

4th Pacific Rim Real Estate Society Conference
Perth, 19-21 January 1997

WHY THE HYPOTHETICAL DEVELOPMENT METHOD IS FLAWED.

*R.T.M. Whipple, PhD
Emeritus Professor
Curtin University*

e-mail: dwhipple@inet.net.au

Keywords: Development Projects, Valuation, Valuation Standards

Abstract:

The method of hypothetical subdivision has been favourably viewed by the courts and is endorsed by the relevant professional body.

It is one of three variants that need to be carefully defined in order to assess reliability. These are the method of hypothetical subdivision in assessing the value of in globo land and the method of hypothetical development in assessing the value of a single site. The third variant is a combination of the other two.

All three are flawed to varying degrees. Two flaws are common to all: first, the use of magnitudes that are comparable only if the real rate of return is zero; second, the importation of cost estimates produced in markets only tenuously related to the real estate market and which cannot be expected to predict the selling price of real property.

The third variant introduces unnecessary complications, magnifies the possibility of serious error and fails the test of Occam's razor. Furthermore, its use assumes the margin for risk in both land subdivision and building operations is known. As this is frequently not the case, serious distortion results – even if the previously noted objections are without force.

Concomitantly, use of these methods to analyse a profit and risk factor from sales of land that has subsequently been developed and sold will produce a result that is difficult, if not impossible, to interpret. This is so for all variants. Further, the traditional profit and risk factor is unrelated to the business decision process and is a concept without meaning.

WHY THE METHOD OF HYPOTHETICAL DEVELOPMENT IS FLAWED

*To study without thinking is futile
To think without studying is dangerous.*

Confucius, *Analects*, 2.15

Introduction

The proposition I wish to investigate in this paper is that the method of hypothetical development is flawed and should not be used as a real estate pricing model. I acknowledge at the outset that it does have a part to play in feasibility analyses and in the economic ranking of alternative land use proposals as part of the valuation process, but I am not concerned with those applications here. My concern is with its use as a means of predicting the price likely to be fetched in the real estate market. This is very much the concern of the valuer because the objective of valuation is price prediction.

Some of the problems detailed below I first raised in 1987 (published in Whipple, 1998) and repeated them in Whipple (1995, pp. 442-443). Because they are so obvious I did not give them a detailed treatment but, as the errors persist in valuation practice, a more comprehensive treatment is called for.

Variants

The general method has a number of variants that need to be carefully distinguished.

Variant 1 – Predicting the Selling Price of Land In Globo

This variant generally goes under the name of “the method of hypothetical subdivision”. It is accepted as a valid method of price prediction by the courts – most recently in *Joondalup Gate Pty Ltd v The Minister for Lands*, 1996 (unreported). It is also listed as a method of valuation in the Australian Institute of Valuers and Land Economists’ *Due Diligence Guidelines*, page 4, issued 1/96. The variant is therefore well known and will be illustrated below.

Variant 2 – Predicting the Selling Price of a CBD or Shopping Centre Site

In this application a site is hypothetically developed to its “highest and best use” (more accurately, its “most probable use”). The building is notionally rented and outgoings computed so as to calculate its net annual income. This net income is then capitalised at a selected rate to give an estimate of capital value. From this the cost of the building is deducted to yield an estimate of land value.

It is not uncommon to encounter this method in the context of predicting the price of a CBD site. The same approach is adopted in the feasibility analysis of a drive-in shopping centre site after the results of market analyses are to hand. While there are some technical differences between these two applications, they are similar in kind.

Variant 3 – Predicting the Selling Price of a Site for an Integrated Development

This is a combination of the preceding two Variants. The site is subdivided, buildings notionally erected on each site, the buildings are leased, the net income is capitalised and, from this capital sum, all development costs are deducted to result in an estimate of the raw land value.

We now consider each variant in turn.

Variant 1 – Hypothetical Subdivision

To illustrate the discussion, refer to Table 1, taken from the source indicated. The layout is typical of the method adopted by most practitioners. By way of background, it was assumed the project would span 19 months from the date of acquisition – the reader is referred to Whipple (1995) for other assumptions underlying the magnitudes in Table 1.

