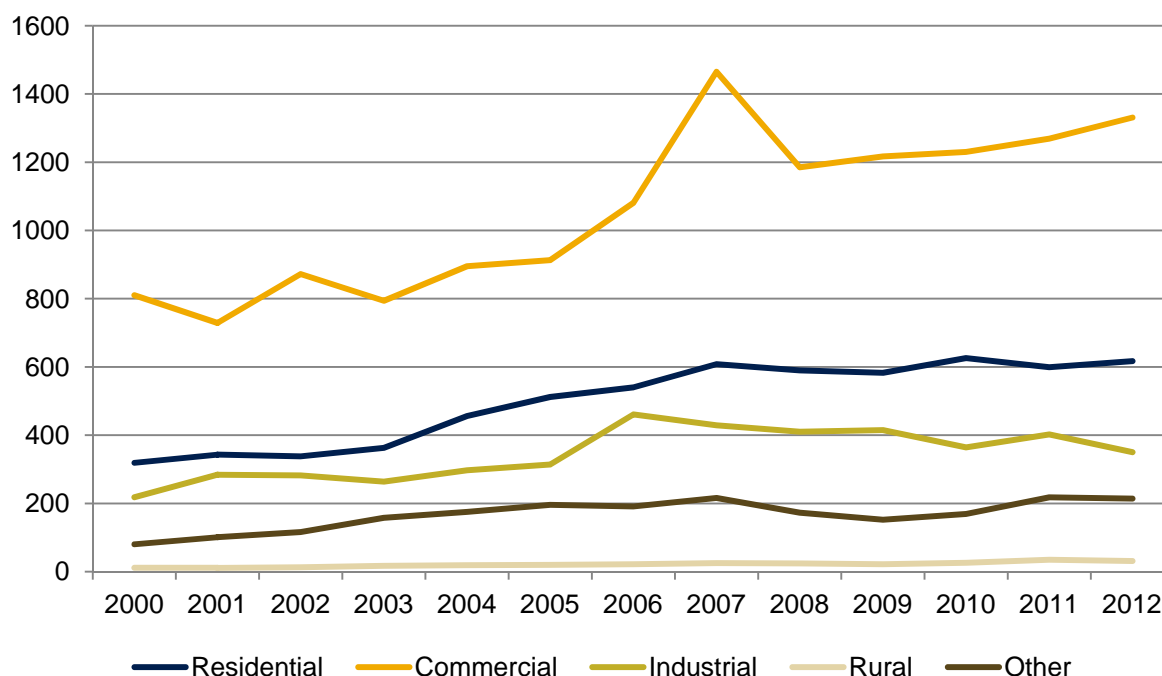
Appendix 5D – Rural Market data

Year	Number of Sales	Average Sale Price	Standard Deviation Sale Price	Average Land Area Sold(m ²)	Standard Deviation Land Area Sold (m ²)	Average Sale Price per Square Metre (\$/m ²)
2000	8,117	280,035	562,323	25,781	21,406	11
2001	8,508	294,753	500,822	25,806	20,962	11
2002	11,732	343,614	617,378	26,311	21,465	13
2003	11,797	431,344	864,319	26,093	21,488	17
2004	9,663	514,203	972,660	26,428	22,583	19
2005	8,359	547,140	958,476	26,954	22,449	20
2006	8,579	611,066	1,198,805	27,169	22,838	22
2007	9,322	652,438	1,122,698	26,246	21,877	25
2008	7,933	636,191	1,200,761	26,710	22,600	24
2009	8,434	576,685	922,929	26,285	21,965	22
2010	8,875	705,774	1,502,708	27,041	22,476	26
2011	8,379	921,370	2,683,017	26,586	22,232	35
2012	8,937	773,870	2,280,937	24,791	22,071	31

