

Land Administration of Contaminated Sites – Considering Alternative Uses

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Key words: Environment, forensic, contamination, containment, site specific, alternative uses.

SUMMARY

Western world governments and private sector businesses have recognised the importance of “re-found”¹ brownfield² land. Land that had previously been contaminated and rendered unusable as a result of its past use is being “re-found” via a forensic process and thus made useful again. The consideration of alternative uses and valuation methodology is paramount in establishing the value of such a site.

The need to encourage this practice of quality land administration of contaminated sites has been driven by three key factors:

1. Land shortages, particularly in urban/commercial areas, (equating to higher prices);
2. The need to rectify environmental catastrophes which have occurred over time, usually via the movement of contaminated ground water resulting in the contamination of clean land; and;
3. To remove visually unattractive evidence of past uses such as former rubbish tips.

Contaminated brownfield land, which has occurred via increased soil toxicity, creates its own unique assessment difficulties. Enhanced technology for assessment of the volume and type of contamination, coupled with methods for its ‘clean-up/containment’, has in many cases enabled previously unusable sites to be returned to viable uses. In other words, “re-found”. A combination of the costs specific to the site and the value of the identified alternative use (costs and land use matrix) will determine the highest overall assessment.

The experience of Valuer-General Victoria provides a case study of a sophisticated forensic valuation³/appraisal approach to the valuation of contaminated land which has facilitated viable development to take place. Furthermore, by using this process, risk is reduced via the increased use of specialists in various fields of site investigation.

This paper will provide information on the Cost and Land Use Matrix used and substantial environmental issues to be addressed. The application of these techniques enables sites to be regenerated and returned to an economically viable, socially acceptable and productive use.

¹ Re-Found: used for a specific purpose but had previously been used for a totally different, and now obsolete, purpose. A new use is thus “re-found”. For example, a former wharf/docklands area being converted to residential housing. A coffee cart being incorporated into a building foyer.

² Brownfield: Land that has been contaminated or affected by chemicals.

³ Forensic Valuation: Incorporates a scientific and quantifiable aspect to the valuation process.

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1. ALTERNATIVE USES

1.1 “End Game Scenarios”

It can be crucial to establish a number of alternative uses for a site. This is based upon the assumption that the site is *clean*, that is, free of contamination.

The purpose of identifying a range of uses, (for example showroom/warehouse, office building, open paved storage), is that the highest and best use can be determined only after taking into consideration the cost of the clean up of any contamination and rectification works. All factors must be taken into consideration, which would potentially result in a lower end-use value.

The identification of these alternative uses will establish the viability as to the extent of clean up needed to be undertaken and accordingly, will establish the justifiable value of the site. For example, a site only used for the storage of shipping containers (which would require a lesser degree of clean up) would be valued less than an office/warehouse complex (which may require a greater degree of clean up).

As a general rule ‘Residential Use’ requires the most extensive degree of site contamination works and this is inevitably expensive and requires the removal or treatment of contamination on site. However, the increased land value in the Cost and Land Use Matrix will often justify such rectification works.

- These individual feasibility assessments are therefore vital when dealing with contamination on a site-specific appraisal project. For example, office/warehouse development approximately 4,000m² on sites of 8,000m².
- To identify that the highest and best use of the subject site can also be influenced by the zoning within the district.
- The forensic data for assessment can thus be established and can proceed.

1.2 Alternative Use Matrix

Based upon a mixed use zoning a number of alternatives uses can be considered. Furthermore, in many parts of the world the local planning authorities will also consider a ‘special application’ to change an “in use” in order to assist developers to find economical solutions to correct contaminated site catastrophes.

Each of the Uses identified within the ‘Alternative Use Matrix’ below would also have sub-groups. For example, residential, single dwelling, dual occupancy, multi level apartments and

townhouses/residential housing. These sub-groups may in themselves create a requirement for further site specific adjustments in the case of ‘clean-up/containment’.

Table 1 – Alternative Use Matrix

Residential	Commercial Showroom	Commercial Office	Industrial Warehouse	Industrial Factory	Open Storage	Parklands
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A site may have a range of contaminants. For example, an asbestos cement sheet clad warehouse on ‘clean land’ and an imported dump fill on part of the balance of the site. The alternative use of such a site may be a combination of uses from the above matrix. For example, residential for the land upon the warehouse (once the asbestos is removed) and commercial office once a ‘capping layer’ over of the contaminated imported fill has been put in place.