It is important to note that the figures entered into the model are costs and returns using current money values.

The model predicts a price of (say) \$680,000 whereas the site sold for \$870,000. A model which mis-prices so widely in a particular case cannot be a general model – i.e., used at large. The situation is akin to the well known problem regarding the argument from induction. One observation inconsistent with the conclusion invalidates the generalisation.

Such underestimation is typical of the writer's experience when employed in the real estate development industry. Having been outbid for development sites on a number of occasions, my colleagues and I probed the model and quickly came to the realisation that it is fundamentally flawed. In a growth situation we found it usually underestimated raw land value; conversely, in a period of economic contraction, it usually overestimated raw land value. We stopped using it some 40 years ago and it is rather surprising that it is still in vogue among valuers and accepted by the courts. Well, perhaps one shouldn't be too surprised. Nevertheless, as a price prediction model, it is unstable.

There are three flaws in the use of the model – each is now reviewed.

Flaw 1:

The magnitudes recorded in Table 1 are not comparable. Recall they are all expressed in to-day's dollar values and purport to be present values of their associated cash flows. The only condition when they will be present values of those cash flows is when the real rate of return is zero.

Table 10.20 in Whipple (1995) is a cash flow analysis of the same project. That is not reproduced here but readers who refer to it will verify that gross realisations occurred as follows:

Month	Lots Sold	Prices \$	PV @ 5% \$
12	8	472,000	449,027
13	6	354,000	335,373
14	4	236,000	222,654
15	3	177,000	166,298
16	3	177,000	165,608
17	3	177,000	164,921
18	2	118,000	109,491

Total:	29	1,711,000	1,613,372

The third column shows the pattern of lot sales using to-day's dollar values. At the time this estate was developed, the real rate of return would have been around 5%. The last column shows the present value of the relevant cash flows using that rate. Obviously, a nominal rate should not be used because the cash flows have not been inflated.

Note the difference between totals of the last two columns: \$97,628. In present value terms, this is equivalent to the selling price of 1.7 lots.

The figure for gross realisations that should be entered in Table 1 is \$1,613,372 (shown in *italics* in Table 1) – not \$1,711,000.

Similar comments apply to the other entries. It would be tedious here to discount all of them for present purposes but, just to reinforce the point, take the case of earthworks, drainage and road construction.

In to-day's dollars, that item costs \$193,000. Reference to Table 10.20 already cited shows the following actual timings (using to-day's dollars):

Month	Cost \$	PV @ 5% \$
11	56,213	53,700
12	57,151	54,369
13	79,636	75,446

Total:	193,000	183,515

Present values are shown in the last column (see also the italicised entries in the last column of Table 1). The difference is \$9,485 – the per lot cost of this item is equivalent to 1.4 lots.

Whereas in Table 1 the sum of \$1,711,000 is treated as being in the same currency units as the \$193,000, the correct comparison is between \$1,613,372 and \$183,515.

When repeated over almost all the items, it may be seen that the table is misleading. The manipulation of numbers that are not comparable can only yield meaningless results. In fact, Table 1 is without content.

The only time when this will not be so is if the real rate of return is zero. That is easy to demonstrate:

$$PV = FV(1 + i)^{-n}$$

from which it may be seen that $PV = FV$ when $i = \text{zero}$.

Hence, on this score, it follows that the method of hypothetical subdivision should be used only if the real rate of return is zero. There are, however, other problems with it.

Flaw 2:

The method of hypothetical subdivision is really another manifestation of the cost approach to price prediction and it therefore suffers from the same illogicalities.

The approach may be characterised in the form of what is referred to as “the developers’ equation”:

$$\text{Land “Value”} = \text{Net Realisations} - \text{Profit} - \text{Development Costs} - \text{Finance Costs}$$

For the equation to hold, we require

1. the dollar equivalents to be comparable which, as shown above, is so only if the real rate of return is zero AND
2. that the items on the right hand side of the equation to be in terms of values determined in the real estate market – more correctly, in units of land value.

We shall refer to the “profit” factor below. Net realisations, if correctly estimated, are reasonably assumed to be determined in the real estate market. This is not quite so, however, with development and finance costs.