Appendix 5E – Other Market data

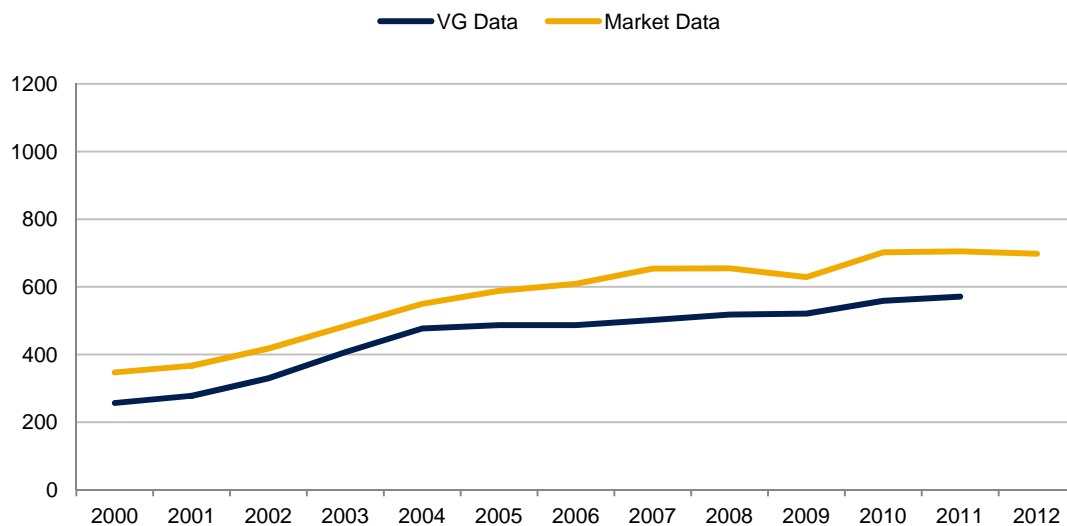
Year	Number of Sales	Average Sale Price	Standard Deviation Sale Price	Average Land Area Sold(m ²)	Standard Deviation Land Area Sold (m ²)	Average Sale Price per Square Metre (\$/m ²)
2000	1,703	727,479	2,285,182	9,088	17,432	80
2001	1,604	849,074	2,331,802	8,374	16,047	101
2002	2,210	984,012	2,815,940	8,453	16,116	116
2003	2,146	1,204,780	3,457,042	7,625	14,605	158
2004	1,679	1,280,083	3,316,598	7,327	14,080	175
2005	1,598	1,558,359	4,141,611	7,947	15,317	196
2006	1,648	1,404,772	3,487,210	7,364	14,961	191
2007	1,887	1,626,264	3,882,829	7,520	14,691	216
2008	1,510	1,460,069	3,572,297	8,462	16,232	173
2009	1,732	1,253,548	3,222,527	8,225	15,334	152
2010	1,689	1,350,138	3,415,852	8,000	14,999	169
2011	1,578	1,362,451	3,675,812	6,260	13,076	218
2012	1,545	1,468,146	3,681,984	6,847	13,968	214

Appendix 5F – Property Type Comparison of Market Data



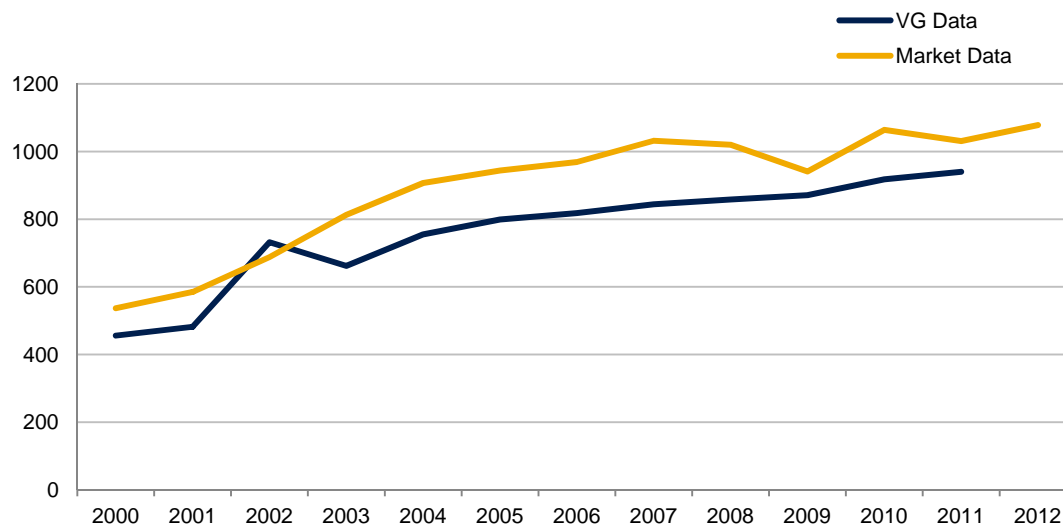
Price per Square Meter by Property Type (\$/m²)

