

# **The Necessity for ‘Re-found’ Brownfield Land and Preventing Environmental Catastrophes – A Forensic Valuation/Appraisal Approach to Contaminated Land**

**Simon ADCOCK, Australia**

**Key words:** Environment, forensic, contamination, containment, site specific.

## **SUMMARY**

Western world governments and private sector businesses have recognised the importance of “re-found” brownfield land, that is, land that had previously been contaminated and rendered unusable as a result of its past use, being “re-found” via a forensic process and thus made useful again.

The need to encourage this practice has been driven by three key factors:

- Land shortages, particularly in urban/commercial areas, (equating to higher prices);
- 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;
- To remove visually unattractive evidence of past uses such as former rubbish tips.

Contaminated brownfield land, which has occurred via soil toxicity, creates its own unique assessment difficulties. Enhanced technology for assessment of the volume and type of contamination, coupled with methods for ‘clean-up/containment’, has in many cases enabled previously unused sites to be returned to viable uses. In other words, “re-found”.

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

This paper will provide a case study of a site, which had substantial environmental issues and was functionally obsolete and visually unattractive for many years. However, the application of these techniques has enabled this site to be regenerated and returned to an economically viable and socially productive use.

# **The Necessity for ‘Re-found’ Brownfield Land and Preventing Environmental Catastrophes – A Forensic Valuation/appraisal Approach to Contaminated Land**

**Simon ADCOCK, Australia**

## **1. CASE STUDY –THACKRAY ROAD, PORT MELBOURNE**

### **1.1 Location**

Port Melbourne is situated approximately 4 kilometres north west of the Melbourne Central business District (CBD). It is an area that is characterised by an older style, industrial/warehouse use as well as a residential element that has recently undergone gentrification. This has resulted in a vibrant, multi-use area that is in great demand because of its amenity and close proximity to the Melbourne CBD.

In addition to major residential apartment development, substantial new commercial and industrial development has occurred with high profile occupants including British Aerospace, General Motors Holden, Kraft Foods and Toyota either expanding into or redeveloping exiting industrial sites in the precinct. The change of user-profile and strong demand in the precinct has seen land prices rise significantly.



Subject outline in red and shows proximity to the city

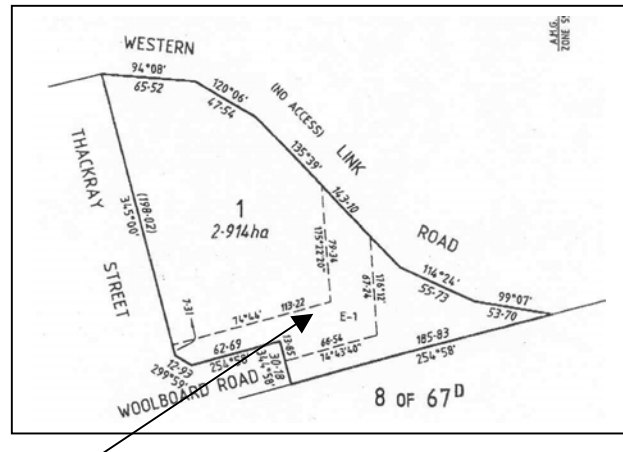
## 1.2 Subject Site

The site is significantly contaminated, generally level in contour and comprises a total land area of 2.914 hectares. The land is affected by an overhead power transmission line (E-1 as indicated on the site plan below). This impacts on the development potential of a portion of the site and effectively severs the site into two portions, although limited use of the site is still possible over the easement area.

Photograph of Site and Site Plan



View of obsolete industrial building on the site



Overhead Transmission Lines

## 1.2 Contamination Status

Aerial photographs from the 1960s indicate that the majority of the site had been excavated which is most likely as a result of sand quarrying:

- Parts of the site were alleged to have been used for many years as a rubbish tip.
- Contaminated soil was also supposedly deposited on the site.

The site had significant chemical-related hazards and was unstable for normal industrial type foundations.

The key conclusions of the environmental consultant are summarised in 1.3.1 below.