Finance costs are set in the finance market. Now it is true that the demand for finance employed in the real estate market is determined partly by that market – but by other markets as well.

Similarly, the level of development costs is a product of forces within and beyond the real estate market. One simply has to think of the materials supply market, the market for transport services and such like. The level of professional fees is at least

recommended by professional bodies as well as influenced by the demand from clients operating beyond the real estate market.

It may be argued that costs so determined are paid by developers who are, of course, an integral part of the real estate market and the resulting level, when paid, is real estate market determined. This overlooks the fact, however, that such estimation is no guarantee that the developed sites will fetch a price in the real estate market sufficient to cover those costs and to provide an adequate profit and risk margin.

It follows, therefore, that an equation which has elements which are only partly determined in the real estate market and which (on its right hand side) are not in units of land value cannot coalesce into a prediction of the price the raw land may fetch in the real estate market – unless the whole economy is in a state of stationary equilibrium. That seems never to happen. Therefore the cost approach, while it has an important role to play in feasibility analyses, should not be used as a real estate price predictor – which is to say valuers should not use it as a valuation method. It is, however, listed in the Institute's publication cited above.

Furthermore, the way in which items of capital expenditure interact directly with each other and indirectly with others in the list is little understood. To assert that the effects are additive (as the model does) is to simplify that which is a very complex set of interrelationships.

In short, the model is illogical – but so, too, is the cost (or summation) approach. I have canvassed the arguments for this at some length in Whipple (1995, p. 488-492).

Flaw 3:

We turn now to the profit factor. There are some real problems with this item – both conceptual and mechanical. Let us examine the mechanical aspects first. There are two sides to this coin.

First, it will be seen from Table 1 that this is computed by proportion. The rate of 20% is used in the example and this seems to be the generally adopted rate in contemporary valuations of subdivisional land.

Whereas the calculation is based on net realisations of \$1,621,250, rather it should be based on the present value of gross realisations of \$1,613,372 (as shown above) less the present value of selling costs. The latter is \$84,627. Hence the base figure should be \$1,538,745 (shown also in the last column of Table 1).

The profit and risk factor, computed from this discounted sum, is \$254,790 – compared with \$270,208. The difference is \$15,418. By virtue of the method of constructing Table 1, that error is carried down to the final value estimate. In the process, other errors are picked up as well for the reasons just given.

But is this quite right? No, it isn't. This is because the actual margin over costs is itself a set of cash flows. They occur as net cash (hopefully) emerges from the project. The correct measure of the profit and risk factor is the present value of its component of the net cash flows at the real rate of return.

The second side to the coin lies in the analysis of completed developments in the attempt to solve for the profit and risk factor.

The data in Table 2 is representative of how valuers are directed to go about it in older texts on valuation. This uses the data of Table 1. Without labouring the point too much, it will be seen it suffers from the same problems as reviewed above.

There is a danger in using it, however, and this relates to the nature of the data inputs. It would not be difficult to ascertain the prices fetched on subdivision. Enquiry of contractors and others might well reveal the actual development costs. These numbers will differ from those used in Table 2 – for the reasons already given. It follows that the analysed profit and risk factor using those costs will be different from that factor on which the decision to proceed with the development actually turned.

If the real rate of return is zero, the required figures are those extant at the time the decision to proceed is taken. It follows, therefore, that this allowance in a valuation using the hypothetical subdivision method will most probably be incorrect. There is, of course, the further problem spelled out above – i.e., gross realisations should be set at \$1,613,372, and so forth for the other entries.

In fine, the mechanical problems dictate that the profit and risk factor is incorrectly estimated. It cannot, therefore, be a reliable decision criterion.

The difficulties do not stop there, however, for it is bedevilled by severe conceptual problems such that it is impossible to give it a substantive interpretation – even assuming the mechanical problems away.

We approach this proposition as follows:

Assume for the moment that, as part of the management and review function, we lay out in a spreadsheet the magnitude and timing of all the actual cash flows (suitably classified) and compute their internal rate of return. Because we are dealing with factual data, the internal rate of return is the actual return earned by the money invested in the project from period to period (monthly, say).

