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## **MEASURING THE BENEFITS OF LAND REVITALIZATION: STATE SUCCESSES AND CHALLENGES**

**November 2010**

*By the ECOS Workgroup on Land Revitalization Measures*

### **STATEMENT OF ISSUE**

Most states have strong programs to revitalize contaminated lands, and these efforts are key to states' success in achieving their sustainability missions while promoting economic development. As remediation programs generally are found in state environmental agencies, principal measures of success have been linked to the amount of environmental restoration accomplished and the public health and ecological resources protected. These measures are directly related to the core missions of the state agencies, and thus many quantitative measures for program outputs, outcomes, and environmental benefits have been developed and implemented.

However, in cleanup and revitalization programs, another critical area of success is the economic benefit of making contaminated land available for safe reuse. The Environmental Council of the States (ECOS) has identified the measurement and valuation of cleanup and revitalization as an issue in need of attention.

In the course of their participation in the U.S. Environmental Protection Agency (EPA) Strategic Plan process and National Program Managers' Guidance process, the states identified land revitalization as a priority they shared with EPA. Several ECOS members have met with representatives of EPA to discuss possible options for working together to advance this priority, and there has been general consensus that cross-program measures of the benefits of cleanup and revitalization are critical to the continued success of state programs.

### **OVERVIEW**

Through the Land Revitalization Measures project that resulted from these discussions, the ECOS Waste Committee and its Workgroup on Land Revitalization Measures (Workgroup) intend to improve understanding of the benefits of state cleanup and revitalization programs. This report examines data that have been used to successfully convey the benefits of cleanup and revitalization, while a follow-up report slated for publication in the spring of 2011 will present a "states' toolbox" for facilitating collection and reporting of economic data.

In order to develop the first report, ECOS collected local examples of cleanup and revitalization where on-the-ground benefit analysis and communication have successfully been achieved. The report presents 29 case studies from 13 state agencies to identify the common threads contributing to their success, and then touches on the challenges in collecting quality land revitalization data

The objective of this report is to pinpoint appropriate models usable by all land revitalization programs, irrespective of the statutes or rules referenced in the case studies. Measures reported here are being employed to convey successes at Superfund (both state and federal), Brownfields, and Resource Conservation and Recovery Act (RCRA) Corrective Action sites, as well as in the cleanup of Underground Storage Tanks (USTs).

In Michigan, for example, a former 17-acre Superfund National Priorities List battery disposal site remediated in part with state grants was brought back into productive use. The property value has increased by more than \$5 million, and three warehouses have been built on the site, generating 300 jobs. Meanwhile, a former Bethlehem Steel plant site subject to RCRA corrective action has progressed through remediation and redevelopment under a team consisting of the Pennsylvania Department of Environmental Protection, EPA Region 3, and others. Their efforts at the largest contiguous Brownfield site in the United States generated significant tax revenue for state and local communities, the creation of thousands of direct and indirect jobs, and increased tourism. In Idaho, the state's Department of Environmental Quality reports great success at a downtown American Linen property that once housed petroleum USTs. After the site's tanks were removed along with contaminated soils, redevelopment including the construction of four new buildings led to economic development benefits of more than \$10 million. A New York hazardous waste disposal site contaminated with PCBs and heavy metals was remediated under the state Superfund program and now hosts an ecological restoration project involving the planting of native trees, shrubs, and wildflower species. And in Wisconsin, former marshland blighted by 125 years of fill and manufacturing which housed USTs underwent a major transformation. The site, revitalized pursuant to a remedial action plan approved by the state's Department of Natural Resources, now houses the Harley Davidson museum complex, which brings 350,000 visitors to Milwaukee each year and generates \$78 million in annual spending. The complex also includes 20 acres of outdoor green space.

Not only do the examples presented in this report span statute and program type, but they touch on various types of measure as well. The Workgroup identified four main categories of benefits measurement: tax benefits (property tax revenue, assessed value for land and structures); leveraged resources and investments (private, city, state, federal); job creation (full-time, part-time, long-term, short-term, direct, indirect, entry-level, hourly wage, creation, retention); and community impact (ecological restoration, green space, public parks, cultural opportunities, affordable housing, recycling programs, renewable energy facilities). All of these measures are highlighted in the case studies in this report.

The Workgroup participants agree that targeted reporting of these measures – particularly job creation numbers – can yield tangible results. In these tough economic times, job creation and economic revitalization are key agenda items for Governors across the country. Given this priority of state executives, state environmental agencies must present the benefits of land revitalization in this context. Use of economic measures can help states defend their programs against general across-the-board budget and program reductions or even help them obtain renewed or increased funding for land revitalization activities. In Massachusetts, for example, the Department of Environmental Protection highlighted the job creation benefits of a Boston redevelopment project to make the case for recapitalization of the Brownfield Redevelopment Fund. As a result, the Massachusetts Legislature appropriated an additional \$30 million for the important program.

It is the hope of the Workgroup that through this project, more states will understand and take advantage of the benefits of measuring and reporting land revitalization successes.

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## **CASE STUDIES: MEASURING THE BENEFITS OF LAND REVITALIZATION**

### **TAX MEASURES**

#### **Lakewood, Colorado**

**Project Summary:** An old indoor shopping center in Lakewood, Colorado was redeveloped into a thriving Town Center in an historical community. Groundwater and soil contamination, as well as asbestos and hazardous materials cleanup, took place as part of rebuilding the area.

**Site Characteristics and History:** Once the largest indoor shopping center in the Mountain West, the Villa Italia Mall began declining in the 1990s. By 1999, approximately 50 percent of the property was vacant, and the 104-acre tract of land was ripe for redevelopment. Dry cleaners and auto shops had contaminated groundwater and soil, and old buildings contained asbestos and other hazardous materials. Villa Italia epitomized the term *greyfield*: a derelict shopping center surrounded by an expanse of empty parking lots.

**Environmental Issues and Remediation:** Environmental cleanup to clear the way for redevelopment required a multi-pronged effort. The Colorado Brownfields Revolving Loan Fund provided a \$1.9 million loan to the developer to help pay for assessment and cleanup. Negotiations with responsible parties yielded the collection of \$2.5 million. The City of Lakewood secured a \$110,000 federal grant. Also, a creative remedy cut the cleanup costs. Carbohydrates injected into the groundwater increased bacteria respiration, breaking down solvents and petroleum in the contamination plume.

**Measuring Economic Impact:** Redevelopment of the 22-block area has an estimated \$500 million price tag, financed by the developer and bonds from area Metropolitan Districts. Tax-incremented financing and a public improvement fee are helping pay back the bonds. Annual tax revenues to the City of Lakewood resulting from the redevelopment are estimated at \$4,293,500. Annual county tax revenues run at \$2,638,506.

**Audience for Data:** Audiences for this data include local and county officials, business leaders, and developers. The Colorado Department of Public Health and the Environment (CDPHE) uses these case studies in various outreach efforts such as at its annual Colorado Brownfields Conference, and in speaking engagements at various stakeholder events. CDPHE recently participated in workshops in Alamosa, Breckenridge, Canon City, Fort Collins, Denver, and Lakewood. In addition, write-ups are posted in the “Success Stories” section of the CDPHE Brownfields website. This information is also shared with people from across the country at events such as the National Brownfields Conference sponsored by EPA and the EPA Region 8, 9, and 10 Brownfield Workshop.

**Other Economic Benefits:** The surrounding community helped shape the new mixed-use development into the Belmar Town Center. Fully complete, the site will create more than 2,000 jobs and will contain 1,300 residences. The buildings have designs for flexible use, fostering a business climate that promotes a vibrant community asset that is sustainable and full of life. Further, green building practices enabled the developer to recycle 90 percent of material from the former mall and save money on energy-efficient operations.

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## Tallahassee, Florida

**Project Summary:** A property located near Florida's State Capitol complex and the Florida State University and Florida A&M University football stadiums was redeveloped from an empty and contaminated property into a Marriott Residence Inn. Soil and ground water contamination from previous activities on the site were addressed as part of the redevelopment project.

**Site Characteristics and History:** This former petroleum bulk storage facility has been transformed into a five-story, 135-suite hotel situated in close proximity to the Leon County Civic Center, Florida State University, Florida A&M University, and the State of Florida Capitol Complex. The Residence Inn, completed in 2006, was the first major project in the redevelopment of Tallahassee's Gaines Street Corridor. Historically, land use in the Gaines Street corridor included light industrial and commercial businesses. Since construction of the Residence Inn, a number of unsightly buildings have been razed, and the City is about to begin reconfiguring the street. The redesign of Gaines Street will reduce the current four lanes to two lanes with some on-street parking, slow traffic in the corridor, and create a more pedestrian-friendly environment.

**Environmental Issues and Remediation:** Environmental work at the property and on nearby properties had addressed groundwater contamination. However, prior to redevelopment, site soils still contained arsenic, dioxin, and petroleum compounds above Florida cleanup target levels. The most highly contaminated soils were removed from the site. Low-level arsenic and petroleum contamination that remained in site soils was controlled with the building foundation, parking lot, and two feet of clean fill in landscaped areas. Institutional controls were recorded for the property to ensure that these engineering controls will be maintained in the future. The site received a Site Rehabilitation Completion Order from the Florida Department of Environmental Protection in March 2007 indicating that no further action was required at the property.

**Measuring Economic Impact:** Prior to cleanup and redevelopment, the property was valued at \$588,166. After completion of the Residence Inn, the City of Tallahassee reported the value of the property at \$10,139,737. Taxes on the approximately two-acre parcel were \$11,685 in 2006 prior to redevelopment. In 2009, the property tax was \$186,983.

**Audience for Data:** The City of Tallahassee has been targeting the Gaines Street Corridor for redevelopment for many years. Because the cleanup and redevelopment of the Residence Inn property was a benchmark for revitalization of the corridor, the audience for the information was broad. Local government officials, economic redevelopment professionals, local businesses, and an active citizens group followed the project with keen interest.