Appendix 6A – NSW Residential Price per Square Metre



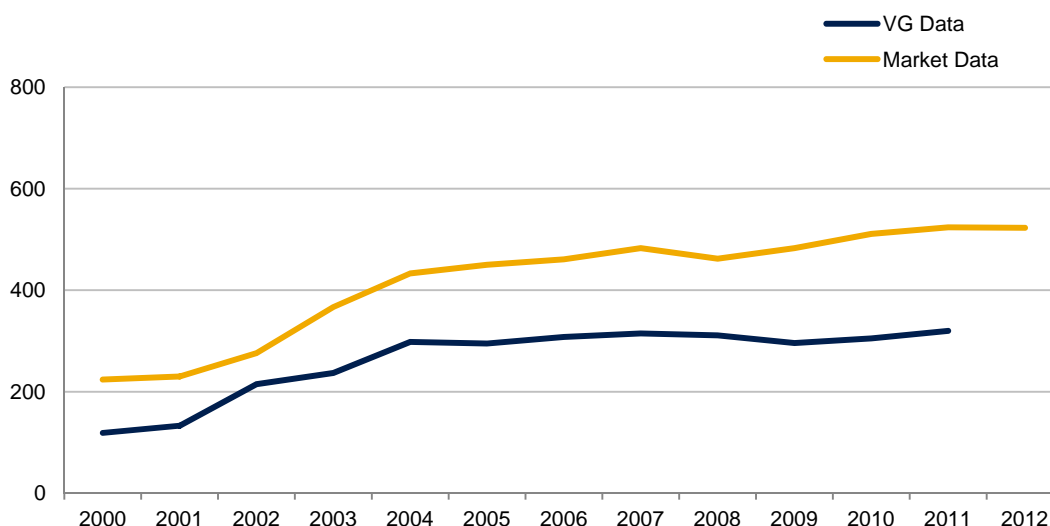
VG Data	257	278	330	407	477	487	487	502	518	521	559	571	
Market Data	347	367	418	484	550	588	609	654	655	629	702	705	698

Appendix 6B – Sydney Metropolitan Residential Price per Square Metre



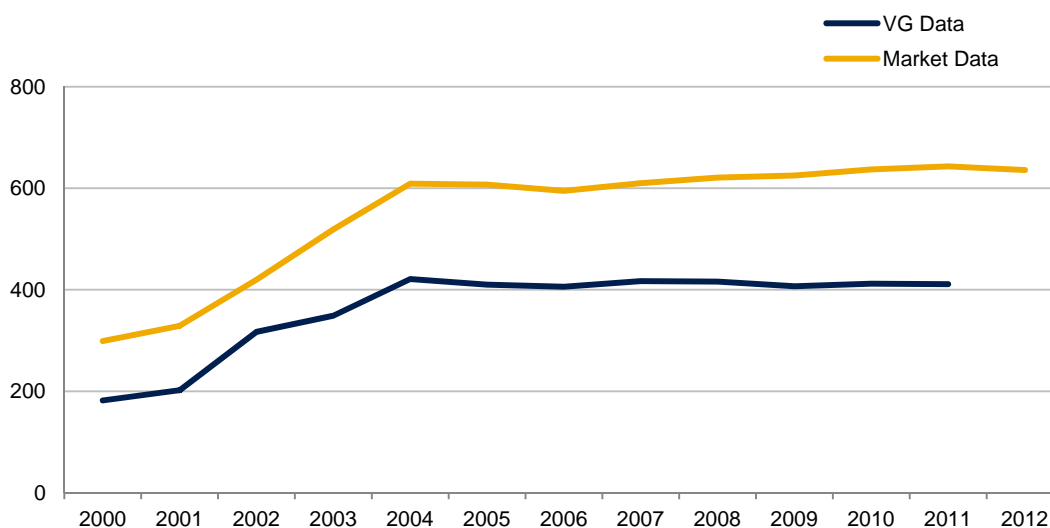
VG Data	456	482	732	662	755	799	818	844	858	871	918	940	-
Market Data	537	585	688	813	907	944	969	1032	1020	941	1064	1031	1078