## 1.3 Environmental Consultants Report - The Key conclusions were as follows

- The site was underlain by fill material at depths greater than 6 metres. The fill material was affected by elevated metal and PAH concentrations, with contaminants in excess of NEPM HIL F for commercial/industrial use exceeded at nine of the twenty locations sampled. Leachability testing indicated a potential for leaching of contaminants under acidic conditions. However, given the neutral to slightly alkaline pH of fill and

groundwater and given the low acid sulphate potential of the soils, the generation of acidic groundwater capable of significantly leaching contaminants from the underlying contamination soils was considered unlikely.

- Characteristics of fill underlying the site were found to be consistent with that found in the surrounding land covered by the Dames and Moore 1999 Environmental Audit report.
- Provided that an appropriate separation layer between the contamination fill and site users is constructed and maintained and appropriate OH&S precautions implemented during any maintenance or future development work, it was considered that the risks to human health from the contaminants detected at the site were acceptable. Where existing physical barriers are present, these must be maintained and replaced if damaged or disturbed.
- Groundwater was encountered at depths between 1.9 and 4.8 metres below grade in fill material. It was found to be impacted by elevated metal (arsenic, chromium, copper, nickel and lead) and cyanide concentrations above the ANZECC criteria for ecosystem protection. The contaminants detected in groundwater appeared to be associated with the quality of fill material within the site and in adjacent areas and with the industrial uses of the adjacent land.
- The identified groundwater contamination was considered unlikely to be precluding an existing beneficial use or a beneficial use that is likely.
- The potential for further impacts of groundwater would be significantly reduced by site coverage and provision of appropriate drainage.
- The environmental risks were considered to be acceptable in the context of the proposed continued use of the site for commercial/industrial purposes.
- Given the identified groundwater contamination at this site and the presence of groundwater contamination within the adjacent land as indicated by Dames and Moore (1999), no use of groundwater should be permitted.
- If more sensitive uses were planned for parts of the site in the future, further environmental assessment and remedial works would be required.
- Furthermore, the environmental consultant considered that with appropriate management of the soil, the site would be suitable for ongoing commercial/industrial use. The presence of asbestos-containing building materials and asbestos debris at the site should also be investigated and the associated risks assessed.

#### **1.4 Proposed Sale of Subject Site**

In November 2002 a State Government Department put the subject site on the market for sale and appointed CB Richard Ellis as the selling agent. The site was put to public auction and there were no genuine bids. The property was passed in. Following the auction, the selling agent was unable to secure any interest in the land and by February 2003, no other offers had been received.

In view of the above, it was decided that substantial investigations, including a 'forensic assessment', was required in order to facilitate the site's potential for sale.

By mid 2003 a major industrial land development firm had shown substantial interest in the subject site. It had a history of working with complex site issues and adding value to its projects. This firm also had previous experience in development sites with brownfield characteristics. Through cooperative discussions, a picture emerged as to how the site could be used and what needed to be done to ‘re-find’ the site and transfer it from its brownfield status.

Some months of ongoing investigations, including an exhaustive investigation period was undertaken. It was important to establish a bench mark level of value. Agreement of this as a ‘starting point’ early in the process was important prior to expenses being incurred and time being spent in determining costs associated with adjustment (detailed further in this paper).

## **2. SITE SPECIFIC ADJUSTMENTS**

### **2.1 “End Game Scenarios”**

Firstly, it was crucial to establish a number of alternative uses for the site which were based upon the assumption that the site was *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 to be undertaken and will accordingly, 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 for an office/warehouse complex (which would require a greater degree of clean up).

These individual feasibility assessments are therefore vital when dealing with contamination on a site-specific appraisal project.

It was identified that the highest and best use of the subject site at Thackray Road was as follows:

- Five office/warehouses developments each of approximately 4,000m<sup>2</sup> on sites of 8,000m<sup>2</sup>.
- The balance of the site, that portion severed by the easement E1 as indicated in section 1.2, has an area under the overhead transmission lines that would be best used for storage, landscaped for car parking or an alternative suitable use permitted by the power company.

The forensic data for assessment was now established and could thus proceed.

## 2.2 Forensic Costs Data

Having established the most likely development use (see 2.1), it was necessary to identify the precise steps to be taken and to qualify these in terms of cost, time and risk. For this case study, the three key areas of cost/works involved were:

1. Installing a capping layer.
2. Demolition and removal of the existing structures.
3. Building additional foundations.

An independent consultant to the seller of the land (the Government of Victoria) provided advice on the proposed purchase cost impediments and the methodology to be applied to the containment of site contamination.

