

# Watersbend: Appraising a Brownfield Redevelopment Project

by Rudy R. Robinson, III, MAI, Scott R. Lucas, and Garland G. Rasberry

One of the most notorious events in the real estate history of Austin, Texas, took place in 1991 when approximately 1,000 tenants were forced to evacuate on forty-eight hours notice from the Watersbend apartment complex. State environmental officials had discovered that potentially explosive levels of methane had seeped into ground-floor units overlaying a former municipal landfill. Eight years passed before the property accepted new tenants. During that time, the property was looted, new legislation was enacted to facilitate its remediation, and millions were spent on its rehabilitation.

Watersbend is one of the most unusual but ultimately successful brownfield redevelopment cases in Texas. This property was appraised just prior to its reopening, and the appraisal required research of the property's history, laws that expedited its remediation, the potential for tenant resistance, and environmental risks that could affect its value. This article discusses the complete history of the property: the bizarre circumstances of its construction, evacuation, and abandonment; its lengthy and groundbreaking remediation project; the recently enacted laws that permitted its rehabilitation; its reopening and market acceptance; and the multiple risks affecting its value then, now, and into the future. The authors believe the property suffers from a small but definite residual stigma, but on the whole its redevelopment is a resounding success that could serve as a model for other brownfield sites.

The impact of contamination on real estate is established in several articles. In 1991, Peter Patchin, MAI, in "Contaminated Properties Stigma Revisited," noted the development of data proving the existence of stigma in contaminated properties.<sup>1</sup> Patchin described stigma as a "negative intangible" caused by fear of hidden cleanup costs and public liability, lack of mortgageability, and the trouble factor, defined as monetary compensation for going to the "trouble of making a necessary improvement" to a contaminated property.

## abstract

This paper examines issues affecting the appraisal of a brownfield apartment property in Austin, Texas. These issues include the contamination that forced the property's evacuation, its eventual remediation, the creation of the legal framework permitting its reoccupation, market acceptance of its safety, and ongoing stigma risks. The authors describe the research and methodology needed to quantify the risks of owning a brownfield property. They conclude that complicated and long-term redevelopment projects such as this one can be successfully and profitably redeveloped while suffering only a modest post-remediation stigma.

1. Peter Patchin, "Contaminated Properties Stigma Revisited," *The Appraisal Journal* (April 1991): 162-172.

In 1992, Bill Mundy, MAI, PhD, discussed how contamination affects property value over time in his article "The Impact of Hazardous Materials on Property Value."<sup>2</sup> He maintains that property damages are manifested in lost income, utility, and marketability. In the early stage when uncertainty is highest, loss in value is greatest as a result of loss in marketability caused by "disclosure requirement by the sales agent or seller, required disclosure statements, concern on the part of the lender, and appraiser uncertainty." Damages decrease as the situation is understood and uncertainty is lessened. Mundy also describes residual stigma as "the difference between cured value and full market value," noting that cured value may never reach unimpaired value because of public perception of health risks.

A more recent article, "Post-Repair Diminution in Value from Geotechnical Problems" by Michael V. Sanders addresses the case studies approach and its applicability to estimating damages to properties affected by contamination and construction defects.<sup>3</sup> Sanders states that "the measurement of residual loss in value or stigma best employs the use of case studies." He further states that "case study properties need not be in the same area as the subject property, and data limitations usually necessitate searching a broader geographical area. While the circumstances surrounding the loss in value may be similar, properties selected for case studies are in many cases not directly comparable to the subject."

Robert Simons, PhD, discusses brownfields and their redevelopment in several articles and books listed in the bibliography. In his book *Turning Brownfields into Greenbacks*, Simons notes that the primary obstacles to brownfield redevelopment are the cost of cleanup and liability.<sup>4</sup> Regarding the cost of cleanup, he describes a relatively common situation in which the "net price of urban land [the cost of purchasing and remediating the land] possibly contaminated by a prior use would be higher than a comparable suburban property on virgin farmland." He also notes that the "strict, joint, and several liability" clauses of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) have impeded the involvement of developers and lenders in remediation of contaminated property.