Appendix 6C – Newcastle Metropolitan Residential Price per Square Metre



VG Data	119	133	215	237	298	295	308	315	311	296	305	320	-
Market Data	224	230	276	367	433	450	461	483	462	483	511	524	523

Appendix 6D – Wollongong Metropolitan Residential Price per Square Metre



VG Data	182	202	317	349	421	410	406	417	416	407	412	411	-
Market Data	299	329	420	519	609	607	595	610	621	625	637	643	636

Appendix 7 – Regional Information

Central

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	52.09	53.94	57.55	69.93	100.89	107.56	116.05	117.58	121.31	120.26	119.88	121.31
	Market	134.84	125.73	143.47	154.41	212.68	250.85	259.64	249.46	264.54	270.16	254.68	265.06
% change	VG		3.4%	6.3%	17.7%	30.7%	6.2%	7.3%	1.3%	3.1%	-0.9%	-0.3%	1.2%
	Market		-7.2%	12.4%	7.1%	27.4%	15.2%	3.4%	-4.1%	5.7%	2.1%	-6.1%	3.9%
% difference			10.7%	-6.1%	10.6%	3.3%	-9.0%	3.9%	5.4%	-2.6%	-3.0%	5.8%	-2.7%
Indexed	VG	100.00	103.43	109.93	129.38	169.09	179.57	192.70	195.21	201.21	199.45	198.82	201.17
	Market	100.00	92.76	104.22	111.61	142.19	163.82	169.37	162.46	171.72	175.29	164.64	171.08

Far West

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	4.76	5.53	7.87	6.10	10.53	9.96	14.38	35.38	47.30	47.29	36.82	34.57
	Market	62.78	57.45	79.31	79.78	90.52	100.99	112.49	134.79	160.56	179.80	147.55	180.15
% change	VG		13.9%	29.7%	29.1%	42.1%	-5.8%	30.7%	59.4%	25.2%	0.0%	28.4%	-6.5%
	Market		-9.3%	27.6%	0.6%	11.9%	10.4%	10.2%	16.5%	16.0%	10.7%	21.9%	18.1%
% difference			23.2%	2.2%	29.7%	30.2%	16.1%	20.5%	42.8%	9.1%	10.7%	-6.6%	24.6%
Indexed	VG	100.00	113.90	147.75	104.76	148.87	140.28	183.40	292.29	365.90	365.89	261.84	244.79
	Market	100.00	90.72	115.73	116.41	130.22	143.72	158.41	184.62	214.25	237.18	185.34	218.88

Hunter

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	123.04	137.95	169.08	252.86	316.93	311.45	322.84	330.33	324.45	316.61	327.03	345.42
	Market	177.82	179.36	195.70	256.21	330.85	342.45	358.46	357.53	356.98	381.17	392.70	406.46
% change	VG		10.8%	18.4%	33.1%	20.2%	-1.8%	3.5%	2.3%	-1.8%	-2.5%	3.2%	5.3%
	Market		0.9%	8.4%	23.6%	22.6%	3.4%	4.5%	-0.3%	-0.2%	6.3%	2.9%	3.4%
% difference			9.9%	10.1%	9.5%	-2.3%	-5.1%	-0.9%	2.5%	-1.7%	-8.8%	0.3%	1.9%
Indexed	VG	100.00	110.81	131.21	174.68	210.00	206.30	213.58	218.42	214.46	209.15	215.82	227.31
	Market	100.00	100.86	109.28	135.09	165.56	171.18	178.82	178.36	178.08	189.38	194.94	201.54