**Other Economic Benefits:** The redevelopment led to the creation of 32 full-time and nine part-time positions. In addition, with this demonstrated success, the City of Tallahassee has been able to secure additional Brownfields grants from EPA to continue redevelopment of the corridor.

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## Case Study Location: Albion, Idaho

**Project Summary:** A former teacher's college contaminated with asbestos and lead was redeveloped into a convention center, family reunion retreat, day camping, RV parking, recreation, and special events center. Contaminated materials were removed from inside the site's structures, and contaminated surface soils were removed from around the building footprints.

**Site Characteristics and History:** Albion State Normal School teacher's college was created by an act of the 1893 Idaho Legislature. The first class began in 1894. Over the years, enrollment grew, and additional buildings were constructed. They included Sanger Hall (1897), Miller Hall (1901), Hannah Cornish Hall (1918), Bocock Hall (1927), and McMurray Hall (1929), for a total of 120,000 square feet of interior space. The school was closed in 1951 due to failure of the legislature to provide funds for its operation. The 35-acre grounds and all of the buildings were donated to the City of Albion (population 225), and for the next 56 years, the campus was vacant or inactive. The City of Albion auctioned the property in June 2007 after receiving results of a Phase I environmental site assessment and an asbestos screening report from the Idaho Department of Environmental Quality (DEQ) Brownfields Program.

**Environmental Issues and Remediation:** The Phase I Assessment revealed environmental concerns on the property necessitating a Phase II environmental site assessment. The assessment consisted of collecting 70 soil samples; installing two monitoring wells; collecting down-gradient and up-gradient groundwater and soil samples; sampling for asbestos, lead, and mercury; and issuing a report that summarized activities and also compared cleanup methodologies and costs. The results indicated the presence of asbestos and lead in the soil surrounding some buildings as well as the interiors.

The owners entered into DEQ's Voluntary Cleanup Program to implement cleanup. They also participated in Idaho's Community Reinvestment Pilot Act and received a rebate from the State of Idaho for qualifying remediation costs in the amount of \$106,000 once cleanup was certified by DEQ.

**Measuring Economic Impact:** The current assessed value of the property is \$1,400,000. Prior to purchase, the property was publicly owned and therefore was not on the tax rolls. The purchase price of the property was \$600,000. Consequently, the increase in property value could be calculated at \$800,000 if one assumes that \$600,000 represented fair market value at time of purchase. However, since the property had no assessed value prior to private ownership, it could be argued that the increase in assessed value was \$1,400,000. Current property taxes are approximately \$10,000 annually. Prior to purchase and redevelopment, the City and County received no tax revenue from this site.

The seven-structure (all on the National Register of Historic Places), 35-acre site was cleaned up and redeveloped for just under \$1,000,000, according to the current owner.

**Audience for Data:** The data were presented to the Governor's office and are also featured on the DEQ Brownfields Program success stories web page. This data and additional socioeconomic indicators will be presented to the Idaho Legislature in future sessions as required by the pilot amendment to the Idaho Land Remediation Act. It is hoped that the Legislature will choose to make the pilot a permanent program based on the data from this and the other nine pilot Brownfield sites in Idaho. Brownfield stakeholders also are exposed to this data during the many presentations that DEQ Brownfields Program staff deliver across the state to local government officials, real estate agents, bankers, and developers.

**Other Economic Benefits:** Please see the following table.

### Albion, Idaho Revitalization

Category / Site	Albion Normal School
Assessment dollars expended	\$58,000 assessment and \$106,000 Community Reinvestment Pilot Rebate
Jobs created during redevelopment	14
Total payroll during redevelopment	\$400,000 (estimate from owner)
Employees currently employed	20
Part time	19
Full time	1
Total current payroll	\$80,000
Annual operating expense (non-payroll)	\$150,000
Total material cost for redevelopment	\$600,000
Structures remodeled	7 @ 120,000 square feet  All structures on the National Register of Historic Places
Assessed value prior to redevelopment	Property was always exempt from valuation due to public ownership. Purchase price was \$600,000, so DEQ assumes this to be the fair market value pre-redevelopment
Assessed value post redevelopment	\$1,400,000
Increase in property value	\$800,000 (see assumption above)
Annual taxes prior to redevelopment	\$0 due to public ownership
Annual taxes post redevelopment	Estimated at \$10,000
Other indicators	1. Construction of senior center on the campus property valued at \$250,000  2. Local catering business saw an increase in revenue of \$35,000 annually once the campus re-opened.
One-time redevelopment investment	\$1,800,000
Annual economic return	\$240,000
Total project return on assessment dollars during first year of operation	\$35.17 return per \$1 of assessment funding  \$12.43 per \$1 of assessment + rebate

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**St. Louis Park, Minnesota**

**Project Summary:** A property located in St. Louis Park, Minnesota was redeveloped from a battery manufacturing plant to light industrial and commercial warehouse with office space. Soil contamination from previous activities on the site was addressed as part of the redevelopment project.

**Site Characteristics and History:** The site consists of the battery manufacturing plant and two small commercial buildings. The lead smelting activities on the site were conducted from 1940 until 1982. The site was placed on the National Priorities List in 1983.

**Environmental Issues and Remediation:** Environmental testing at the site found elevated levels of lead and petroleum in the soil and groundwater. Arsenic and cadmium were also discovered on the site. Remediation activities included building demolition, soil excavation, and site capping. A Restricted Covenant was placed on the site requiring anyone planning on digging on the site to notify the Minnesota Pollution Control Agency, and a plan for the annual inspection and repair of the cap was put in place.

**Measuring Economic Impact:** DEED measured the increase in property taxes collected by the municipality as an indicator of increased property value from land revitalization. The redevelopment of this 11-acre site with a new 80,000 square foot building has a new assessed value of more than \$7.1 million. Property taxes paid to St. Louis Park amount to almost \$233,000 annually, an increase of more than \$150,000.

**Audience for Data:** The primary audience for the information was high-ranking government decision makers focused on economic development, including those in the Governor's office and the Minnesota Legislature. The audience also included interested stakeholders in the business community.

**Other Economic Impacts:** The project leveraged \$6.2 million in private investment and has created more than 150 new jobs.

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**St. Paul, Minnesota**

**Project Summary:** A property located in St. Paul, Minnesota was redeveloped from a residential and commercial/industrial area with numerous businesses, including an appliance manufacturing company, a large brewery, an auto salvage business, a rail switching yard, and a waste transfer station, to seven sites that are occupied by business such as medical care facilities, a credit union, and technology companies. Soil contamination from previous activities on the site was addressed as part of the redevelopment project.

**Site Characteristics and History:** Prior to redevelopment, there were 12 buildings on the site that were demolished to make way for a new roadway and seven development sites. The site lies within a former

industrial/commercial corridor of St. Paul with close proximity to the Interstate highway for transportation. Surrounding properties are occupied by residences. The developer had purchased the property from multiple industrial users.

**Environmental Issues and Remediation:** Environmental testing at the site found elevated levels of volatile organic compounds, semi-volatile organic compounds, diesel range organics, polychlorinated biphenyls, and metals in the soil, and the developer of the property conducted a soil remediation action at the property.

**Measuring Economic Impact:** To assess the economic value of land revitalization activities, the Department of Employment and Economic Development measures several economic indicators including the increase in property taxes assessed. The property covers an area of approximately 35 acres of land with a new assessed value exceeding \$13 million more than the assessed value prior to redevelopment. The annual property tax increase is more than \$690,000 annually.

**Audience for Data:** The primary audience for the information was high-ranking government decision makers focused on economic development, including those in the Governor's office and the Minnesota Legislature. The audience also included interested stakeholders in the business community.

**Other Economic Impacts:** The amount of private funds invested in construction and site improvements at the property is more than \$68 million. The redevelopment has led to the creation of 600 jobs on the site.

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**Duluth, Minnesota**

**Project Summary:** A property located in Duluth, Minnesota was redeveloped from a former iron foundry and heavy machining shop to the Duluth Heritage Sports Center, which includes a permanent ice hockey arena, a multi-sport field house, and space for the Boys and Girls Club. Construction is still underway onsite, and when complete, the site will also offer a hotel, commercial space, and the Duluth Children's Museum. Soil contamination from previous activities on the site was addressed as part of the redevelopment project.

**Site Characteristics and History:** Prior to redevelopment, the site consisted of 14 buildings, some with historical significance. Due to the range of building conditions from poor to fair, some of the buildings were demolished, while others were restored and renovated for reuse. The site is located in the Lincoln Park neighborhood, which is one of the oldest and largest neighborhoods in Duluth and is targeted for redevelopment and revitalization. Surrounding properties are occupied by commercial and industrial businesses.

**Environmental Issues and Remediation:** Environmental testing at the site found elevated levels of lead, arsenic, chromium, benzo(a)pyrene, and petroleum in the soil, and the developer of the property conducted a soil remediation action at the property.

**Measuring Economic Impact:** To assess the economic value of land revitalization activities, the Department of Employment and Economic Development measures several economic indicators including the increase in property taxes assessed. The property covers an area of approximately 10.2 acres of land with an estimated future assessed value of more than \$25 million. When construction is complete, property taxes paid are estimated to amount to almost \$340,000 annually.

**Audience for Data:** The primary audience for the information was high-ranking government decision makers focused on economic development, including those in the Governor’s office and the Minnesota Legislature. The audience also included interested stakeholders in the business community.

**Other Economic Benefits:** As part of the project, the developer and community partners will have contributed an estimated \$39 million of private funds toward construction and site improvements. Upon completion, it is anticipated that the redevelopment will lead to the creation of 98 new jobs in Minnesota.

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**Lincoln, Rhode Island**

**Project Summary:** A property located in Lincoln, Rhode Island was redeveloped from a distribution facility for a pen manufacturer to an office and communication center for a large regional bank. Soil and groundwater contamination from previous activities on the site were addressed as part of the redevelopment project.