In this article, rather than discuss brownfields or contaminated properties in general, we will de-

scribe in detail the evolution of a single brownfield property.

### **The History of Watersbend Apartments, 1984–1994**

Watersbend is located on U.S. Highway 183 in northeast Austin along a creek. Improvements were constructed in 1984 at a cost of \$13 million during a period of economic prosperity and unprecedented real estate construction in Austin. Watersbend was originally a 358-unit, garden-style complex of average-quality construction consisting of 25 buildings with wood frames on concrete slabs and a combination of brick and cedar siding. Amenities included two swimming pools, a clubhouse, and laundry rooms. The primary tenants were college students and middle-class families.

By the late 1980s, the Austin real estate market had collapsed. New tax rules, a slowing statewide economy overdependent on oil, and a glut of recently completed projects pushed the citywide apartment occupancy level below 80%. Watersbend suffered through this downturn along with other properties in Austin. At the turn of the decade, Watersbend and similar properties achieved a 90% occupancy level, albeit with rent levels well below those attainable in the period of 1984–1986.

### **Landfill Discovery and Tenant Evacuation**

By 1991–1992, approximately 1,000 people called Watersbend home. Unbeknownst to residents, however, Watersbend was constructed over a closed municipal, solid-waste landfill. Reportedly, Travis County used the site and surrounding area as a county landfill from 1950–1960, and then the City of Austin used it as a landfill from 1960–1968. From 1966–1968, the city used much of the subject site for filling purposes, including most of the area where the apartment buildings would be constructed.

Two reports published prior to the construction of Watersbend described the landfill, but on the whole, recordkeeping on municipal landfills during this time was poor, and information regarding the landfill's boundaries, types and amounts of waste accepted, and environmental controls is sketchy and vague. Still, in the early 1980s, the project builder convinced the City of Austin that construction of the apartments over a closed landfill would not pose an undue health risk. The builder and architect asserted that the fireplace

2. Bill Mundy, MAI, PhD, "The Impact of Hazardous Materials on Property Value," *The Appraisal Journal* (April 1992): 155–162.

3. Michael V. Sanders, "Post-Repair Diminution in Value from Geotechnical Problems," *The Appraisal Journal* (January 1966): 59–66.

4. Robert Simons, PhD, *Turning Brownfields into Greenbacks*, Urban Land Institute (1998).

chimneys would properly ventilate residual methane gas emitted from the closed landfill. Absurd as that seems, the builder must have offered his explanation very persuasively because the apartments were completed within three years.

In 1991, environmental consultants performed the first known Phase I Environmental Site Assessment specific to Watersbend. The study revealed high concentrations of methane in two subsurface areas beneath the apartments. The report also raised concerns about structural settling, health problems caused by methane-gas migration into the apartment units, and leachate contamination of Walnut Creek.

The following year, officials with the Texas Natural Resource Conservation Commission (TNRCC) discovered unacceptably high levels of methane in several first-floor units. Because methane is odorless and colorless, the tenants could not have detected it themselves. While the risk of explosion was very low, the results of an explosion obviously would have been catastrophic. Within two days, state and local authorities forced the complete evacuation of the complex. This action received widespread publicity and exacerbated an already tight rental market.

In an instant, Watersbend became an insoluble liability to its owners. They defaulted on the loan, but the primary lienholder initially declined to foreclose on the property because it was unwilling to assume the risks of ownership. The property eventually became a foster child of the unwilling American taxpayer as a holding of the Resolution Trust Corporation (RTC).