If the obtained IRR is equal to or exceeds the entity's cost of capital, solvency is achieved. This is to say that the costs of servicing debt are met and there is sufficient remaining to service the equity position. For this comparison to be valid, financing costs are excluded – to include them is to double count because, as just noted, those costs are part of the entity's cost of capital.

The cost of capital is an amalgam of the interest rates required by different kinds of investor – both equity and non-equity. They will refrain from investing in the entity unless the return by way of interest is perceived to compensate them for the risks associated with the relevant industry sector and with the entity. In short, the cost of capital rate is that rate which covers all risks as perceived by investors with the possible exception of risk specific to the project itself.

It is the objective of management, therefore, to ensure that the return associated with a project is at least equal to the cost of capital plus, if applicable, a margin to cover project specific risk. The magnitude of the latter is a function of managements' risk/reward profile. I have shown how to estimate the risk that a project will fail to meet these thresholds elsewhere (Whipple, op. cit., pp. 435-436).

It follows, obviously, that the only discount rate that makes sense is the cost of capital. In the case of a feasibility analysis, this will be the cost to the client. In the case of a valuation, this will be the cost to the industrial sector.

Now consider the conventional "profit and risk factor". It is not possible to ascertain from it whether or not a project will meet the entity's cost of capital rate and the important requirement for solvency. Neither does it give any indication as to whether or not project specific risk is covered. It does not measure profitability since it cannot be related to the entity's set of revenue accounts and balance sheet and it is of no use for capital budgeting purposes. In short, it fails to inform the business decision process. One wonders why valuers persist with producing ancillary data which is of no use to their clientele when there is available to them other avenues which will inform the decision process and establish the profession's relevance to that process.

The profit and risk factor is, I submit, largely without content. Because it is not related to the entity's cost of capital, various allowances are made for interest charges (as may be seen in Tables 1 and 2) which are only an approximation and assume an equal cost for each source of capital invested in the project – a most unreal assumption.

Objections Summarised

We have established the following:

1. As a price predictor it is unstable.
2. The magnitudes used in the analysis are comparable only in the unlikely event that the real rate of return is zero.
3. It is an application of the cost approach to price prediction and suffers from the same illogicalities.
4. The profit and risk factor is computed from a false base unless the real rate of return is zero.
5. If the real rate of return is non-zero, the profit and risk factor is the present value (at the real rate of return) of its component of the net cash flow.
6. The profit and risk factor analysed from recent sales of en globo land that has been developed and sold is highly likely to be wrong.
7. The method of allowing for interest charges assumes all the sources of capital invested in the project have the same cost.

8. The method is irrelevant to the business decision process and contributes to making the valuation profession seemingly irrelevant also.

In short, it is no price predictor – rather it is an intellectual mess.

Variant 2 – Predicting the Selling Price of a CBD or Shopping Centre Site

To recapitulate. The site is notionally developed to its so called “highest and best use”, rented out, outgoings estimated, the net income capitalised from which development costs and developer’s profit are deducted to yield an estimate of land value.

Problems with this model have been long recognised by the courts and by the profession. These concern its sensitivity to the choice of capitalisation rate and difficulties in “designing” the highest and best use, estimating with tolerable accuracy all development costs, the assessment of gross rents, renting up period and outgoings. Changes in assumed uses and floor space configuration, for example, can profoundly affect marketability and gross anticipated rents. Then there is the problem of building efficiency in the architectural and economic senses – and so on. The reader is invited to review the discussion of superadequacy in Whipple (op. cit., pp. 482-483).

Concerning the estimation of construction costs it should be remembered that valuers are not trained cost estimators. Cost estimation falls outside the scope of the discipline’s formal object (Whipple, op. cit., pp. 495-507). So also does architecture.

These alone are serious shortcomings. To these one must add some of the points made with reference to Variant 1. If the real rate of return is non-zero, the magnitudes used are not comparable, it suffers from the same illogicalities as the cost approach, the method of allowing for interest charges assumes the same cost applies to different sources of capital and it is irrelevant to the business decision process.

One wonders why its use survives into contemporary practice as a real estate price prediction model. It is an even bigger intellectual mess than Variant 1.