Illawarra

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	139.26	156.78	239.08	299.31	373.89	363.17	355.12	352.17	349.27	341.98	346.50	347.03
	Market	198.13	203.70	275.91	368.49	405.19	425.82	424.27	443.10	430.95	430.10	431.95	437.94
% change	VG		11.2%	34.4%	20.1%	19.9%	-3.0%	-2.3%	-0.8%	-0.8%	-2.1%	1.3%	0.2%
	Market		2.7%	26.2%	25.1%	9.1%	4.8%	-0.4%	4.3%	-2.8%	-0.2%	0.4%	1.4%
% difference			8.4%	8.3%	-5.0%	10.9%	-7.8%	-1.9%	-5.1%	2.0%	-1.9%	0.9%	-1.2%
Indexed	VG	100.00	111.17	149.44	179.51	215.32	208.97	204.23	202.52	200.84	196.56	199.12	199.42
	Market	100.00	102.74	129.63	162.19	176.88	185.45	184.77	192.63	187.20	186.83	187.63	190.19

Mid-North

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	84.38	87.82	123.22	187.55	240.44	246.47	233.08	230.95	234.82	231.42	237.10	236.15
	Market	118.09	122.31	125.91	171.18	252.90	277.17	280.33	253.10	277.91	299.04	305.93	317.69
% change	VG		3.9%	28.7%	34.3%	22.0%	2.4%	-5.7%	-0.9%	1.6%	-1.5%	2.4%	-0.4%
	Market		3.4%	2.9%	26.4%	32.3%	8.8%	1.1%	10.8%	8.9%	7.1%	2.3%	3.7%
% difference			0.5%	25.9%	7.9%	10.3%	-6.3%	-6.9%	9.8%	-7.3%	-8.5%	0.1%	-4.1%
Indexed	VG	100.00	103.91	133.76	179.64	219.16	224.52	211.62	209.67	213.12	210.00	215.03	214.16
	Market	100.00	103.45	106.41	134.54	178.02	193.61	195.79	174.73	190.33	203.78	208.37	216.08

Murray

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	40.95	40.94	48.61	54.64	79.27	100.43	110.27	120.54	119.46	113.05	113.12	112.62
	Market	103.37	113.12	118.68	136.83	162.09	192.36	198.62	223.08	216.57	209.23	188.44	227.10
% change	VG		0.0%	15.8%	11.0%	31.1%	21.1%	8.9%	8.5%	-0.9%	-5.7%	0.1%	-0.4%
	Market		8.6%	4.7%	13.3%	15.6%	15.7%	3.2%	11.0%	-3.0%	-3.5%	11.0%	17.0%
% difference			-8.6%	11.1%	-2.2%	15.5%	5.3%	5.8%	-2.4%	2.1%	-2.2%	11.1%	17.5%
Indexed	VG	100.00	99.97	115.74	128.52	168.46	203.95	222.15	241.09	238.90	225.36	225.50	224.49
	Market	100.00	108.62	113.71	128.79	148.87	172.29	177.72	197.21	191.28	184.57	164.20	192.15

Murrumbidgee

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	66.23	67.79	72.61	69.92	86.74	107.05	127.95	128.38	131.08	136.89	139.50	143.04
	Market	138.73	138.63	164.80	171.12	225.17	242.48	264.34	292.07	279.09	269.06	294.20	304.23
% change	VG		2.3%	6.6%	-3.8%	19.4%	19.0%	16.3%	0.3%	2.1%	4.2%	1.9%	2.5%
	Market		-0.1%	15.9%	3.7%	24.0%	7.1%	8.3%	9.5%	-4.7%	-3.7%	8.5%	3.3%
% difference			2.4%	-9.2%	-7.5%	-4.6%	11.8%	8.1%	-9.2%	6.7%	8.0%	-6.7%	-0.8%
Indexed	VG	100.00	102.30	109.09	104.90	125.24	149.00	173.34	173.92	177.50	185.04	188.49	193.17
	Market	100.00	99.93	115.80	120.07	148.90	159.53	172.72	189.12	180.32	173.60	188.43	194.65