The RTC's stewardship of Watersbend could best be described as indifferent. With security consisting of nothing more than a hastily constructed chain-link fence, the property was repeatedly vandalized and inhabited by squatters. Thieves stole most of the water heaters, appliances, carpet, and

even doors and fireplaces. Vandals set some buildings on fire. Water damage from neglect and poor building design irreparably damaged many of the exterior walkways. As reported by the subsequent owner, the City of Austin used the property to train firefighters and in one case deliberately set one building ablaze, a SWAT team conducted exercises on the property. Both parties apparently believed they had clearance to destroy government property; whether they did is doubtful. In fact, the property had already been sold to a private developer when these incidents occurred. The developer received undisclosed compensation for the trespasses and damages.

#### Watersbend Purchased

In 1994, Limited Liability Corporation purchased Watersbend "as is" from the RTC for \$1 million, or just \$2,793 per unit. This sale price was drastically lower than prices of similar complexes built during the same period, as described in Table 1. If not for its evacuation and other problems, Watersbend probably could have sold for a price within the range of these comparable sales. In fact, Watersbend sold at a discount of 85%–90% compared to these properties.

These comparable transactions involved private parties, but at the time the RTC and other receivers were a dominant force in Austin real estate. Sales of similar properties from banks and the RTC ranged from \$13,000–\$15,000 per unit, indicating Watersbend sold for a discount of 79%–81% even when compared to properties with disadvantageous selling conditions.

To further illustrate the severity of the landfill's impact on the property, Table 2 describes five sales of apartment complexes that needed major rehabilitation and had a very low occupancy level.

These properties were chosen more for similarities in condition and vacancy than for similarities in

**Table 1 Comparison of Watersbend Sale to Sales of Unimpaired Apartment Complexes**

Apartment Complex	Date of Sale	Year Built	Units	SF/ Unit	Monthly Rent/SF	Occupation %	Sale Price	Price/ Unit
Watersbend	Jan-94	1984	358	707	NA	0%	\$1,000,000	\$2,793
Shadow Wood Villas of La Costa	Jul-93	1984	240	735	0.68	99%	6,000,000	25,000
Stony Creek Landing	Feb-93	1979	204	780	0.68	100%	4,250,000	20,833
Chevy Chase Downs	Apr-94	1982	420	750	0.66	95%	11,200,000	26,667
Wildcreek	Apr-94	1985	240	678	0.72	95%	5,275,000	21,979
	Apr-94	1984	232	663	0.68	92%	4,425,000	19,073

**Table 2 Comparison of Watersbend Sale to Sales of Apartment Complexes in Need of Major Rehabilitation**

Apartment Complex	Date of Sale	Year Built	Units	SF/Unit	Occupation %	Sale Price	Price/Unit	Notes
Watersbend	Jan-94	1984	358	707	0%	\$1,000,000	\$2,793	Subject property
2506 Manor Road	Jan-93	1971	102	360	0%	455,000	4,461	Former affordable housing project; abandoned, 100% vacant
Greentree	Aug-93	1973	124	869	0%	400,000	3,226	Vacant for five years; \$6,000/unit rehabilitation
South Shore	May-91	1963, 1973	145	732	0%	778,000	5,366	\$10,000-\$12,000/unit rehabilitation including asbestos and gas line leaks which closed the property
Riverpark	Jan-91	1968-1972	490	873	23%	1,690,000	3,449	\$7,100/unit in rehabilitation/repairs: appliances, flooring, paint, exterior fences, roofs
Estrada	Nov-92	1968	310	839	30%	1,600,000	5,161	Bank sale; water damage from roof/window leaks, only 33% inhabitable

age, size or location, but they effectively demonstrate the magnitude of the environmental problems beyond mere reconstruction. Watersbend sold at a discount of 13%–48% per unit compared to several older, vacant or near-vacant apartments needing less extensive rehabilitation than Watersbend would ultimately require. Its sale price of \$2,793 per apartment unit was roughly equivalent to the price of vacant land during 1994, indicative of a 100% loss in the contributory value of the improvements just ten years after their construction.