2. FORENSIC COSTS ANALYSED

Having established a number of alternative development scenarios, it is then necessary to identify the precise steps to be taken and to qualify these in terms of cost, time, and the risks directly related to the contamination.

Professional experts should be engaged to undertake investigations and provide costs, time allowance and advice on risk factors.

Broadly speaking, there are two main remedies to achieve an environmentally acceptable site. First, the removal and related de-toxing of the contaminant and second, containment of the contaminant on site. Both of these remedies have a range of approaches.

2.1 Removal of Contaminants

The concept of simply relocating the problem. For example, transferring contaminated soil from a previously used petrol station to a ‘dumping ground’ is, in many countries, considered environmentally inappropriate.

To be acceptable, substantial cleaning of the soil particles is required to comply with local Environmental Standards. The increasing costs associated with ‘dumping’ also tends to encourage more sophisticated scientific remedies to be found.

Table 2 – Removal of Contaminants

Item	Cost for Alternative Use
Site Works	
De-toxing of contaminate	

2.2 Containment of Contaminants

In a number of circumstances, containment of contaminants is an economical and acceptable outcome when considered within the overall matrix. However, generally such an approach to contamination is used within Industrial/Commercial Use Zones.

The subject site is often 'stripped' of top soil and a geotextile mat under a crushed rock layer is put in place. In some cases 'larger walls' of concrete or crushed rock are also required around the sub soil parameter of the site for further containments in certain circumstances to prevent leakage.

A consequence of this approach is for ongoing site monitoring. This is generally required in order to comply with Environmental Regulations.

Table 3 – Containment of Contaminants

Item	Cost for Alternative Use
Stripping & Site Preparation	
Geotextile Mat	
Crushed Rock (capping layer)	
Ongoing Site Monitoring	

2.3 Additional Building Cost

The ramifications of developing a site which has been contaminated often results in additional development costs, particularly in the extra costs of building foundations.

In the case of a site that has been cleaned, it is likely that deeper foundations are required in order to find stability or solid base. Alternatively where contamination has taken place, a friction pile foundation system and suspended raft building slabs could often form part of the solution.

As part of incorporating this issue into the matrix assessment, it is vital to only consider the additional/extra costs incurred. This needs to be qualified as a cost amount.

Table 4 – Additional Building Costs

Item	Cost for Alternative Use
Deeper Foundations	
Friction Piles extra slab thickness	

2.4 Contingency Cost of Rectification

In general it would be reasonable to consider site clean-up and/or the containment of contamination as a separate project and thus apply an appropriate risk factor. An appropriate risk factor is usually in the range of 5% to 10% of the cost identified by the professionals.

Table 5 – Contingency Cost of Rectification

Item	Cost of Alternative Use
Cost of risk factor	

2.5 Impact on Capitalisation Rate/Profit & Risks

Where a site has been cleaned of contamination, the only remaining issue is the ‘stigma’ of its past use. For example, a highly toxic site previously used as a ‘gas storage facility’ may increase the yield/capitalisation rate that an investor seeks. Alternatively, it may reduce the amount a buyer would be willing to pay for a dwelling due to the stigma caused by the previous contamination. Thus a higher profit and risk allowance can be an appropriate method for considering this matter if a hypothetical ‘Turner’ approach is used as a valuation technique.

In many countries where containment is identified on the Ownership Title or other documents as a ‘Blot on Title Ownership’, this would impact on the value of the site or the development permitted upon the site.

Table 5 – Ongoing Liabilities of Contamination

Item	Cost of Alternative Use
Site Stigma	
Additional Profit & Risk	
Blot on Title cost	

2.6 Ongoing Liabilities on Contamination

Where a site has been ‘cleaned up’ and has received the appropriate Environment Audit Statement, there is generally little, if any, ongoing liability for the owner.

However, where ground water contamination or containment is involved, there is often a requirement for ongoing maintenance and related liabilities, including recurrent expenditure. In these cases, a special allowance should be made to cover this. This can involve a provision of a sinking fund style of payment to meet such obligations, or alternatively, the purchase of specialist insurance.

In cases where there is a change of use from say industrial to office warehouse, an insurance bond can be arranged to cover the cost and liabilities during a defined period of say 5 years. Alternatively an allowance in the form of a Present Value (PV) calculation can be made.

Table 6 – Ongoing Liabilities of Contamination

Item	Cost of Alternative Use
Ongoing Cost (PV)	

2.7 Time Cost of Rectification of Contamination

It would be reasonable to consider that the rectification of such site contamination would take time and would inevitably delay the future development commencement date.