A specialist consultant who can quantify and justify the proposed action is vital for this type of assessment.

### 2.2.1 Capping Layer

A collective view between all parties (the seller, developer and consultant professionals) identified a way forward for dealing with the site.

The proposed purchaser had allowed for the placement and compaction of 750mm thick layer of crushed rock and capping over the contaminated soil across the entire site.

The breakdown of costs is provided in the following *Table 1*. The rate of \$55/m<sup>2</sup> includes stripping the top soil and site preparation and the placement of a geotextile mat under the crushed rock layer.

**Table 1**

<b>Item*</b>	<b>Rate*</b>	<b>Site Area</b>	<b>Cost</b>
Stripping & site prep.	\$8.50 / m <sup>2</sup>	29,140m <sup>2</sup>	\$247,690
Geotextile Mat	\$11.00 / m <sup>2</sup>	29,140m <sup>2</sup>	\$320,540
750mm Crushed Rock (capping layer)	\$38.50 / m <sup>2</sup>	29,140m <sup>2</sup>	\$1,121,890
<b>Total</b>	<b>\$58 / m<sup>2</sup></b>		<b>\$1,690,120</b>

\* rates have been altered due to confidentiality.

The independent consultant confirmed that the above rates for each item were in line with the current industry rates.

In addition, the proposed purchaser provided an extensive explanation as to the reason for the particularly thick capping layer of 750mm. It had two functions:

1. A separation layer over contamination material
2. To provide adequate bridging over the lower site fill to facilitate construction operations.

The independent consultant confirmed the proposed purchaser's justification for the capping.

### 2.2.2 Demolition and Removal of Existing Structures

The proposed purchaser allowed a rate of \$10/m<sup>2</sup> (or \$190,900) over the entire unaffected portion of the site area for the demolition and removal of existing structures. This also included an allowance for the removal of asbestos and concrete slabs. This was supported by separate advice from a demolition contractor.

The independent consultant confirmed the cost to be fair and reasonable.

### 2.2.3 Building Foundation Extra

In normal circumstances, a standard pad and strip footing system would be used, however, the proposed purchaser allowed a rate of \$30/m<sup>2</sup> (or \$572,700) over the unaffected portion of the site. This represented additional costs associated with the construction of a friction pile foundation system and suspended raft building slab.

This need and the cost were based on construction figures extrapolated by the proposed purchaser from a similar development in the Port Melbourne precinct where pile foundations up to 20-25m in depth were required to be constructed.

The independent consultant considered it to be fair and reasonable for the proposed purchaser to consider the 'worst case scenario' based on actual experience in the precinct on a similar ground condition which was of poor quality.

## **3. RISK COST OF RECTIFICATION OF CONTAMINATION**

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.

However, in the case study of Thackray Road, no additional allowance was made because the assessment had been partly based upon data provided by the proposed purchaser and independent consultant's report.

## **4. 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 development commencement date.

However, in many cases (including Thackray Road), other issues could be undertaken while the site works were being completed - such as attending to planning approvals etc. In this case, the proposed purchaser was also granted a lengthy "due diligence period with site

access for investigation”. This included drilling and taking case samples. Purchase settlement dates may also be negotiated to offset the effect of associated delays.

## **5. ONGOING LIABILITIES OF 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 vendor.

However, where ground water contamination is involved, there is often a requirement for ongoing monitoring and related liabilities, including recurrent expenditure. In these cases a special allowance should be made to cover this. This can involve the 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.

## **6. FORENSIC VALUATION APPROACH**

### **6.1 Sales Evidence**

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

In the case study, the market assessment rate of the “unaffected site area component” of 19,090m<sup>2</sup> was determined to have *an analysed market rate* of \$355m<sup>2</sup>. The balance of the site – the “affected” portion (overhead power transmission) of 10,050m<sup>2</sup> was considered to have *an analysed market rate* of \$170m<sup>2</sup>.