**Site Characteristics and History:** The site consists of a large building with internally divided areas and total floor space of 110,000 square feet. It lies within an industrial/commercial section of the Town of Lincoln near the Blackstone River with close proximity to the Interstate highway for transportation. Surrounding properties are occupied by manufacturing and warehousing businesses. The pen manufacturer had purchased the property from a company that manufactured nickel-cadmium batteries.

**Environmental Issues and Remediation:** Environmental testing at the site found elevated levels of the metal nickel in the soil and groundwater, and former owners of the property conducted a soil removal action at the property. Groundwater testing results conducted at the time of the pen manufacturer’s purchase indicated that the concentration of nickel in the groundwater was decreasing to an allowable concentration under Rhode Island Department of Environmental Management (RIDEM) remediation regulations. Access was restricted in the areas of contamination, and institutional controls were recorded to prohibit groundwater consumption on the property. Groundwater monitoring will continue at the site until levels are below drinking water standards.

**Measuring Economic Impact:** RIDEM measured the increase in property taxes collected by the municipality as an indicator of increased property value from land revitalization. The property covers an area of approximately 17.07 acres of land with a new assessed value of more than \$4.8 million. As part of the project, the purchaser initiated site improvements at the property costing \$24.9 million. Property taxes paid to the Town of Lincoln amount to almost \$110,000 annually.

**Audience for Data:** The audience for the information was primarily high-ranking government decision makers focused on economic development, including those in the Governor’s office and the Rhode Island Legislature. The audience also included interested stakeholders in the business community.

**Other Economic Benefits:** The redevelopment has led to the creation of 350 new jobs in Rhode Island and is expected to create as many as 2,000 jobs within five years. The Rhode Island Economic Development Corporation has estimated that the economic impact of the Lincoln facility includes some \$2.4 million in annual income tax revenue and the creation 2,500 spin-off jobs.

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**Alexandria, Virginia**

**Project Summary:** The 15.66 acre site is located in Alexandria, Virginia and was once part of a larger tract of land which is still under redevelopment. Work began around 2000 to redevelop the site as a 2.4 million square foot office complex and campus. The site was divided into seven parcels for development purposes which included the construction of five office buildings and two parking decks. Past use of the property had resulted in extensive soil contamination along with groundwater contamination, which required remediation to be completed as an integral part of the redevelopment process.



*The Alexandria site following remediation.*

**Site Location and History:** The site is located inside the Washington, DC metropolitan area beltway and is less than eight miles from the U.S. Capitol area in Washington, DC, with close proximity to rail, Metro, bus service, and Reagan National Airport. Large tracts of undeveloped property are difficult to obtain and highly sought-after within this market area, as proven by the pre-remediation \$87 million purchase price of the 15-acre study site. The proximity to the nation’s capital creates exceptionally high land values even when obvious contamination is present.

Past use of the property included a railroad switching yard dating back more than 150 years, a scrap yard, and a municipal landfill which closed in the 1970s. Prior to sale to the developer, all past use of the property had ceased and former structures had been razed.

This property is now leased to the U.S. Patent and Trademark Office (USPTO) and is considered its main campus, housing nearly all of the employees of the agency in this complex of five buildings.

**Environmental Issues and Remediation:** The property has been the subject of a number of environmental investigations and remediation efforts dating back to late 1980s. In 1997, when the project was being considered for redevelopment, it was not subject to a mandated state or federal cleanup. However, environmental issues clearly were present, and a vehicle was needed for resolving potential outstanding liabilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). With the development of Virginia’s Voluntary Remediation Program and the subsequent 2002 Superfund Memorandum of Agreement between the Virginia Department of Environmental Quality (VDEQ) and EPA, cleanup at the site could move forward with the assurance that once the cleanup was completed outstanding CERCLA liabilities would be resolved.

The site characterization indicated the presence of select metals, volatile organic compounds (VOCs), semi-volatile compounds, petroleum hydrocarbons, and polychlorinated biphenyls in the soil and/or groundwater. Resultant remediation included the excavation, management, and/or disposal of 450,000 cubic yards of material. Once remediation was completed, the risk assessment evaluated reuse of the site as the proposed office complex. Institutional controls were placed on the property which prohibited the use of the groundwater except for environmental monitoring and required dewatering and prohibited residential use. Furthermore, the controls required hardscape capping of the site or two feet of clean fill and the construction of a gas collection system that used vapor barriers, gas collection piping, and blowers under the buildings to prevent the potential buildup of methane, other landfill gases, or VOCs.

**Measuring Economic Impact:** The property tax increase and total assessed value were extracted directly from the City of Alexandria tax and assessment records, which are available online. A summary of this data is presented in the table below. Also included in the table is an adjacent a 2.43 acre parcel for comparison.

The predevelopment \$87 million study site was valued at \$5,586,060 per acre at purchase in 2001, and in 2009, the site was assessed at \$9,823,772 per acre excluding the value of the buildings. The corresponding annual property tax increase is an estimated \$962,254 without structures to \$9,823,772 for the property and buildings combined.

Total assessed value based on Alexandria's 2009 property assessment is approximately \$1.077 billion.

**Audience for Data:** The intent of the Brownfields Program initial study (which is briefly discussed below) was to provide VDEQ and local officials a tool to evaluate the potential economic benefits of Brownfield redevelopment including employment estimates and real estate tax revenues.

**Other Economic Benefits:** VDEQ's Brownfields Program completed a study in 2009 to assess the beneficial impacts of Brownfields redevelopment based on an evaluation of six successfully redeveloped properties including this study site. Although this study site is more of an extreme example due to the high value of the property as compared to the average Brownfields redevelopment in Virginia, it did fit with the model that was developed to predict and evaluate future redevelopments.

This campus complex accommodates more than 9,000 employees, of which approximately 5,900 have Virginia residences. Since the buildings that make up the campus are occupied by a federal agency, it can be assumed that a great deal of this employment would not have been generated in Virginia if the development had occurred in Washington, DC or Maryland. The facility did consolidate employees that were working in 18 buildings at other locations, so it should be noted that some of this employment may have been preserved rather than created. However, it should also be noted that a significant increased efficiency has to be realized by consolidation of these 9,000 employees and 18 offices into this campus complex. Furthermore, each site which has been redeveloped along this former rail line has been a stepping stone for further redevelopment and increased property values over the entire corridor.

Also of interest is that this 2.5 million square foot complex represents the largest lease signed by the U.S. General Services Administration for a federal government tenant. Another interesting result of VDEQ's evaluation of this property is that the total wages paid at this complex are estimated at \$795 million per year.

This property was enrolled into Virginia's Voluntary Remediation Program in order to receive statutory benefits once the site completed the program and to enable VDEQ to be involved in the remediation process. One of the developer's attorneys who negotiated the environmental issues surrounding this cleanup indicated that without Virginia's Brownfield/Voluntary Remediation Program, it is very likely this project would not have been completed.

See the table below for additional tax information.

**Alexandria, Virginia Revitalization**

	<b>Case Study Site</b>	<b>Adjacent Property</b>
Number of Acres	15.66	2.43
2001 Assessment or Purchase Price	\$87,477,715	\$4,700,000
2001 Tax Revenue	\$962,254	\$52,170
2001 Structure Value	No Structure	No Structure
2001 Per Acre Land Value	\$5,586,060	\$2,298,790
2001 Tax Rate	\$1.1100	\$1.1100
2009 Assessment	\$1,077,372,300	\$13,210,000
2009 Tax Revenue	\$9,728,670	\$119,286.30
2009 Structure Value	\$923,532,020	No Structure
2009 Land Value	\$158,840,280	\$13,210,000
2009 Per Acre Land Value	\$9,823,772	\$5,436,213
2009 Tax Rate	\$0.9030	\$0.9030

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## ***LEVERAGED RESOURCE/INVESTMENT MEASURES***

### **Durango, Colorado**

**Project Summary:** Several community organizations in Durango, Colorado partnering with state, local, and federal agencies made it possible to restore and revitalize an old powerhouse that sat idle and vacant for nearly two decades. The resulting Discovery Museum reclaimed an important part of the city's history and created economic benefit to the region.

**Site Characteristics and History:** The City of Durango started as a mining boomtown in the early 1860s and was incorporated in 1881. The area quickly evolved into a vacation destination due to its proximity to historical sites, including Mesa Verde. In 1893, Durango Light and Power Company built the world's first steam-powered alternating current power plant along the Animas River. The plant operated for 80 years before closing in 1972. The City of Durango purchased the property in 1983 and intended to relocate offices and the firehouse to the powerhouse building. However, lack of resources complicated by environmental conditions hindered the City from utilizing the site. Site utilization was stalled for 13 years before the Children's Museum of Durango and the Durango Arts Center partnered with the City to put the powerhouse on the Colorado Preservation, Inc.'s Most Endangered Places list, and to get environmental assessments and remediation completed so renovation could begin.

**Environmental Issues and Remediation:** The powerhouse site, as well as an adjacent highway and a former gas station, contributed to surface and groundwater contamination. Soil on the site contained visible remnants of the coal and slag from historical operations. Soil contaminated from drainage holes in retaining walls along U.S. 550 eroded radioactive tailings. Groundwater under the site was compromised by a petroleum plume extending onto the site from several USTs from a nearby gas station. Using funds from landfill fees, the State of Colorado removed more than 1,000 cubic yards of soil contaminated from coal and coal residue remaining on-site. In some areas, soil was excavated to more than 12 feet below ground surface. Confirmation samples indicated that remaining soils contained no further contamination. Funding from the state also provided for mitigation of radioactive tailings by filling drainage holes with pea gravel and a drainage net to filter tailings without compromising the drainage system. Mitigating asbestos in the power plant building was the most costly part of the cleanup, and was accomplished by a partnership between the museum organization and the state. Development and Reuse partners included the City of Durango, the Colorado Dept of Local Affairs, the Colorado Department of Public Health and Environment (CDPHE), the Colorado Historical Society, the Durango Arts Center, the Durango Discovery Museum, La Plata County, the National Parks Service, private donors and volunteers, and Rebuild Colorado.