Variant 3 – Predicting the Selling Price of a Site for an Integrated Development

To recapitulate once again. The raw land is subdivided, buildings are erected on the lots, the buildings are rented, net rentals are estimated, capitalised and sold at the capitalised sum. From all of these estimates, land “value” is estimated as a residual.

We illustrate this variant with a simplified example. Assume land is ripe for industrial/commercial development. A traditional subdivider develops lots for that use. Assume the buyer of those lots (or even one lot) erects a speculative building for rental and then sells the revenue earning building for rental.

Consider the building developer first.

	\$
Price paid for the developed site:	1,000,000
Net selling price of the completed building:	3,000,000
Total building costs including fees, etc:	1,500,000

This may be set out in the conventional hypothetical development model as follows:

	\$
Net building selling price:	3,000,000
Profit and risk factor 20%	500,000
Total outlay:	2,500,000

Represented by:

	\$	
Land cost	1,000,000	
Building and other costs	1,500,000	2,500,000

Now examine the land subdivider's investment. Assume that, for the raw land, he paid the equivalent of \$250,000 per lot. Development costs were \$600,000 per lot and his net realisations were \$1,000,000 per lot. We then have:

	\$
Net selling price per lot	1,000,000
Profit and risk Factor 17.65%	150,000
Total outlay:	850,000

Represented by:

	\$	
Raw land cost	250,000	
Deleopment costs	600,000	850,000

Now we put these components together as this Variant requires:

	\$
Net sale proceeds from completed building:	3,000,000
Less profit and risk allowance 17.65% - say	450,000
Total outlay	2,450,000

Less:

	\$
Cost of building	1,500,000

Land development costs	600,000	2,100,000

Land “value”		350,000

So land cost is overestimated by \$100,000 per lot.

Now rerun the model using the 20 per cent profit and risk factor:

	\$
Net sale proceeds from completed building:	3,000,000
Less profit and risk allowance 20%	500,000
Total outlay	2,500,000

Less:

	\$
Cost of building	1,500,000
Land development costs	600,000
	2,100,000

Land “value”	400,000

This overestimates the land component by \$150,000 per lot.

The difficulty is that the profit and risk factor for the building component was 20 per cent whereas the factor of 17.65 per cent refers to the land subdivision part of the process. Only one of these was applied in each of the two examples just given.

Arithmetically, the factor of 17.65 per cent should have been applied to the price of the developed site and 20 per cent should have been applied to the building investment. In the examples, the “additional” margin has been allocated to raw land “value”. This shows that this Variant requires knowledge of the profit and risk factor obtained by both components of the development process.

It is possible, of course, to rework such figures infinitely and I am acutely aware that per lot costing can be dangerous – but the point stands.

The building developer pays a price for the site that rewards the subdivider. The final investor pays a price which rewards the builder for buying the developed site, investing in the new building, managing to lease it and so on. The builder’s net margin is the return to the land, labour, capital and management inputs due to the building development. The market price paid for the developed site captures its potential for the final use. It is important to allocate the “rewards” to their appropriate set of productive factors. Both profit and risk factors are a reward for two different kinds of activity comprising the real estate development process. If they differ, the proper magnitudes must be entered into the analysis to avoid spurious results.

This last remark assumes, however, that the basic model is a valid one. We have seen above that it isn't.

A further objection to Variant 3 is that it requires the assessment of costs and returns in addition to those needed in the hypothetical subdivision case. This introduces scope for further error. With typically large sums involved in building development, for example, a change in cost estimation would likely produce a significant variation in the result. Similar remarks concern even slight variations in the adopted capitalisation rate. The effect of such additional variables is to act as a kind of lever. The multiplication of entities without necessity violates the principle of Occam's razor.

Additionally, all the objections relating to Variants 1 and 2 apply as well. Of all three Variants, this one is the biggest intellectual mess.

Some Objections:

Against the views I have expressed above, three related objections might be proposed:

1. Even though the models have problems, they can be used as a valid check against a price prediction resulting from another approach – comparable sales, say.
2. As valuation is an inexact science, the use of approximate models is excusable because “over” accuracy in prediction is spurious.
3. If there are no comparable sales to use as a benchmark in price prediction, the methods reviewed above are the only available ones.