North Western

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	31.47	32.60	34.88	40.24	49.23	63.89	67.67	73.77	71.36	72.22	74.07	76.67
	Market	99.08	76.38	92.35	114.05	132.85	146.24	157.96	171.86	183.73	164.38	155.02	185.76
% change	VG		3.5%	6.5%	13.3%	18.3%	23.0%	5.6%	8.3%	-3.4%	1.2%	2.5%	3.4%
	Market		29.7%	17.3%	19.0%	14.2%	9.2%	7.4%	8.1%	6.5%	11.8%	-6.0%	16.5%
% difference			33.2%	10.8%	-5.7%	4.1%	13.8%	-1.8%	0.2%	-9.8%	13.0%	8.5%	13.2%
Indexed	VG	100.00	103.46	110.21	124.90	147.71	181.61	191.75	207.61	200.58	202.98	208.04	215.09
	Market	100.00	70.27	82.43	98.12	112.00	122.25	131.32	141.94	151.12	133.32	125.28	146.01

Northern

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	34.85	35.27	38.25	40.78	54.03	62.86	71.86	79.76	81.07	82.99	84.94	86.56
	Market	101.86	91.49	105.70	119.89	151.14	171.37	202.55	205.47	207.97	218.55	186.44	246.47
% change	VG		1.2%	7.8%	6.2%	24.5%	14.1%	12.5%	9.9%	1.6%	2.3%	2.3%	1.9%
	Market		-	11.3%	13.4%	11.8%	20.7%	11.8%	15.4%	1.4%	1.2%	4.8%	17.2%
% difference			12.5%	-5.7%	-5.6%	3.8%	2.2%	-2.9%	8.5%	0.4%	-2.5%	19.5%	22.5%
Indexed	VG	100.00	101.18	109.06	115.84	144.24	164.51	185.11	203.45	206.73	211.52	216.38	220.43
	Market	100.00	88.66	100.58	112.49	135.75	151.78	175.14	177.63	179.76	188.46	156.01	194.00

Richmond-Tweed

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	118.88	133.83	241.64	264.18	293.93	297.83	301.40	319.39	349.08	330.97	341.58	331.42
	Market	137.74	129.13	144.31	171.84	265.81	294.90	303.46	344.12	350.03	367.15	382.24	356.26
% change	VG		11.2%	44.6%	8.5%	10.1%	1.3%	1.2%	5.6%	8.5%	-5.5%	3.1%	-3.1%
	Market		-6.7%	10.5%	16.0%	35.3%	9.9%	2.8%	11.8%	1.7%	4.7%	3.9%	-7.3%
% difference			17.8%	34.1%	-7.5%	25.2%	-8.6%	-1.6%	-6.2%	6.8%	10.1%	-0.8%	4.2%
Indexed	VG	100.00	111.17	160.77	174.49	192.15	194.67	196.97	208.07	225.77	213.41	220.04	213.30
	Market	100.00	93.33	103.15	119.68	161.99	177.97	182.99	204.61	208.07	217.77	226.36	209.86

South Eastern

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	60.02	63.76	80.39	147.81	195.50	195.93	197.77	201.07	206.89	201.74	198.67	200.28
	Market	107.73	122.59	142.83	175.48	211.75	254.01	273.14	291.28	275.28	298.02	297.80	308.65
% change	VG		5.9%	20.7%	45.6%	24.4%	0.2%	0.9%	1.6%	2.8%	-2.6%	-1.5%	0.8%
	Market		12.1%	14.2%	18.6%	17.1%	16.6%	7.0%	6.2%	-5.8%	7.6%	-0.1%	3.5%
% difference			-6.3%	6.5%	27.0%	7.3%	16.4%	-6.1%	-4.6%	8.6%	10.2%	-1.5%	-2.7%
Indexed	VG	100.00	105.87	127.77	186.05	231.44	231.94	234.11	237.94	244.63	238.39	234.71	236.59
	Market	100.00	112.12	128.01	151.83	177.83	207.42	221.95	235.77	222.07	239.01	238.83	247.23

Sydney Inner

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	1003.96	1067.82	1300.26	1438.04	1578.58	1567.08	1558.69	1639.76	1777.10	1831.51	1969.84	2018.54
	Market	1319.07	1550.20	1790.51	2100.86	2170.29	2231.85	2364.89	2624.54	2570.42	2184.17	2458.46	2398.53
% change	VG		6.0%	17.9%	9.6%	8.9%	-0.7%	-0.5%	4.9%	7.7%	3.0%	7.0%	2.4%
	Market		14.9%	13.4%	14.8%	3.2%	2.8%	5.6%	9.9%	-2.1%	-17.7%	11.2%	-2.5%
% difference			-8.9%	4.5%	-5.2%	5.7%	-3.5%	-6.2%	-4.9%	9.8%	20.7%	-4.1%	4.9%
Indexed	VG	100.00	105.98	124.93	136.90	149.08	147.99	147.19	154.47	166.41	171.35	183.38	187.81
	Market	100.00	114.91	130.33	149.58	154.37	158.63	167.55	184.13	180.25	148.38	164.93	160.81