**Measuring Economic Impact:** The partnership leveraged resources to complete this project. New investment included: \$810,000 for construction and renovation costs; \$420,000 city investment toward infrastructure, parking, and open space; a \$15,000 National Park Service grant toward site work and open space; a \$15,000 county investment toward site work and open space; a \$135,000 CDPHE grant for environmental assessment and remediation; and a pending \$3.9 million city investment on highway access and infrastructure.

**Audience for Data:** Audiences for this data include local and county officials, business leaders, and developers. CDPHE uses case studies in various outreach efforts such as its annual Colorado Brownfields Conference and in speaking engagements at various stakeholder events. The department recently participated in workshops in Alamosa, Breckenridge, Canon City, Fort Collins, Denver, and Lakewood. In addition, write-ups are posted in the "Success Stories" section of the CDPHE Brownfields website. This information is also shared with people from across the country at events such as the National Brownfields Conference sponsored by EPA and the EPA Region 8, 9, and 10 Brownfield Workshop.

**Other Economic Benefits:** This project initially created eight museum staff jobs with an average annual salary of \$39,000 each and a one-time impact of eight full-time equivalent construction workers earning an average annual salary of \$40,000 each. Economic benefits also include \$2.1 million in annual non-local visitor spending and 32 direct jobs supported by non-local visitor spending, not including museum staff.

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**Boise, Idaho**

**Project Summary:** For years, environmental concerns at the American Linen property hampered efforts of Boise's Capital City Development Corporation (CCDC) to market this former industrial/commercial district for mixed-use redevelopment, including urban residential uses. Developer concerns related to a known historic petroleum release and suspected risks related to historic laundry-related uses. The property sat vacant for years and constituted blight on the urban landscape.

CCDC expressed to the Idaho Department of Environmental Quality (DEQ) its view that addressing the stigma surrounding this property would act as a catalyst for renewal of the district. Accordingly, in 2004, CCDC asked the Brownfields Program to fund assessment activities at the property to evaluate the ground water quality beneath the site. DEQ agreed to fund the requested assessment.

**Site Characteristics and History:** The site occupies the northwest corner of 14th and Grove Streets in downtown Boise. The site takes up one quarter of a city block, which is bisected by an east-west trending alley to the north of the property. The site had three contiguous buildings with separate historical operations ranging from commercial to light industry. Past owners used the site as a linen supply operation involving commercial laundry with conventional detergents. While the owners did not perform commercial dry cleaning, occasionally they used tetrachloroethylene (perc or PCE) to clean heavily soiled garments. The property once housed USTs holding diesel fuel for delivery trucks and Stoddard solvents for spot-cleaning difficult stains.

**Environmental Issues and Remediation:** In 2001, the site's petroleum USTs were removed along with contaminated soils. A remediation system treated contamination in the soil until its removal in 2004, when DEQ issued a no-further-action letter related to the petroleum issues in the former tank area. Another concern centered on groundwater samples impacted by an unknown source of chlorinated solvents. The historical petroleum concerns and area PCE issues prompted CCDC's request for additional assessment activities.

DEQ conducted assessment activities including removal of nine solvent USTs and associated contaminated soils. Based on the investigation results, DEQ determined the property was not the source of original groundwater contamination and provided a no-further-action determination with respect to the property.

**Measuring Economic Impact:** The Brownfields Program invested approximately \$90,000 in the assessment of the American Linen Property. This property was redeveloped as three distinct properties. The former Farm Store now houses two businesses: Big City Coffee (a bakery, caterer, and full service café) and G Fit Studio, which focuses on high-end performance training and fitting for cyclists. The former warehouse is now dedicated as parking for Capitol City Development Corporation, Boise's urban redevelopment agency. The former American Linen building was redeveloped into the Linen Building event center and art gallery.

Redevelopment of these structures constituted a one-time, \$3,850,000 expense. However, four other properties were purchased and redeveloped at nearly the same time by the same developer, and many new businesses were attracted to the newly branded six-block Linen District. This secondary redevelopment constituted a one-time redevelopment expenditure of approximately \$10,000,000 and the opening of eight new businesses.

**Audience for Data:** The data were presented to the Governor’s office and are also featured on the DEQ Brownfields Program success stories web page. This data and additional socioeconomic indicators are useful when discussing potential Brownfield projects with developers, property owners, and real estate agents. Brownfield stakeholders are also exposed to this data during the many presentations delivered by DEQ Brownfields Program staff across the state to local government officials, real estate agents, bankers, and developers.

**Other Economic Benefits:** Development of the Linen Building led to the purchase and redevelopment of more than 60 percent of the buildings (most of them formerly vacant) in this neglected area of downtown Boise and the formation of the six-block Linen District. One of the buildings in the Linen District which was purchased and redeveloped by the Linen Building owner is now dedicated to a business, Second Chance, which is focused on the recycling and sale of building supplies to support the non-profit Supportive Housing and Innovative Partnerships (SHIP). SHIP clients are the employees of Second Chance. They deconstruct buildings and bring the saleable materials to Second Chance while earning a wage, which allows these formerly homeless employees to afford decent housing.

The Linen Building hosts multiple events that positively impact the restaurants, hotels, and retail establishments in the Linen District as well as tax receipts. Every other Sunday, the Linen Building holds an indoor Sunday Market where local entrepreneurs can display and sell their wares. The building owner donates 10 percent of all income from the Sunday Market to local non-profits. The Linen Building also hosts multiple fundraising events for the Treasure Valley Institute for Children’s Arts (TrICA). The funds from these events go directly to the redevelopment of a former Brownfield site which will eventually house TrICA. See the table below for other economic benefits.

**Boise, Idaho Revitalization**

Category / Site	American Linen, Warehouse, Farm Store
Assessment dollars expended	\$90,000
Jobs created during redevelopment	40
Total payroll during redevelopment	\$850,000
Employees currently employed	7
Part time	5
Full time	2
Total current payroll	\$210,000
Annual operating expense (non-payroll)	\$280,000
Total material cost for redevelopment	\$1,400,000
Structures remodeled	3 @ 26,000 square feet.

	One of these structures is on the National Register of Historic Places
Assessed value prior to redevelopment	\$900,000
Assessed value post redevelopment	\$2,500,000
Increase in property value	\$1,600,000
Annual taxes prior to redevelopment	\$10,000
Annual taxes post redevelopment	\$20,000
Other indicators	1. Led to purchase and redevelopment of four other buildings in the "Linen District" with a total economic development benefit of over \$10,000,000 2. All original infrastructure was able to be reused. No infrastructure costs were incurred by local utilities or governments as a result of this development.
One time redevelopment investment	\$3,850,000
Annual economic return	\$510,000
Total project return on assessment dollars during first year of operation	\$48.44 return per \$1 of Brownfield assessment funding

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**Grand Rapids, Michigan**

**Project Summary:** The former industrial properties located at 630-634 South Division Avenue and at 558 South Division Avenue in Grand Rapids were cleaned up and the derelict buildings demolished as part of a state-funded cleanup effort. Tillman Industries purchased the properties and redeveloped them into a new high-tech manufacturing building and a commercial shopping plaza.



*630-634 South Division Avenue, currently developed as Veteran Medical Products, a Tillman Industries company.*



*558 South Division Avenue, currently developed as the T-3 Plaza, owned by Tillman Development.*

**Site Characteristics and History:** South Division Avenue is a major traffic artery along the edge of an industrial/commercial area in southeastern Grand Rapids. Since the early 1900s, commercial businesses including used car, auto parts, and machinery sales operated at the Container Waste/American Laundry site at 630-634 South Division Avenue. Container Waste, Inc., a refuse service, used one of three buildings on the northern parcel. The southern parcel was an industrial laundry, American Laundry, a leaking underground storage tank (LUST) site. Two blocks north at 558 South Division Avenue was the former Gray's Maintenance site, consisting of numerous parcels totaling about 1.5 acres. Since the early 1900s, use of the site changed from residential to commercial and included a laundry, used car business, tire service, tin shop, welding shop, grocery store, and radio repair shop. Gray's Maintenance used one of the four buildings for an office and garage. The remaining buildings were vacant and in serious disrepair.

**Environmental Issues and Remediation:** At the Container Waste/American Laundry site, a 1998 Phase I Site Assessment indicated the presence of stained soils, waste oil, diesel fuel, hydraulic oil, paints, batteries, and a large amount of trash. A Phase II assessment and structural analysis was conducted in 2000, followed by demolition of the buildings, removal of LUSTs, removal of contaminated soil, and a soil cover over contaminated areas. A total of \$254,131 of Clean Michigan Initiative (CMI) funds was used to conduct the work. In 1998 at the Gray's Maintenance site, the city performed Phase I and II assessments on the property's six parcels. The Phase I assessment reported an aboveground waste oil tank in the garage and various items outside the building, including appliances, lead batteries, drums containing liquids and solids, engines, and transmissions. Soil samples indicated the presence of arsenic and volatile organic compounds at concentrations exceeding the Residential Direct Contact criteria under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended. A total of \$182,264 of CMI funds were used to conduct a limited site investigation, demolish the buildings, and remove contaminated soil.

**Incentives Utilized:** City-funded site assessment on tax-reverted, city-owned properties, the CMI state-funded cleanup program (\$436,395), and a Renaissance Zone designation were utilized for the sites.

**Measuring Economic Impact:** As an indicator of the economic impact of the CMI funds, the Michigan Department of Natural Resources and Environment (MDNRE)<sup>1</sup> measured private investment. Private investment for Veteran Medical Products (VMP) was estimated at \$2 million. The investment at the T-3 Plaza is estimated at \$900,000.

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<sup>1</sup> The Michigan Department of Environmental Quality and the Michigan Department of Natural Resources were merged into a new Michigan Department of Natural Resources and Environment on January 17, 2010.