### The Remediation of Watersbend Apartments, 1994–1999

The new owners faced an unusual obstacle in remediating Watersbend: the legal framework for doing so didn't exist. The State of Texas had few regulations specifically relating to the use of land over a closed landfill. "Brownfield" legislation and awareness were in their infancy, and existing laws covering environmentally challenged properties tended to be compulsory and punitive. Two measures were needed to spur the redevelopment of the property: the Voluntary Cleanup Program and Subchapter T, Chapter 330 of the Texas Administrative Code.

#### Voluntary Cleanup Program

The Voluntary Cleanup Program (VCP) is the primary program of Brownfield Redevelopment Initiative in Texas. According to the Texas Natural Resources Conservation Commission (TNRCC), the

VCP "provides incentives for properties with real and perceived contamination [brownfields] to be investigated, cleaned, and redeveloped. An additional benefit is the sparing of outlying rural, 'greenfields.'"<sup>5</sup> The VCP was intended to be more proactive than punitive and provided a clearer, more streamlined approach to remediation than existing programs such as the State and Federal Superfund.

In brief, the owners of property in the VCP program must submit an application with an Environmental Site Assessment detailing the type and extent of contamination. Then the applicant and TNRCC must agree on the remediation process, and the applicant must pay all TNRCC oversight costs. After completion of the cleanup, the owner receives a Certificate of Completion from the TNRCC, stating that all non-responsible parties are released from all liability to the state for cleanup of areas covered by the certificate. Sites already under an enforcement order or pending legal action are not eligible for the VCP. More information about the VCP is available at <<http://www.tnrcc.state.tx.us/permitting/trrp.htm>>.

#### Subchapter T

In addition to the VCP, the Texas Legislature amended the state's Solid Waste Disposal Act, and the TNRCC enacted Subchapter T, Chapter 330 of the Texas Administrative Code in 1995. Both were written specifically with Watersbend in mind, and Watersbend became the pilot project for these statutes.

5 <<http://www.tnrcc.state.tx.us/permitting/remed/vcp/brownfields.html>>.

Subchapter T “establishes standards for the use and development of land over closed municipal solid waste landfills [and establishes] practical requirements while maintaining strict standards for human health and safety and environmental protection.”<sup>6</sup> This statute does not cover hazardous wastes.

Subchapter T provides the TNRCC with authority to administer a permit program for construction of enclosed structures over a landfill, establish requirements related to their construction, establish procedures for conducting soil tests to determine the existence of a landfill, and provide notice to tenants of the landfill’s existence.

In general, any permanent, enclosed structure within 1,000 feet of a waste disposal area must be designed and constructed to prevent gas migration—that is, the buildup of potentially explosive gases such as methane. The primary structural controls consist of layers of low gas permeability between the slab and the subgrade and a gas ventilation system to prevent buildup. Also required is a Site Operating Plan and a Structured Gas Monitoring Plan prepared by a professional engineer. The property owner must register the site in the county deed records, and the owner cannot lease property over a landfill without a permit from the TNRCC. Any waste excavated during redevelopment of the property must be disposed of in an approved landfill.

Owners are not obligated to investigate the existence of a landfill, but once known to them (whether by research or accident), they must immediately inform all tenants. The permit process is required regardless of the age of the landfill, although owners can suspend monitoring requirements if they can demonstrate no potential for gas migration. More information about Subchapter T is available at <<http://www.tnrcc.state.tx.us/permitting/wasteperm/mswperm/clsduse.html>>.

#### The Remediation Process

In 1995, the owners of Watersbend presented a Comprehensive Assessment/Remediation Plan (CARP) to the TNRCC and submitted their application to the TNRCC’s Voluntary Cleanup Program. The CARP and a Site Investigation Report were completed in 1996. The owners subsequently received approval to design a Remedial Action Work Plan (RAWP) consisting of three major components: a semiactive ventilation system consisting of 108 wells placed in ten clusters throughout the property, an active gas-extraction system in the subslab

of each building that would prevent methane buildup in the apartment units, and a surface drainage-control system to prevent exposure to landfill leachate. Also, each apartment unit was provided a hard-wired, active gas monitor/alarm.