My answer to each of these, briefly, is as follows:

1. The models are too unstable to afford even a degree of comfort. The use of models which are so riddled with absurdity is an inadequate basis for the claim to professionalism.
2. This is the argument that “near enough is good enough”. But with such a flawed model, one never knows what it is that one has to be “near to” – let alone “near enough to”. It is true that a price prediction is an observation from a probability distribution of probable prices. It follows that valuers should always provide their clients with an estimate of just how reliable that prediction is. For this reason every valuation should provide its reader with three figures: two demarking the transaction zone within which the forecast price is most likely to fall and one being the most probable price. The less the certainty, the wider the transaction zone: vital information for decision makers. The models reviewed here are, as stated above, too unstable and lacking in intellectual content to assist materially in the attainment of this objective. All the objections raised interact with and compound each other to produce a result that cannot be given a substantive interpretation.

3. Even if comparable sales are available, a DCF approach should always be adopted. I cannot emphasise too strongly the imperative of conducting a **SERIES** of DCF analyses: one for each of a set of cogently reasoned scenarios (groups of assumptions, if you will) from each of which a land price estimate results. The requirement for scenario analyses follows from the stochastic nature of the cash flow estimates. Such omission from the Institute's *Practice Standard: Discounted Cash Flow* of September 1996 is one of a number of serious disregards in that document. The analyses result in a range of prices likely to be obtained across a series of scenarios – from which the valuer selects the most probable. All, of course, have to be reported. Valuations and feasibility studies should **NEVER** rely on merely one DCF analysis. The discount rate, being the cost of capital rate, can be determined external to the model and related directly to the business decision. Furthermore, the scenario associated with the most probable price provides the client with a valuable asset management plan and further reinforces the relevance of valuers' services to their clientele. I have reviewed all of these issues elsewhere (Whipple, 1988 and 1995).

The essence of success in real estate development is managing the timing of the cash flows. Failure to do so adequately is the major source of risk in this kind of investment. It is absurd to use a model that ignores the very essence of the phenomenon it purports to model.

The Position of the Courts and the Relevant Professional Body:

The *Joondalup* case, referred to above, is the latest foray by the judiciary into this area after an absence of many years. The court quite correctly rejected Variant 3 (as I have labelled it) largely on the score that slight variations in building cost estimates and capitalisation rates will have a profound impact on land "value". This is quite true but, as will be evident from our preceding discussion, it does not go far enough.

The court did not, however, question the adequacy of Variants 1 and 2 (its main concern was with Variant 1; Variant 2 was introduced in cross examination). It appears the court was content to accept previous rulings concerning the acceptability of Variant 1. That the objections raised above were not introduced before the court doubtless explains why it did so.

The court did, however, recognise the need for deferment:

"... Mr" X "did not allow for a deferment period from the date on which the land is valued (or hypothetically purchased) to the date on which necessary rezoning or approval for subdivisional development could be obtained. By contrast Mr" Y "assumed that a deferment period of two years was required in order to achieve the necessary approvals and applied an appropriate discount rate of 13.5 per cent to the two year deferment.

"The values as assessed by the two valuers for the land resumed were \$803,000 for Mr" X "and \$578,782 for Mr" Y. "If these figures are corrected so that, in accordance with our finding elsewhere in these reasons, the same deferment period of 18 months is applied to each at a discount rate of 13.5 per cent, the two values become \$655,000 for Mr" X "and \$618,000 for Mr" Y. (Page 76 of judgment).

Whilst recognising the need for deferment in this part of the exercise, it is a pity the court did not push its thinking another step forward to recognise the need to discount the figures making up the entries in the valuations before it using the hypothetical subdivision method. Had it done so, the common law might now be in step with proper practice. A good opportunity was lost and the point will have to be argued before the courts on a later occasion. To be successful, that will require well educated valuers who have the courage of their convictions.

In the meantime, valuers using any of the three Variants reviewed above should be invited to demonstrate why the objections I have raised are of no material force. The relevant professional body might also address these issues with profit to all concerned. In that process it may find it productive to consult its academic members as well (Boydell and Gronow, 1997, p. 59).