Table 7 – Time Cost of Rectification of Contamination

Item	Cost of Alternative Use
Time Cost Contamination	

3. FORENSIC VALUATION APPROACH

3.1 Sales Evidence

Court precedent and valuation principles have lead us to establishing the market level of value. This, however, disregards the site specific items related to contamination. A market level of value is drawn from sales evidence and provides a benchmark value upon which further adjustments can be made.

However, analysis of sales for contaminated sites and discussions with professionals within the industry provides some indicators to approach appropriate allowances. In particular, this is useful to items that are difficult to quantify such as increase profit and risk allowance, site stigma and Blot on Title.

3.2 Forensic Assessment

Based upon zoning, a number or uses of sub-groups can be considered and information from various professionals can be drawn together in order to provide the ‘fabric’ of the assessment analysis.

Where possible, it is useful to quote costs as a rate per \$/m² and full cost for the subject site.

Table 8 – Forensic Assessment Matrix

Item	Alternative Uses					
	Residential	Commercial Showroom	Commercial Office	Industrial Warehouse	Industrial Factory	Open Storage
Benchmark Value						
Less Site Specific Adjustments						
Removal of Contaminate						
Site works						
Sub Total						
Containment of Contaminate						
Stripping & site prep.						
Geotextile mat						
Crushed rocks (capping layer)						
Sub Total						
Additional Building Cost						
Deeper foundations						
Friction piles extra slab						
Sub Total						
Contingency Cost of Rectification						
Cost of risk factor						
Sub Total						
Impact of capitalisation rate/profit and risk						
Site stigma						
Additional profit and risk						
Blot on Title						
Sub Total						
Time cost of rectification of contamination						
Sub Total						

ASSESSMENTS

3.3 Valuers/Appraisers Judgement

Having now become fully aware of consequences of the site specific adjustment upon the Benchmark Value for the Alternative Uses (subject to zoning), it still remains the valuer's own judgement on the market's perception of the site, related to the current market conditions.

4. CONCLUSION

Pro-active land administration of contaminated sites can be beneficial. An approach to achieving a desirable outcome is possible by looking at land uses.

The importance of considering alternative uses and methodology when valuing/appraising contaminated sites will, in many cases, allow it to be 're-found' and returned to a viable use. The rectification of past environmental disasters and relieving the shortage of land in sought after locations is both economically required and morally desirable.

This detailed forensic valuation methodology relies heavily on appropriately experienced environmental consultants capable of quantifying and qualifying the costs and time frames required for rectification of the site contamination issues.

A contamination benchmark value with site specific adjustments will result in providing the valuer with indication of the best outcome and in turn the level of value for the site.

This paper endeavours to provide a further insight and discussions within the professions who are involved in land matters to enable the removal of environmental risks.

Quality land administration systems with good governance is a cornerstone to this being achieved.

DISCLAIMER

I would like to draw to your attention to the fact that the views presented in this paper are my own; and should not be construed as representing those of the State Government of Victoria, Australia.

The figures within this paper have been altered and do not represent current levels or rates. This has been done due to confidentiality.

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ACKNOWLEDGMENTS

Barbara Flett, Director, Land Registry, Land Victoria, Department of Sustainability and Environment.

Graeme Balfour, Deputy Valuer-General, Valuer-General Victoria

Ed Young – EHL Young, Land Surveyor and Property Consultant.

Kathy Greening, National Marketing Manager, United KFPW.

Lea Brown – PA / Administration Assistant, Valuer-General Victoria.

BIOGRAPHICAL NOTES

Simon Adcock has a wide range of valuation experience on major commercial valuation sites, major office buildings, residential development sites and specialist properties, some of which have values in excess of AU\$1 billion. Currently he is involved in valuation issues involving the redevelopment of Melbourne Docklands into a residential/mixed use precinct and the 2006 Commonwealth Games venue.

For a number of years he has presented international conference papers at FIG, these include Buenos Aires- South America, Durban - South Africa, Brighton – United Kingdom, Seoul – South Korea, Washington DC – United States, Paris – France and Athens - Greece. He also presented papers at 46th IFHP World Congress held in Tianjin – China.

Simon is a member of both the Australian Property Institute (Victorian Division) and Victorian Division of Institute of Surveyors Australia Inc. In addition, he is also Chair of Working Group 9.2, Commission 9, and Chair Elect for Commission 8, FIG.

Simon enjoys substantial support from the Victorian Government to promote the benefits of FIG at these forums.

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