**Audience for Data:** The target audience for the Brownfield redevelopment economic impact case studies is primarily the Michigan Legislature and Governor's office. State law requires that MDNRE report annually the amount of tax increment revenues approved, including taxes levied for school operating purposes. Additionally, MDNRE publishes an annual Consolidated Report to the Internet so that the general public can view sites where the state is funding cleanups, providing incentives, and using tax increment financing. Success stories are published to the MDNRE website as well, in order to highlight particularly interesting or high-priority projects. MDNRE also has developed a catalogue of many of these case studies that will be sent to statewide public interest groups, economic development agencies, Brownfield redevelopment authorities, and legislators.

**Other Economic Benefits:** MDNRE and the Michigan Economic Development Corporation measure several factors when tracking the results of Brownfield redevelopment projects, including job creation, acres redeveloped, property tax increment, and increased taxable valuation of properties. The new business, VMP, currently employs 30 people. There are four small businesses located at the T-3 Plaza, with an unknown number of employees. Approximately half of the three-acre Container Waste/American Laundry site was actually developed, with the other half available for future development. The entire 1.5- acre Gray's Maintenance site is now the T-3 Plaza. Because both sites are located in a Renaissance Zone, currently only about \$15,000 in property taxes is remitted to the city. Prior to cleanup and redevelopment, the tax values were zero. The current assessed value of the VMP property is \$694,000, and the current assessed value of the T-3 Plaza is \$473,200. Other economic benefits not calculated include an increase in adjoining property values, the amount of spending by workers, and the conservation of green space by redeveloping an urban property. Tillman Industries also redeveloped the property located between these two sites as a commercial and office building.

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## ***JOB CREATION MEASURES***

### **Tampa, Florida**

**Project Summary:** Originally developed and operated as a cannery from 1936 until 1981, this property was characterized by local media as a “gritty industrial site between the Port of Tampa and Ybor City.” Panattoni Development purchased the property in 2005 and entered the Florida Brownfields Redevelopment Program in 2007. IKEA purchased the property in 2008 from Panattoni after most of the environmental work was complete. IKEA opened its third Florida store on the property in May 2009. The environmental issues associated with the property were managed by removal of tanks, railroad tracks, and contaminated soil and the use of engineering and institutional controls. The redeveloped 29-acre site now contains a 353,000 square foot store, a 350-seat restaurant, and approximately 1,700 parking spaces. With the opening of the IKEA store, a destination shopping location has been created immediately adjacent to historic Ybor City.

**Site Characteristics and History:** Historically, the Adamo Corridor has been characterized by warehouses, light industry, and adult clubs. Both Ybor City and the Adamo Corridor have long been targeted for redevelopment. IKEA chose the location based on the direct highway access, visibility, and size of the population within a 60-minute drive time of the store.

**Environmental Issues and Remediation:** Environmental testing at the site revealed elevated levels of polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons, and arsenic in the soil. Soils with contaminant concentrations above Florida’s soil cleanup target levels for leachability to groundwater were excavated and removed from the site. Soils with contaminant concentrations that exceeded Florida’s soil cleanup target levels for human exposure on industrial properties were left in place and covered with a minimum of two feet of clean fill as an engineering control to prevent exposure. Aluminum and iron were detected in groundwater at concentrations above Florida’s secondary drinking water standards, but these impacts did not extend off-site. Institutional controls were recorded to ensure that the soil cap is maintained and to limit future land use to commercial/industrial. The site received a Site Rehabilitation Completion Order from the Environmental Protection Commission of Hillsborough County in June 2009 stating that no further action was necessary at the property.

**Measuring Economic Impact:** The IKEA project created 500 construction jobs and 400 new, in-store jobs. When the store opened in May 2009, the Tampa area had been particularly hard hit by the effects of the economic downturn, and jobs were being lost. The opening of IKEA and the number of jobs created was widely anticipated and reported from the time that store was announced until several months following the opening. IKEA received several thousand applications for the 400 positions. IKEA’s practice of providing health insurance benefits to all employees, including part-time, is an added economic benefit.

**Audience for Data:** The audience for the economic impact of this redevelopment project, particularly job creation, was enormous. From the time the store was announced in April 2007, the progress of the development and the number of jobs expected were consistent topics for all Tampa Bay Area media outlets.

**Other Economic Benefits:** In addition to creating new jobs, IKEA will increase local tax revenues. The projected ad valorem tax benefit is \$1.3 million. The presence of the IKEA store is expected to be a catalyst for additional redevelopment in the area.

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## Indianapolis, Indiana

**Project Summary:** A property located in Indianapolis, Indiana was redeveloped from a former dilapidated heavy manufacturing facility into an expansion of an adjacent industrial tool manufacturing facility. Soil and groundwater contamination from previous site industrial activities was, and is, being addressed as part of the redevelopment project. Portions of the former building were deconstructed and recycled, including wood beams, steel girders, and metal siding.

**Site Characteristics and History:** The approximately six-acre site consisted of multiple linked one- to three-story buildings with approximately 250,000 square feet of floor space. The site is located on Dr. Andrew J. Brown Avenue in the northeast-central portion of Indianapolis and lies within a blighted residential and industrial area that is being revitalized. The property had various uses from 1872 to 2002, including the manufacturing of rail cars and engine parts. Surrounding properties include active industrial facilities and residential properties.

**Environmental Issues and Remediation:** Following a \$600,000 emergency hazardous substance removal conducted by EPA in 2006, site environmental investigation and remediation costs were funded by approximately \$600,000 in grants from the Indiana Brownfields Program, with additional investment by the City of Indianapolis of approximately \$1.6 million for soil cleanup costs and \$1.5 million for building demolition. Investigation results revealed lead, petroleum, polychlorinated biphenyls, tetrachloroethylene, and trichloroethylene in the soil and groundwater exceeding the Indiana Department of Environmental Management's Risk Integrated System of Closure guidelines. Groundwater test results showed that on- and off-site groundwater was significantly impacted by chlorinated compounds originating from the former facility and adjacent off-site locations.

**Measuring Economic Impact:** Economic goals achieved by this project included the retention of more than 200 industrial jobs and the creation of 50 new jobs.

**Audience for Data:** The audience for the information was primarily high-ranking government decision makers focused on economic development, including those in the Governor's office, the Indiana Economic Development Corporation, and the Indiana Legislature. The audience also included communities interested in boosting redevelopment efforts and jobs creation on Brownfield sites. The project received a 2008 Indiana Governor's Award for Environmental Excellence.

**Other Benefits:** The adjacent manufacturer invested approximately \$19,000,000 to double its manufacturing capacity by 150,000 square feet by expanding the facility onto the site. The expansion is anticipated to increase the property value by \$6,500,000, with a substantial increase in property taxes levied after the Tax Increment Financing (TIF) district bonds are paid. The total public and private funds leveraged for the project were over \$26,000,000. A total of 50,000 tons of available free foundry sand was utilized to backfill the excavation created by the removal of contaminated soils so that the new facility could be constructed. All but 27 percent of the building materials were recycled during the facility demolition. More than 40,000-gallons of hazardous liquids, 3,000 pounds of other hazardous wastes, and 450 linear feet of asbestos were removed and disposed of from the site.

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## **Boston, Massachusetts**

**Project Summary:** A property located in the Dorchester neighborhood of Boston, Massachusetts was redeveloped by the Dorchester Bay Economic Development Corporation (DBEDC) into the headquarters for Spire, a Boston-based marketing and printing company. Soil and groundwater contamination from previous site use was addressed as part of site redevelopment.

**Site Characteristics and History:** This 4.7-acre site was home to Boston Insulated Wire and Cable Company for more than 80 years and then abandoned. DBEDC bought the site in 1994 and financed cleanup and other activities using a combination of public and private funding through 20 individual organizations. The site is located in a state-designated environmental justice area and is surrounded by residential and commercial uses. It is located in close proximity to transit.

**Environmental Issues and Remediation:** Prior to redevelopment, contamination was concentrated on a 1.1-acre portion of the site that contained a lagoon and railroad spur. Groundwater was contaminated with lead and silver, volatile organic compounds, oil, and grease. The railroad spur also contained lead, polycyclic aromatic hydrocarbons, and total petroleum hydrocarbons. Funding from the EPA Brownfield Program and the Massachusetts Brownfields Redevelopment Fund (administered by MassDevelopment) was used to characterize and remediate contamination to facilitate redevelopment.

**Measuring Economic Impact:** A primary measure of economic impact of this project was the job creation resulting from site redevelopment. Spire's new headquarters created 166 jobs in this neighborhood, including entry-level positions. Spire offers job training for local residents in this lower income area to prepare them for some of these entry-level positions. The opening of Spire caused a ripple effect in the community. Businesses adjacent to the site have opened or expanded, creating more jobs.

**Audience for Data:** The audience for information on the land revitalization benefit of this project is widespread. This redevelopment was one of the first major success stories for the Brownfield Redevelopment Fund (BRF), which was created under the 1998 Brownfields Act. When funding for the BRF Program was depleted, the job creation benefits resulting from the Spire project was highlighted as an example to state lawmakers of why the fund should be recapitalized. As a result, the Massachusetts Legislature appropriated an additional \$30 million to MassDevelopment to recapitalize this important program in 2006. This project also won the international Phoenix Award in 2004, and has been focus of numerous press events hosted by the Governor and Lieutenant Governor.

**Other Economic Benefits:** As a result of the redevelopment, homeowners have seen their property values increase.

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## **Detroit, Michigan**

**Project Summary:** The former Laro Coal site was an industrial property in the City of Detroit used for coal storage, marine fueling, cement manufacturing, concrete crushing and storage, paper stock supplies, industrial solvent storage, and automobile storage. It is being redeveloped for waterfront single-family and condominium housing.

**Site Characteristics and History:** The former Laro Coal site is approximately 43 acres in size and contains 250 feet of frontage on the Detroit River overlooking the northern end of Belle Isle. The western portion of the property is separated from the eastern portion by a 1,800 foot long deep-draft canal running north from the Detroit River. Past on-site activities included operations associated with coal and iron works, marine fueling, cement manufacturing, lime and chemical suppliers, paper stock suppliers, industrial solvent storage, and an automobile storage/impound lot for the police department. During the 1980s the property was acquired by tax reversion or condemnation by the City of Detroit, which promoted residential development.