Sydney Outer

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	323.16	346.49	417.73	472.78	545.70	536.04	523.86	531.24	522.66	537.37	565.44	577.21
	Market	415.39	457.99	548.11	647.51	733.17	743.64	753.65	766.91	744.79	752.05	828.18	808.00
% change	VG		6.7%	17.1%	11.6%	13.4%	-1.8%	-2.3%	1.4%	-1.6%	2.7%	5.0%	2.0%
	Market		9.3%	16.4%	15.4%	11.7%	1.4%	1.3%	1.7%	-3.0%	1.0%	9.2%	-2.5%
% difference			-2.6%	0.6%	-3.7%	1.7%	-3.2%	-3.7%	-0.3%	1.3%	1.8%	-4.2%	4.5%
Indexed	VG	100.00	106.73	124.94	139.48	158.12	155.27	151.66	153.77	151.24	155.38	163.10	166.42
	Market	100.00	109.30	127.27	146.81	163.96	166.27	168.48	171.40	166.30	167.91	183.34	178.77

Sydney Surrounds

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
\$/m ²	VG	181.02	207.62	257.72	315.39	377.26	381.24	377.68	369.57	352.21	343.17	348.07	340.71
	Market	274.69	265.66	314.49	419.82	464.26	485.40	484.40	467.55	463.94	464.15	477.14	469.16
% change	VG		12.8%	19.4%	18.3%	16.4%	1.0%	-0.9%	-2.2%	-4.9%	-2.6%	1.4%	-2.2%
	Market		-3.4%	15.5%	25.1%	9.6%	4.4%	-0.2%	-3.6%	-0.8%	0.0%	2.7%	-1.7%
% difference			16.2%	3.9%	-6.8%	6.8%	-3.3%	-0.7%	1.4%	-4.1%	-2.7%	-1.3%	-0.5%
Indexed	VG	100.00	112.81	134.74	159.38	185.52	187.46	185.69	181.61	172.66	168.11	170.48	166.80
	Market	100.00	96.60	111.60	139.60	152.96	159.63	159.30	153.56	152.36	152.43	156.58	153.92

Appendix 8A – Regional Map of NSW



Sourced from NSW Department of Premier and Cabinet – Division of Local Government

http://www.dlg.nsw.gov.au/dlg/dlghome/dlg_regions.asp

Appendix 8B – Zone Legend

Aggregated Zone Code	Aggregated Zone Description	Zone Code	Zone Description
A	Residential	A	Residential
A	Residential	R1	General Residential
A	Residential	R2	Low Density Residential
A	Residential	R3	Medium Density Residential
A	Residential	R4	High Density Residential
A	Residential	R5	Large Lot Residential
B	Business	B	Business
B	Business	B1	Neighbourhood Centre
B	Business	B2	Local Centre
B	Business	B3	Commercial Core
B	Business	B4	Mixed Use
B	Business	B5	Business Development
B	Business	B6	Enterprise Corridor
B	Business	B7	Business Park