These three components cost just under \$1.4 million, and the annual monitoring and maintenance cost was slightly under \$40,000. In 1998, the TNRCC issued a conditional Certificate of Completion requiring the owners to monitor methane levels and operate a methane-gas recovery system for as long as minimum concentration levels are detected, estimated at the time to be fourteen years.

Concurrent with the Remedial Action Work Plan were slab leveling, repair of slab and beam cracks, provision of better drainage for foundations, rebuilding a retaining wall, and construction of a new retaining wall along Walnut Creek. These improvements were primarily related to the requirements of Subchapter T.

Three of Watersbend’s 25 apartment buildings were deemed unfit for redevelopment and were demolished. Redevelopment of the remaining apartments took place in two phases during 1998 and 1999 and included new roofs, doors, windows, flooring, plumbing fixtures, and appliances. The demolition of the three buildings reduced the number of leasable units from 358 to 290.

The comprehensive redevelopment cost, including environmental remediation, was \$9.5 million, or about \$32,750 per unit. Until 1999, the owners paid for all remediation costs out-of-pocket. In 1999, the owners received a construction loan, but they had to provide personal guarantees and other real estate holdings as collateral.

#### Appraisal Issues: Assessment of Market Acceptance, Ownership Risk, and Stigma

Our firm was hired to appraise the property in early 1999 while remediation was underway and before any units were leased. We evaluated the risks and liabilities associated with the project and their effect on value, including:

- Lack of market acceptance. Potential tenants, once notified of the property’s history and ongoing monitoring as required by law, might refuse to live there;
- Legal compliance to the regulations of Chapter 330, Subchapter T of the Texas Administrative Code as described previously;

6. <<http://www.tnrcc.state.tx.us/permitting/wasteperm/mswperm/clsdinfo.pdf>>.

- Operation and maintenance of the active-gas extraction system and the semiactive-gas-extraction system as required by the conditional Certificate of Completion of the VCP;
- A \$5 million insurance policy at a cost of \$8,400 per year for five years. The policy covers legal expenses and pays off the primary lien in case of serious environmental problems during the life of the policy;
- The risk of future soil subsidence that could necessitate expensive repairs and maintenance;
- Watersbend's location amidst a larger brownfield area; and
- Other facets of stigma such as deed recordation of contamination (as required by Subchapter T and the risk reduction rules of the Voluntary Cleanup Program), the potential of third-party litigation instigated by adjacent property owners, and lender reluctance to fund additional loans due to the unique nature of the contamination and the remediation project.

Our task was to quantify those risks. Regarding the question of market acceptance, we researched similar situations including an apartment complex in southeast Austin. The property was also constructed over a landfill and had methane-buildup problems. While its remediation was not of the scale of Watersbend, the tangible signs that could affect its occupancy—a gas ventilation system, monitors, and in-unit alarms—were there. This property did not suffer any noticeable resistance from the market, and its occupancy and rent levels were equivalent to citywide rates. Our research of this property and other remediated dwellings indicated that a properly remediated property with active monitoring and other safeguards in place should not suffer more than minimal tenant resistance.

Still, the other risks and environmental liabilities were substantial. Even after completion of the remediation project, knowledgeable purchasers would demand a discount on this property in order to justify the investment risks and potential market resistance. These are defined by Randall Bell, MAI, in his book *Real Estate Damages: An Analysis of Detrimental Conditions*, as “the risk... associated with the ongoing stage of a detrimental condition analysis [including] the reluctance on the part of the real estate market to buy a property that has historically been damaged or tainted. Sometimes called stigma.”<sup>7</sup>

### The Case Studies Approach

Our firm quantified the discount with several case studies, that involved research of similar contaminated sales and remediated properties. The discount in each case study depended on the type and extent of contamination, the use of the property, the amount of governmental involvement, the extent of the remediation when sold, and whether the purchaser was indemnified by the seller or another party responsible for liabilities related to the contamination. In most cases, the discounts were quantified by comparison of the sale of the contaminated property with sales of unimpaired properties with similar physical characteristics and locations. Less frequently, comparison of the eventual sale price to an earlier contracted price with no disclosure or knowledge of contamination or lengthy marketing delays was the basis for the discount.