**Environmental Issues and Remediation:** A Phase I and Phase II environmental site assessment (ESA) was performed in 2001 to evaluate recognized environmental concerns. The Phase I ESA indicated stockpiles of abandoned cars, boats, trucks, and tires at the site, along with several small abandoned structures. Because of the historical property usage, the original Phase II ESA was quite thorough, and included 140 soil borings and seven monitoring wells. Widespread, but comparatively shallow, soil and groundwater contamination from multiple Leaking Underground Storage Tanks, contaminated and unconsolidated fill soils, and areas of surface spilling and discharge, were found. The property was contaminated with volatile organic compounds, semi-volatile organic compounds, and some heavy metals, all exceeding cleanup criteria under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended. Interim response activities, the demolition of an abandoned structure and removal of USTs, railroad tracks, dumped waste stockpiles, abandoned boats and cars, tires, a truck scale, and heavily contaminated soils (arsenic and lead) were conducted under the Clean Michigan Initiative (CMI) in 2003 and 2004. The Michigan Department of Natural Resources and Environment's (MDNRE's) state-funded investigation and remedial activities amounted to \$519,678. Supplemental assessment activities conducted in 2004 were to identify the routes of exposure from potential hazardous soils and groundwater to humans and the environment.

Morgan Development LLC, a bona fide prospective purchaser, purchased the properties on June 30, 2005, obtaining liability exemption from contamination at the property by conducting a Baseline Environmental Assessment. Due care activities conducted included installation of sheet piling, excavation of some heavily contaminated soils, and installation of a seawall along the Detroit River. Geotextile fabric covered by one foot of clean soil was also installed over some contaminated soil to serve as an exposure barrier. According to cost estimates provided by the developer's engineering and planning consultants, approximately \$8,005,600 was necessary to address the environmental conditions (MDNRE approved \$3,406,938 in environmental costs under the Act 381 Work Plan), and \$3,358,000 was needed to refund expenditures for concrete removal, utility abandonment, and public infrastructure improvements on the property, totaling \$11,363,600.

**Incentives Utilized:** State and local tax capture valued at approximately \$7.5 million was established through a Brownfield redevelopment plan with Detroit's Brownfield Redevelopment Authority. The developer also obtained a Brownfield Single Business Tax credit valued at more than \$3.9 million, or approximately 10 percent of its total investment at the property, making up for the rest of the reimbursable costs at the property. The property also received a Neighborhood Enterprise Zone (NEZ) designation from the City of Detroit. The NEZ provides a reduction in the property tax rate from 67 mils to 17 mils (.017 per \$1,000) for 12 years. The taxable value for the property is approximately 50 percent of the sales price, and therefore, a home with a taxable value of \$400,000 would have property taxes of \$6,800 instead of \$26,800 per year. The redevelopment, at its completion, will include 43 single-family homes and 92 attached low-rise condominiums. As of November 2009, there were 15 sales recorded for a total of \$10,484,360 in sales.

**Measuring Economic Impact:** As an indicator of economic impact, MDNRE measured job creation. In this development there were an estimated 18 long-term jobs created for property upkeep, grounds maintenance, security, and sales at approximately \$24.00 per hour per job, providing an annual payroll of \$898,560. There

were about 200 short-term (3-4 years) of construction-related jobs created at approximately \$45.00 per hour per job. The estimated payroll for three years of construction was \$5,350,400.

**Audience for Data:** The target audience for the Brownfield redevelopment economic impact case studies is primarily the Michigan Legislature and Governor’s office. State law requires that MDNRE report annually the amount of tax increment revenues approved, including taxes levied for school operating purposes. Additionally, MDNRE publishes an annual Consolidated Report to the Internet so that the general public can view sites where the state is funding cleanups, providing incentives, and using tax increment financing. Success stories are published to the MDNRE website as well, in order to highlight particularly interesting or high-priority projects. MDNRE also has developed a catalogue of many of these case studies that will be sent to statewide public interest groups, economic development agencies, Brownfield redevelopment authorities, and legislators.

**Other Economic Benefits:** MDNRE and the Michigan Economic Development Corporation measure several factors when tracking the results of Brownfield redevelopment projects, including private investment, acres redeveloped, property tax increment, and increased taxable valuation of properties. Total private investment was estimated to be \$39 million. There were 36 acres of property actually developed along with seven acres of open space or future development. The amount of property taxes to the city is currently just over \$89,000 per year. The amount of taxes will increase as more homes are sold, averaging \$6,885 per unit per year in additional taxes while the NEZ is in place. Prior to the development, the taxable value of the property was zero. Other economic benefits not calculated include an increase in the amount of spending by residents at nearby businesses and the conservation of green space by redeveloping an urban property.

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**Walker, Michigan**

**Project Summary:** The H. Brown property is a former Superfund National Priorities List (NPL) site that was further remediated with state grant funds to allow for light industrial development. EPA’s original goal was simply to contain the contamination on the site and leave it vacant. The City of Walker and the State of Michigan wanted to further remediate the site to bring it back into productive use. Three warehouses currently sit on the property and are leased to various companies.



*Before: H. Brown Company dumped battery acid into the soil.*



*After: One of three 120,000 square foot warehouses.*

**Site Characteristics and History:** The H. Brown Company, Inc. operated a battery disposal operation on the site beginning in 1961. Between then and 1987, an estimated 170,000 to 460,000 gallons of battery acid were dumped directly onto the ground, and battery cases were shredded onsite. As a result, soil on the site became heavily contaminated with lead (at 380,000 parts per million in the surface soils and at 649,000 ppm in the subsurface soils), arsenic, polynuclear aromatic hydrocarbons, volatile organic compounds, and polychlorinated biphenyls. The site was placed on the NPL in June 1986 following an investigation by the then-Department of Natural Resources and EPA.

**Environmental Issues and Remediation:** EPA began investigation and emergency response actions on the soil and groundwater at the site in 1988. In 1992, the site was fenced, and controls were put in place to suppress fugitive dust. EPA spent more than \$3 million to contain the contamination on the site. The City of Walker strongly wanted to redevelop the site for economic benefits and tax revenues. Bruce Visser approached the city with a development plan and investment funds for the site, on the condition that the environmental contamination could be remediated. DBV Partners L.L.C. entered into a prospective purchaser agreement with EPA and the potentially responsible parties to redevelop the site to a limited industrial use.

The redevelopment plan, in the form of a Record of Decision amendment, was finalized in 1998 to reconsolidate contaminated soils onto the H. Brown Company property; demolish the existing building; build new warehouses; cap the site using the buildings, parking lots, and landscaping as a portion of the cover for the contamination; and provide deed restrictions and landfill gas monitoring. The Five-Year Review in 2004 showed that the remedy continued to be protective of human health and the environment.

**Incentives Utilized:** Primarily, Superfund was utilized to perform containment of the most heavily impacted soils. This investment amounted to just over \$3 million. The city sought a Site Reclamation Grant from the then-Department of Environmental Quality (DEQ) to fund the remediation in the amount of \$289,300. The grant funded due care activities, including a gas venting system and structure demolition that prepared the site for redevelopment, as well as a Baseline Environmental Assessment, which was reviewed and affirmed by the DEQ (now the Michigan Department of Natural Resources and Environment – MDNRE).

**Measuring Economic Impact:** More than \$10 million of private investment was put into the project, and the tenants currently employ approximately 300 people in total. Current tenants include Graybar of Michigan, Dematic Corporation, Exhibit Design Consultants, and Ecosystems Sustainable Exhibits. The redevelopment of the H. Brown property has led to increased interest in the industrial district in Walker, and other businesses have relocated there in recent years, including Louis Padnos Company, located on a nearby Brownfield site, the former Grand Rapids Diecast Plant.

**Audience for Data:** The target audience for the Brownfield redevelopment economic impact case studies is primarily the Michigan Legislature and Governor's office. State law requires that MDNRE report annually

the amount of tax increment revenues approved, including taxes levied for school operating purposes. Additionally, MDNRE publishes an annual Consolidated Report to the Internet so that the general public can view sites where the state is funding cleanups, providing incentives, and using tax increment financing. Success stories are published to the MDNRE website as well, in order to highlight particularly interesting or high-priority projects. MDNRE also has developed a catalogue of many of these case studies that will be sent to statewide public interest groups, economic development agencies, Brownfield redevelopment authorities, and legislators.

**Other Economic Benefits:** In addition to job creation, MDNRE and the Michigan Economic Development Corporation measure acres redeveloped, private investment, and increased taxable valuation of the property, as well as other factors. DBV Partners, L.L.C., constructed three new 120,000-square-foot buildings to be leased to tenants for warehousing and light industrial activities. The net State Equalized Value of the property increased by \$5,145,000 after the industrial development was completed at the 17-acre site. Other economic benefits not calculated include an increase in the amount of spending at nearby businesses by workers and the conservation of green space by redeveloping an urban property.

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**Watkins Glen, New York**

**Project Summary:** The opening of a new hotel in the heart of the Finger Lakes Wine Region is an excellent example of how land revitalization can help communities transition from the past to the future.

**Site Characterization and History:** This site is bounded by Franklin, First, and Decatur Streets in the Village of Watkins Glen, New York. The parcels that make up the Seneca Market site have a history dating back to the 1860s. Former uses include a marble works building, a dry cleaning building, and the former Welch's Grape facility.

**Environmental Issues and Remediation:** Environmental assessments revealed soils and groundwater contaminated with chlorinated organic compounds associated with the former dry cleaning building and its operation. Remedial measures included a soil vapor extraction system for impacted soil and groundwater pump and treat system for contaminated groundwater. Redevelopment activities followed cleanup activities at this site.

**Measuring Economic Impact:** The growing number of tourism and recreational opportunities in the area created a need for additional hotel space. The Watkins Glen Harbor hotel helps meet this demand, creating jobs and providing conference facilities that will attract year-round visitors. Its location on Seneca Lake makes the hotel a key part of the community's effort to revive the village's waterfront.