Aggregated Zone Code	Aggregated Zone Description	Zone Code	Zone Description
B	Business	B8	Metropolitan Centre
B	Business	C	Sydney Commercial / Business
B	Business	D	Mixed Use Development
B	Business	E	Employment
B	Business	M	Mixed Residential/Business
B	Business	T	North Sydney Commercial / Business
B	Business	V	Comprehensive Centre
I	Industrial	I	Industrial
I	Industrial	IN1	General Industrial
I	Industrial	IN2	Light Industrial
I	Industrial	IN3	Heavy Industrial
I	Industrial	IN4	Working Waterfront
I	Industrial	W3	Working Waterways
N	National Parks	E1	National Parks & Nature Reserves
N	National Parks	N	National Parks
O	Open Space	O	Open Space
O	Open Space	RE1	Public Recreation
O	Open Space	RE2	Private Recreation
O	Open Space	W	Reserve Open Space
O	Open Space	W2	Recreational Waterways
P	Protection	E2	Environmental Conservation
P	Protection	E3	Environmental Management
P	Protection	E4	Environmental Living
P	Protection	P	Protection
P	Protection	W1	Natural Waterways
R	Non Urban	R	Non Urban
R	Non Urban	RU1	Primary Production
R	Non Urban	RU2	Rural Landscape
R	Non Urban	RU3	Forestry
R	Non Urban	RU4	Rural Small Holdings
R	Non Urban	RU6	Transition
S	Special Uses	S	Special Uses
S	Special Uses	SP1	Special Activities
S	Special Uses	SP2	Infrastructure
S	Special Uses	SP3	Tourist
S	Special Uses	U	Community Uses
X	Reserved Roads	X	Reserved Roads
Y	Reserved Special Uses	Y	Reserved Special Uses
Z	Undetermined, or Village	RU5	Village
Z	Undetermined, or Village	Z	Undetermined, or Village

Information sourced from the Office of the Valuer General.

Appendix 9 – Presentation Material

During the course of the statistical review, Crowe Horwath has presented the following 2 presentation material.

Presentation 1: Meeting held at Parliament of NSW premises (dated 21 February 2013).



JSCOVG Meeting
Pack - 20130221.pdf

Presentation 1: Meeting held at Parliament of NSW premises (dated 21 March 2013).



JSCOVG Meeting
Pack - 20130321.pdf

Appendix 10 – Reviewed Documentation

The material provided by the Committee and assessed for the review during engagement:

- Proposed Terms of Reference for Analysis (January 2013)
- Issues Paper – Inquiry into the Land Valuation System (February 2013)

Appendix 11 – Document Revision History

Version Number	Date of Issue	Author(s)	Brief Description of Change(s)
0.1	05/03/2013	Crowe Horwath	Initial draft
0.2	19/03/2013	Crowe Horwath	Issued draft to the Committee
0.3	21/03/2013	Crowe Horwath	Updated with appendices and after received feedback
FINAL	28/03/2013	Crowe Horwath	Updated and finalised after feedback received feedback

Crowe Horwath Sydney Pty Ltd is a member of Crowe Horwath International, a Swiss Verein. Each member firm of Crowe Horwath is a separate and independent legal entity. Crowe Horwath Sydney Pty Ltd and its affiliates are not responsible or liable for any acts or omissions of Crowe Horwath or any other member of Crowe Horwath and specifically disclaim any and all responsibility or liability for acts or omissions of Crowe Horwath or any other Crowe Horwath member.

Liability limited by a scheme approved under Professional Standards Legislation other than for the acts or omissions of financial services licensees.

This proposal is provided by Crowe Horwath Sydney Pty Ltd as an information service only. Crowe Horwath Sydney Pty Ltd provides no warranty regarding the accuracy or completeness of the information. All opinions, conclusions, forecasts or recommendations are reasonably held at the time of compilation but are subject to change without notice by Crowe Horwath Sydney Pty Ltd. Crowe Horwath Sydney Pty Ltd assumes no obligation to update this document after it has been issued. Except for any liability which by law cannot be excluded, Crowe Horwath Sydney Pty Ltd, its Directors, employees and agents disclaim all liability (whether in negligence or otherwise) for any error, inaccuracy in, or omission from the information contained in this document or any loss or damage suffered by the recipient or any other person directly or indirectly through relying upon the information. Section 945A of the Corporations Act requires financial planners to obtain information from clients before making recommendations. Equivalent requirements apply also to accountants in relation to the provision of taxation advice. Accordingly, clients and readers should not act only on the basis of material obtained in this update because the contents are of a general nature and therefore do not take into account each person's individual circumstances and may be liable to misinterpretation. Do not act upon any of the information contained within this update without first obtaining specific advice from your Crowe Horwath Sydney Pty Ltd advisor. Crowe Horwath Sydney Pty Ltd is a wholly owned subsidiary of WHK Group Ltd