Each case study was rated for its similarity to Watersbend. Case studies with more severe contamination and less favorable circumstances were rated “higher,” properties with relatively minor contamination and minor post-remediation stigma were rated “lower,” and properties most similar to the subject were rated “even.” The case studies are summarized in Table 3.

Case Studies 3, 4, and 5 were rated even and had a discount range of 10%–21%. These sites sold post-remediation or with only a minor threat of future contamination. Like Watersbend, two of the three sites were in the Voluntary Cleanup Program. Case Study 4 was the most similar to Watersbend; it involved an old landfill, was in the same stage of remediation before redevelopment, and required a similar amount of initial reinvestment capital. Case Study 8, although also involving a site analogous to a landfill, was rated higher because the materials were hazardous and the impact on properties surrounding the landfill was much greater when compared to Watersbend.

From these case studies, we estimated that the market value of Watersbend was 15% less than its unimpaired value. The quantified financial liabilities comprised approximately one-third (5%) of the discount, with the remaining two-thirds (10%) attributable to the other risks described in the bulleted list at the beginning of this section.

### Watersbend Reopens

After rehabilitation and remediation were partially completed at Watersbend, the complex was renamed

7. Randall Bell, *Real Estate Damages: An Analysis of Detrimental Conditions* (Chicago: Appraisal Institute, 1999).

**Table 3 Contaminated Case Studies**

#	Location	Property Type	Waste Type	Amount of Discount	Severity of Contamination and Post-Remediation Situation Compared to Watersbend
1	Austin, TX	Thousands of residences and businesses surrounding a petroleum storage facility	Gasoline and other petroleum products	25.0%	HIGHER: Legal action against oil companies; contamination of air, soil and groundwater; 14- year remediation timetable
2	Austin, TX	Motel and conference center	Asbestos, petroleum hydrocarbons	28.0%	HIGHER: Contaminated by on-site asbestos and hydrocarbons from off-site source; no hydrocarbon remediation has occurred
3	Austin, TX	9.3-acre vacant commercial lot near former gas station	Hydrocarbons from crude oil spill off-site	13.5%; 16.0%–21.0%	EVEN: Contamination on adjacent site; discount caused by testing costs, marketing delays, and future monitoring costs
4	Dallas, TX	18.6-acre vacant commercial tract	Municipal solid waste from old landfill	10%–20%	EVEN: Circumstances very similar to subject property; future buildings require gas-extraction systems
5	Houston, TX	1.5-acre vacant downtown lot	Benzene, lead, phthalate	20.0%	EVEN: Property in Voluntary Cleanup Program; discount consisted of escrow against potential future liabilities
6	Houston, TX	Apartment complex next to gasoline service station	Gasoline, petroleum hydrocarbons	33.3%	HIGHER: Sale price negotiated before full extent of contamination service station was known; risk of off-site migration and other contamination issues
7	Keller, TX	22-acre, multiuse property on former gas station site	Petroleum hydrocarbons and heavy metals in soils	25.8%	HIGHER: Probable greater extent of contamination with no pre-sale remediation; fallout of prior contract
8	Houston, TX	Housing subdivision near Superfund Site (chemical waste storage facility)	Creosote, heavy metals, sludges, petroleum hydrocarbons	33.0%–50.0%	HIGHER: Properties near a Superfund Site with extensive public disclosure; remediation alternatives included incineration, natural attenuation, excavation and removal of soils

“Salado at Walnut Creek” to avoid the negative association with the “Watersbend” moniker. In September 1999, leasing began on 110 rehabilitated units, while rehabilitation continued on the remaining 180 units. Pursuant to Subchapter T, leasing agents informed potential tenants in writing that the property was once used as a municipal solid waste landfill and that structural controls were in place to minimize the dangers posed by the former landfill.