**Audience for Information:** The New York Department of Environmental Conservation (DEC) has posted environmental cleanup success stories, highlighting type of reuse, on DEC's website at <http://www.dec.ny.gov/chemical/50491.html>. The audience for this information includes communities surrounding the sites, the general public, and potential parties interested in the Brownfield Cleanup Program. Highlighting the reuse of Brownfield sites on DEC's website helps to educate the audience about the many possible reuses of Brownfield sites. Also, in light of recent economic conditions as well as interest in developing sustainable practices, posting success stories on the web has the added benefits of saving costs (e.g., paper, printing, and postage), reaching a larger audience, and reducing the carbon footprint.

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**Akron, Ohio**

**Project Summary:** A property located in Akron, Ohio, the famous Goodyear Zeppelin Company Hanger (now known as Akron Airdock), was cleaned up and revitalized so that the current owner, Lockheed Martin, could build a new generation of airships, creating and retaining high paying jobs in the process.



*The Lockheed Martin site following revitalization.*

**Site Characteristics and History:** The Airdock, located in the City of Akron, is a massive, enclosed space with a length that can accommodate two Washington monuments laid end-to-end. Between 1928 and 1930, the Goodyear Zeppelin Company constructed the facility, known as the Akron Airdock, to build the world's first steerable, lighter-than-air airship. As usage shifted to machining and press shops in the 1940s, however, the huge arched interior came to be drastically underused.

**Environmental Issues and Remediation:** In 2003, several years after the Lockheed Martin Corporation acquired the Airdock, the fireproofing layer within the structure's protective steel covering began flaking. This tar-based fireproof material contained PCBs and was essentially snowing down upon anyone that stepped inside. Lockheed Martin and the City of Akron, with assistance from a \$3 million Clean Ohio Fund cleanup grant and a \$2 million Brownfields Cleanup Revolving Loan Fund Program loan, were able to safely remove and dispose of the PCB-laden steel covering making the Airdock safe for use.

**Measuring Economic Impact:** Five hundred twenty-eight jobs were retained, and 93 jobs were created. The majority of these jobs are highly technical and high-paying.

**Audience for Data:** The audience for the information was the Ohio Governor's office, the Ohio General Assembly, local communities throughout the state, and other interested parties. This project was summarized in *The Clean Ohio Fund Report* to legislators and other interested parties. It is available on the web as well at <http://www.clean.ohio.gov/>. Both the Department of Development and Ohio Environmental Protection Agency (OEPA) use case studies at speeches, ribbon cuttings, trainings, and seminars as examples of success of the program. OEPA used case studies in the VAP Annual Legislative Report for 2010 and in its agency-wide annual report. These documents are available on the OEPA website and used for press events to demonstrate the success of the programs. Last but not least, they are used in budget justifications and testimony to the Ohio Legislature to explain what the state's dollars are buying in terms of environmental cleanup and economic recovery.

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**Bethlehem, Pennsylvania**

**Project Summary:** The once vibrant backdrop of the former Bethlehem Steel plant is again poised to be the hub of activity in the Lehigh Valley. The resurgence of this site means that it will no longer be anchored by blast furnaces and steel manufacturing, but by Sands Bethworks™ — a multifaceted shopping, dining, and entertainment complex designed to complement the facility that once gave this manufacturing community its identity. This site, subject to RCRA corrective action, has progressed through remediation and redevelopment through a team consisting of the Pennsylvania Department of Environmental Protection, EPA Region 3, Bethlehem Steel Corporation, and subsequent property owners. The project is enrolled in the One Cleanup Program initiative.

**Site Characteristics and History:** When the former Bethlehem Steel plant ceased operations, thousands of people had lost their jobs. The Lehigh Valley was left with a 1,600-acre environmental challenge – the largest contiguous Brownfield in the United States. How this site and this community would respond to such a dilemma was a complete unknown.

**Environmental Issues and Remediation:** The revitalization began when Bethlehem Steel Corporation characterized a portion of the overall property prior to its bankruptcy. Appropriate remedial actions were taken for soils, groundwater, and surface water at the site, culminating in an Act 2 liability release under the Site Specific standard, as well as approval through the federal corrective action process. Incorporating appropriate protective measures, the Bethworks parcel was prepared for redevelopment.

**Measuring Economic Impact:** The project generated thousands of direct and indirect jobs. The direct and indirect jobs will provide ancillary support for the property and will serve as a strong catalyst for local economic growth, setting in motion an economic engine that has the ability to generate long-term growth and prosperity for the entire community. The first phase of the Sands Bethworks 126-acre development features a 300-room hotel, 200,000 square feet of retail space, a casino with 3,000 slot machines, and a variety of dining and entertainment options. Sands Bethworks also will be home to the National Museum of Industrial History, an arts and cultural center, and the local Public Broadcasting Service affiliate. The casino opened in May 2009.

**Audience for Data:** The audience for information on the land recycling benefit of this project is widespread. The project continues to demonstrate the impact of Pennsylvania's Land Recycling Program 15 years and well over 3,000 site approvals following its implementation. Success stories built through the program demonstrate the necessity of Pennsylvania's Hazardous Sites Cleanup Fund (HSCF) to the Pennsylvania General Assembly. The HSCF is used to support central and regional office staff for implementation of the Land Recycling Program.

**Other Economic Benefits:** The Bethworks Project is a culmination of countless hours of hard work by the community. Significant tax revenue for state and local communities and increased tourism are other major benefits of the redevelopment effort.

Sands Bethworks is a model for Smart Growth redevelopment of a major Brownfield site and will incorporate many of the remaining historical elements of the famed plant. The once heavily used, massive ore crane will be part of the casino facade and will serve as a reminder of the past and a gateway to new,

sustainable development. Design elements such as exposed steel, back-lit perforated metal screens, and a soaring, transparent glass atrium will be featured within a number of existing buildings.

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**Lancaster, Pennsylvania**

**Project Summary:** Most people visualize Lancaster County as rolling green hills in the heart of Amish Country. But one of the county's best-kept secrets is an extremely progressive and successful Brownfields revitalization program. The Lancaster County Planning Commission has adopted a strategy that will focus on land use planning, recycle industrial land consistent with job producing opportunities, build on infrastructure and public/private partnerships, and attract infill development in the form of new, mixed-use development. It is a broad goal, and it is working.

**Environmental Issues and Remediation:** The Pennsylvania Land Recycling Program provides incentives to promote the voluntary development and implementation of site remediation. Clear, uniform cleanup standards and standardized review procedures promote the voluntary elimination of public health and environmental hazards. Remediation of a site according to the standards and procedures provides owners and developers with relief of liability for further remediation of the contamination. The remediation standard(s) selected by the remediator may be chosen based on the future use of the property.

**Measuring Economic Impact:** In what was an old, mostly abandoned industrial area of northwest Lancaster in Lancaster County, there now stands 6,000-seat Clipper Magazine Stadium, home to the minor league Lancaster Barnstormers. Combined, the baseball team and stadium resulted in the creation of 30 permanent and 200 seasonal jobs. However, they did much more to lead the restoration of this section of Lancaster. In the blocks around the stadium, a number of businesses have opened in the past two years. Some of these rely on baseball crowds as part of their customer base, including several restaurants. But others, such as a number of medical and professional offices, stand on their own. Lancaster General Hospital opened a new Orthopedics Center nearby. Other new businesses in the area are emerging technology company Linear Acoustics and technology firms Mission Research and Iron Compass, as well as Robson Forensic, Realty Select, and C.S. Davidson Engineers. Attesting to the more pedestrian-friendly nature of this neighborhood, Franklin and Marshall College's Distler House college bookstore, the Gallery DePaul art gallery, and Sharper Image Barber Salon have located here. All told, about 300 new jobs have come to this area of Lancaster as a result of this project.

Adjacent to this site is another project just getting underway. Planned redevelopment of 47 acres of the former Armstrong World Industries manufacturing site will keep 250 manufacturing jobs in the city of Lancaster. This project will also include residential units, a collegiate and community recreation complex, and athletic fields, which should fit nicely in this resurgent urban community. A local college is a partner in the recreational aspect of this plan. This high-profile redevelopment project has been designated as a Brownfield Action Team project.

**Audience for Data:** The audience for information on the land recycling benefit of this project is widespread. The project continues to demonstrate the impact of Pennsylvania's Land Recycling Program 15 years and well over 3,000 site approvals following its implementation. Success stories built through the program demonstrate the necessity of Pennsylvania's Hazardous Sites Cleanup Fund (HSCF) to the

Pennsylvania General Assembly. The HSCF is used to support central and regional office staff for implementation of the Land Recycling Program.

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**Pittsburgh, Pennsylvania**

**Project Summary:** The site of a former sprawling LTV Steel plant in Pittsburgh is now home to a model urban Brownfield redevelopment featuring office buildings, medical facilities, a manufacturing firm, retail shops, a sports medicine complex and practice fields, and more than 400 housing units. This success story is the result of more than 13 years of collaboration and cooperation between local, state, and federal governments; local economic development leaders; and private investors.

**Site Characteristics and History:** This 123-acre former steel mill located on the Monongahela River presented the standard environmental issue associated with a 100-year history of steel manufacturing – heavy concentrations of iron cyanide metals and evidence of PCBs. However, the facility’s size and location made it an attractive project for the Urban Redevelopment Authority of Pittsburgh to undertake.

**Environmental Issues and Remediation:** The greatest challenge for any remediation is to create a cost-effective remediation plan that will encourage private development while simultaneously protecting the health and safety of workers and future site occupants. The site characterization identified a number of concrete foundations from the steel plant, as well as USTs and soil and groundwater contamination, including heavy metals, volatile organic compounds, and PCBs. The project was remediated using site-specific standards based on the site’s multiple end uses. In the end, engineering controls were utilized to limit human exposure to any residual contamination left on the property.