Perth
January 1998.

RTMW

References

1. Australian Institute of Valuers and land Economists (1996): *Guidance Note – Due Diligence Guidelines*, the Institute, Canberra.
2. Australian Institute of Valuers and land Economists (1996): *Practice Standard – Discounted Cash Flow*, the Institute, Canberra.
3. Boydell, S. and Gronow, S. (1997): The Australian Institute of Valuers and Land Economists discounted cash flow practice standard”, *Journal of Property Valuation and Investment*, Vol. 15, No. 1, pp. 58-69.
4. *Joondalup Gate Pty Ltd and The Minister for Lands as the Delegate of the Minister for Works*, the Compensation Court, WA., Coram Parker J. (President), Priest, R.J. (Assessor) and Solomon, P.L. (Assessor), Lib. No. 960406, unreported.
5. Whipple, R.T.M. (1987): “Evaluating Development Projects”, paper presented to the Second World Valuation Congress, University of British Columbia, Vancouver. Reprinted in 1988 in: *Land Development Studies*, Vol. 5, pp. 91-119. *Journal of Valuation*, Vol. 6, No. 3, pp. 253-285. *The Valuer*, Vol. 30, No 4., October, pp.158-170. *The New Zealand Valuers’ Journal*, Vol. 27, No. 8, March, pp. 484-497. M. Squirrell (ed) (1997): *Readings in Property Economics*, Australian Institute of Valuers and Land Economists, Canberra, pp. 75-105.
6. Whipple, R.T.M. (1995): *Property Valuation and Analysis*, Law Book Company, Sydney.

Table 1

Application of Static Valuation Method to 29-lot Subdivision

			\$
PV @ 5%			
Gross realizations:			
29 lots @ \$59,000 per lot			1,711,000
1,613,372			
Less:			
Selling costs			89,750
84,627			

Net realizations:			1,621,250
1,538,745			
Less profit and risk allowance			
(20% of outlay)			
\$1,621,250 X (20 ÷ 120)			270,208
254,790			

Development costs, land value and interest			1,351,042
Less development costs:			
	\$	\$	
Water and sewerage headworks	68,000		
Earthworks, drainage, road construction	193,000		
183,515			
Undergrounding power	23,000		
Surveying fees	13,000		
Planning fees	4,350		
Council fees	2,000		
Engineering design and supervision	28,000	331,350	

Other Costs:			
Overhead - say 5% of sales		85,550	
Open space contribution		24,000	

Sub-total:	440,900	
Contingencies - say 5% of \$440,900	22,045	
	<u>462,945</u>	
Interest and Property Taxes		
Interest on development costs @ 9% for 9 months \$462,945 X 0.09 X 0.75	31,249	
Rates and taxes for 19 months allow \$1,050 per lot \$1,050 X 29 X 1.58 years	48,111	542,305
	<u>48,111</u>	<u>542,305</u>
Land value, acquisition costs and interest on land purchase		808,737
Less interest on land 9% for 19 months: \$808,737 X (14.25 ÷ 114.25)		100,871
		<u>100,871</u>
Land value plus acquisition costs		707,866
Less acquisition costs @ 3.9%: \$707,855 X (3.9 ÷ 103.9)		26,571
		<u>26,571</u>
Estimated land value:		<u>681,295</u> =====

Source: Whipple (1995, Table 10.22)

Table 2

**Sales Analysis of 29-lot subdivision to Estimate
Margin for Profit and Risk**

	\$	\$
Land Cost		870,000
Acquisition costs - 3.9%		33,930

		903,930
Loss of interest 19 months @ 9%		128,810
Rates and Land Tax \$1,050 X 29 lots X 1.58 years		48,111
Development Costs:	462,945	
Interest at 9% for 9 months	31,249	494,194

		1,575,045
Gross Realizations:	1,711,000	
Less selling costs	89,750	1,621,250

Margin:		46,205
		=====
Margin as per cent of costs:		
	\$46,205	

	X 100 = 2.93 per cent	
	\$1,575,045	

Source: Whipple (1995, Table 10.23)