## 6.2 Forensic Assessment

**Table 2.**  
Thackray Road

	<b>Bench mark level</b>	<b>m<sup>2</sup></b>	<b>\$/m<sup>2</sup></b>		
			<b>(a)</b>		
	Unaffected Land	19,090	\$400	\$7,636,000	
	Affected Land (by easement)	10,050	\$200	\$2,010,000	
	Total Site Area	29,140		\$9,646,000	\$9,646,000
<b>Site Specific Adjustments</b>					
Less (unaffected)	Earth & Capping	19,090	\$58	\$1,690,120	
	Demolition	19,090	\$10	\$190,900	
	Extra Bldg. Foundations	19,090	\$30	\$572,700	
<b>Sub Total</b>				<b>\$2,453,720</b>	<b>\$2,453,720</b>
Less (affected)	Earth & Capping	10,050	\$58	\$582,900	\$582,900
<b>Sub Total</b>					<b>\$6,609,380</b>
<b>(b) Less</b>	Risk Cost		\$0	\$0	
	Time Cost		\$0	\$0	
	Ongoing Liabilities		\$0	\$0	
<b>Assessment/Market Value</b>					<b>\$6,609,380</b>

(a) Rates have been altered due to confidentiality.

(b) See Part 3 for explanation in this case study.

## 6.3 Valuer's Judgement

Having now become fully aware of the consequences of the "site specific adjustments" and the related potential negative impacts on the subject site, it remains the valuer's own judgement on:

- the market's view/perception, of the site;
- its history; and
- approach to contamination matters.

## 7. CONCLUSION

The use of a forensic valuation approach to contaminated land will, in many cases, allow it to be "re-found" and returned to a viable use thus rectifying past environmental disasters and relieving the shortage of land in sought after areas.

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

The foundation of such assessments should commence with a bench mark level assuming that the subject site is clear of contamination and is based on relevant sales evidence. It should be then adjusted accordingly to take into account what needs to be done by way of clean up with allowance for an appropriate risk factor.

Morally the need to reverse environmental disasters prevails. The necessity for re-found land in urban/cities/industrial areas will, however, continue to be substantially driven by the ongoing shortage of land and rising prices.

This paper endeavours to provide a further discussion on the removal of environmental risk.

## **DEFINITIONS LAND OR A BUILDING**

*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.

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

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

*Toxicity:* of poison; poisonous, cause by poison.

*Remedial:* affording a remedy; intended to remedy disease, deficiency, etc (remedial therapy).

## **DISCLAIMER**

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

## **REFERENCES**

- GeoEng., 2000, Paper – Managing Risks in a Large Remediation Project  
Lonie, Ian., Environmental Liability – Using Environmental Audits to Achieve Compliance, Partner, ClaytonUtz  
Pendlebury, G., (30 July 2003), Environmental Issues, From feeling RECT to finding the Solution, Principal, Foresite Pty Ltd.  
Worley Pty Ltd, Environmental Site Issue Reports Aug 2003.

## **ACKNOWLEDGMENTS**

John Rickard, Executive Director, Land Victoria, Department of Sustainability and Environment.

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

Elizabeth Krawczynszyn, Senior Consultant Valuer, Valuer-General Victoria.

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

Kathy Greening, Business Development Manager, United KFPW.

Tracie Thompson – Administration Assistant, Valuer-General Victoria.

## **BIOGRAPHICAL NOTES**

I have 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 I am involved in valuation issues involving the redevelopment of Melbourne Docklands into a residential/mixed use precinct and Commonwealth Games 2006 venue.

For a number of years I have 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 and Paris – France. I also presented papers at 46<sup>th</sup> IFHP World Congress held in Tianjin – China.

I am a member of both the Australian Property Institute and Victorian Division of Institution of Surveyors Australia Inc. In addition I also Chair Working Group 9.2, Commission 9, FIG.

I enjoy substantial support from the Victorian Government to promote the benefits of FIG at these forums.

## **CONTACTS**

Mr. Simon Adcock

Vice Chair of Administration and Chair of WG 9.2

Office of the Valuer-General

Marland House

Level 15/570 Bourke Street

Melbourne

Victoria 3000

AUSTRALIA

Tel. + 61 3 8636 2558

Fax + 61 3 8636 2519

E-mail: [simon.adcock@dse.vic.gov.au](mailto:simon.adcock@dse.vic.gov.au)