According to the leasing manager at Salado at Walnut Creek, the complex received little resistance from potential tenants due to the written disclosure, despite local media coverage of the reopening that was skeptical, if not acutely unfavorable. In truth, some of the lack of resistance could be attributed to the condition of Austin’s apartment market, which was experiencing historically high levels of rent and

occupancy. Arguably, a weaker market might have produced more resistance because potential tenants would have more available housing options. The inference is that brownfield redevelopment projects need a strong economic climate to overcome the multiple risks involved.

Approximately 100 of the 110 available units were leased between September and October 1999 while remediation approached completion on the remaining units. By February 2000, 70% of the full 290 units were occupied or pre-leased. By July 2000, when redevelopment was completed and all 290 units were available for leasing, the complex attained a 94% occupancy rate. As of 2001, the project’s occupancy was near 95%, equivalent to citywide averages, and the units leased for rates at the upper end of the range of competitive properties.

## Conclusion

After the remediation was complete and the property was fully leased, additional appraisals have confirmed that the residual stigma has diminished to  $\pm 10\%$ . This ownership risk, small but still present, makes the property slightly less attractive to potential investors despite the healthy rent and occupancy levels because of ongoing legal requirements of Subchapter T and the VCP, annual expenditures for environmental monitoring costs for at least another twelve years, and deed recordation and disclosure requirements. Also, the property may be hurt more than comparable apartments in the event of a market downturn because much of the property's success is tied to the strong economic climate in which it reopened. Nevertheless, we concluded that the property value exceeds its redevelopment costs, and extensive redevelopment may make it more valuable today than projects of comparable age and construction.

As of late 2001, the stigma of ownership risks is slight and declining. In the spring of 2001, the property owners secured a new, permanent loan requiring an environmental insurance policy covering additional pollution conditions. These conditions could cause loss of use and legal expenses for defense of any third party lawsuits stemming from residual contamination at the property; however, this policy does not cover loss in market value. The cost of this insurance policy (amortized over ten years), combined with the ongoing environmental monitoring costs, reduces the net annual operating income by three to four percent and is a large, tangible component of the residual property stigma. Over time, the stigma should continue to decrease, although it may never reach zero. This unusual brownfield redevelopment project should serve as a model to numerous parties: to developers needing a framework to remediate and market contaminated properties, to municipal planners pursuing creative solutions to increase the local tax base, and to appraisers seeking insights into post-remediation property values and stigma.

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#### **Internet Links**

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TNRCC Brownfield Redevelopment Initiative Home Page: <<http://www.tnrcc.state.tx.us/permitting/remed/vcp/brownfields.html>>.

TNRCC Voluntary Cleanup Program (includes links to Texas VCP News, guidance publications, Applications and Agreement forms, and examples of Certificates of Completion): <<http://www.tnrcc.state.tx.us/permitting/remed/vcp/index.html>>.

TNRCC Risk Reduction Program (for the VCP): <<http://www.tnrcc.state.tx.us/permitting/trrp.htm>>.

EPA Region 6 Brownfield Program: <<http://www.epa.gov/earth1r6/6sf/bfpages/sfbfhome.htm>>.

City of Austin Brownfield Redevelopment Program: <<http://www.ci.austin.tx.us/watershed/brownfields.htm>>.

City of Dallas Brownfield Redevelopment Program: <[http://www.dallascityhall.com/dallas/html/brownfields\\_.html](http://www.dallascityhall.com/dallas/html/brownfields_.html)>.

City of Fort Worth Economic Redevelopment Program: <<http://ci.fort-worth.tx.us/dem/brownfields.htm>>.

City of Houston Brownfield Redevelopment Program: <<http://www.gcr1.com/epa/pilot-cities/default.cfm?ObjID=114>>.

City of San Antonio Brownfield Assessment Pilot: <<http://www.epa.gov/swerosps/bf/html-doc/sananton.htm>>.

Brownfield News: <<http://www.brownfieldnews.com/>>.