**Measuring Economic Impact:** In addition to the loss of 10,000 jobs, the LTV plant closure left behind environmental contamination from decades of steel making. But a determined effort has turned the site into an urban gem, including road improvements, renovation of a bridge, and construction of two parking garages. American Eagle Outfitters recently located its corporate headquarters at the site. Other companies now on the SSW site include UPMC Health Systems, the University of Pittsburgh Center for Biotechnology and Bioengineering, the UPMC Sports Medicine Facility, IBEW's regional headquarters, the McGowan Center for Artificial Organ Development, two phases of the Soffer Office and Retail Development, Matcon Diamond Company, and other office buildings. Employment generated by initial development is approximately 1,500 jobs.

At full buildout of the South Side Works (SSW) project, 5,400 jobs are expected, and hundreds of people will live in this attractive neighborhood. Total private investment is expected to reach \$250 million and will provide more than 5,400 employment opportunities.

**Audience for Data:** The audience for information on the land recycling benefit of this project is widespread. The project continues to demonstrate the impact of Pennsylvania’s Land Recycling Program 15 years and well over 3,000 site approvals following its implementation. Success stories built through the program demonstrate the necessity of Pennsylvania’s Hazardous Sites Cleanup Fund (HSCF) to the Pennsylvania General Assembly. The HSCF is used to support central and regional office staff for implementation of the

Land Recycling Program. The SSW project received the Phoenix Award in 2002 for excellence in Brownfield redevelopment.

**Other Economic Benefits:** SSW is a first-class riverfront development with a mix of office, medical, recreational, housing, and retail uses. In addition to jobs, the project will create 400 new housing units as well as public access to the riverfront. While past environmental damage was addressed at this site, the quality of life also has been enhanced by the creation of a waterfront park and river trail system. Incorporated into the trail and park design was an art sculpture to commemorate the site's steel heritage. The monument is located near the approach to the MONCON Bridge.

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**Wyomissing, Pennsylvania**

**Project Summary:** The Wyomissing Square redevelopment project will turn an abandoned, outdated textile mill into a mixed-use development, providing a key downtown revitalization anchor in Wyomissing in Berks County, Pennsylvania.

**Site Characteristics and History:** The Wyomissing Square property has previously operated under several industrial uses including a textile mill and printing manufacturing using electroplating processes. On-site contamination included heavy metals, solvents, and acids that have been properly remediated for the proposed end use under Pennsylvania's Land Recycling Program.

**Environmental Issues and Remediation:** Selective demolition of irrelevant appurtenances and site work components was necessary to complete the proposed project. Additional efforts included asbestos abatement, lead-based paint removal, and hazardous materials removal and disposal. Due to the historic industrial use of the site, hazardous compounds were detected in multiple areas of concern on the property and were appropriately addressed through the course of remediation. Upon completion, the site will obtain a release of liability for the site by demonstrating attainment of an Act 2 standard for both soil and groundwater.

**Measuring Economic Impact:** The project brings 150 jobs in management, sales, and maintenance to Berks County. Brickstone Realty Corporation and Bozzuto Development Company are proposing this 13-acre, mixed-use urban infill redevelopment that will convert a 330,000-square-foot abandoned industrial building into 248 market-rate apartments, 31,000 square feet of retail space, and a new hotel. Wyomissing Square will complement existing development in the area by expanding an established restaurant to include banquet space, plus the addition of underground parking for residential use. An adjacent 60,000-square-foot office building will be renovated and retained with existing tenants.

Pennsylvania Brownfield Action Team assistance will expedite cleanup and redevelopment. The project is in a prime location near existing retail outlet shops, within walking distance of several transit stops, downtown West Reading, and the Reading Medical Center. The development will revitalize an existing Brownfield property and provide an economic catalyst to the surrounding area.

**Audience for Data:** The audience for information on the land recycling benefit of this project is widespread. The project continues to demonstrate the impact of Pennsylvania's Land Recycling Program 15 years and well over 3,000 site approvals following its implementation. Success stories built through the

program demonstrate the necessity of Pennsylvania's Hazardous Sites Cleanup Fund (HSCF) to the Pennsylvania General Assembly. The HSCF is used to support central and regional office staff for implementation of the Land Recycling Program. Wyomissing Square has been recognized by the Delaware Valley Smart Growth Alliance jury as a good example of smart growth development.

**Other Economic Benefits:** The Wyomissing Square Project is located at one end of a three-mile corridor, extending from Wyomissing through West Reading into Reading that has been designated a planned "entertainment and hospitality" corridor. The conversion of a 119-year old industrial building into 248 market-rate apartments and 50,000 square feet of upscale retail space, along with a 130-room Marriott hotel, has provided an important economic boost to the corridor as well as increased real estate taxes to the Borough of Wyomissing, the Wyomissing Area School District, and the County of Berks.

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**Milwaukee, Wisconsin**

**Site Characteristics:** The Menomonee Valley was a vibrant marshland blighted by 125 years of fill and manufacturing. At the west end sat the 133-acre former Milwaukee Road Shops site, which the railroad had occupied since 1879. The site had been used to build and repair rail cars. CMC (Chicago Milwaukee Co.) went bankrupt in 1985, leaving acres of blighted land and dilapidated buildings. In 2003 the City of Milwaukee acquired the property through condemnation and started remediation of the property.

**Environmental Issues and Remediation:** The property has undergone various site assessments and investigation activities since 1992. The studies consisted of sampling soil and groundwater across the site. Analysis detected petroleum free product, VOCs, CVOCs, PAHs, and metals in soil and groundwater at the site. The perception of unmanageable contamination at the site stemmed from the many years of industrial use and the remnants of the dilapidated buildings. The railroad had gone bankrupt and had done little to move the site into redevelopment. The City of Milwaukee initiated condemnation proceedings, and once it acquired the property, it completed investigations at the site and received Department of Natural Resources (DNR) approval of a remedial action plan.

In July 2005, DNR approved a remedial action plan for the former Milwaukee Road Shops site. The plan included "hot spot" removal, a detailed capping plan which included bringing in additional material (both impacted and non-impacted) to raise the site out of the flood plain, free product removal, and groundwater monitoring. Final capping material will include clean soil, buildings, and pavement. When the site has been fully capped (developed) and groundwater monitoring indicates a stable or receding plume, the site will be placed on the state's Geographic Information System to record any restrictions on the site.

**Measuring Economic Impact:** To date, six new companies have located in the industrial center, creating more than 700 sustained jobs. There remains additional space for further development with an estimated additional 500 jobs.

**Other Economic Benefits:** It is estimated that there will be a \$1 million increase to city tax revenues and a \$120 million increase in ecological, recreational, and aesthetic resources. The city took advantage of a \$16 million Tax Increment District for remediation and infrastructure; the New Market Tax Credit Program; \$24 million in local, state, and federal grants and donations; and additional in-kind support. This project

combined beneficial reuse, innovative materials, stormwater management, sustainable development, and recreational opportunities (including the Hank Aaron State Trail that runs adjacent to the property).

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## **COMMUNITY IMPACT MEASURES**

### **Ligonier, Indiana**

**Project Summary:** A property located in Ligonier, Indiana is in the process of being redeveloped from a former wire manufacturing facility to a community riverfront park and a potential fire station. Soil contamination from previous site industrial activities is being addressed as part of the redevelopment project. The structure was demolished using “green” deconstruction techniques.

**Site Characteristics and History:** The four-acre site consisted of a large three-story structure with approximately 100,000 square feet of floor space. The site is located on Main Street at the edge of the city’s downtown and adjacent to the Elkhart River. It lies within a former industrial area that is being revitalized into commercial and community reuses. The property had various uses since the late 1800s, including the manufacturing of carriages, refrigerators, and wires. The facility sat vacant for decades prior to being gifted to the town. Surrounding properties are former industrial facilities either vacant or converted into commercial reuse.

**Environmental Issues and Remediation:** Site environmental investigation and remediation was funded by a \$175,000 Indiana Brownfields Program grant. The investigation revealed asbestos in the building and elevated levels of heavy metals in the soil exceeding Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure guidelines. Groundwater testing indicated that groundwater was not impacted by facility activities. Upon completion of a soil removal action, low areas will be backfilled with clean soil and the site given closure.

**Measuring Community Impact:** IDEM measured the decrease in reusable materials being landfilled as one indicator of the project’s success. The deconstruction generated the following reusable materials which were sold: 300 tons of steel, copper, aluminum, and brass for recycling; hard rock maple flooring reused for banjos and fiddles; oak posts for furniture manufacturers; 1.6 million bricks sold for reuse at a historic church, a lighthouse on the Great Lakes, and multi-million dollar homes in six states; broken brick for landscaping; and usable wood for mulch. Only five to ten percent of the building material was landfilled.

**Audience for Data:** The audience for the information was primarily high-ranking government decision makers focused on economic development, including those in the Governor’s office and the Indiana Legislature. The audience also included communities interested in boosting recycling efforts and realizing cost savings associated with deconstruction. The project received an Indiana Governor's Award for Environmental Excellence.

**Other Benefits:** The three-year building deconstruction employed 30 local people in Ligonier and saved the community significant building demolition costs.

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### **Lawrence, Massachusetts**

**Project Summary:** A partnership between the City of Lawrence and a private property resulted in the redevelopment of a former industrial laundry site into a riverfront park that connects to the Spicket River Greenway.

**Site Characteristics and History:** The former laundry site is located in the North Common neighborhood of Lawrence, home to generations of blue-collar workers and immigrants. When the city's manufacturing base declined in the 1920s, many homes and businesses were abandoned, leaving behind contaminated sites and creating opportunities for illegal dumping of waste. Quality of life in the neighborhood was diminished.

**Environmental Issues and Remediation:** Former use of the site as an industrial laundry left petroleum hydrocarbons and other contaminants in soil and groundwater. Beginning in 2003, the trustee for the site's former owner funded more than \$1.5 million in assessment and remedial work. Approximately 2,250 cubic yards and a concrete slab were removed from the site. Following closure of the site under the state's cleanup program, the city took ownership of the property to redevelop it into a park.

**Measuring Community Impact:** A primary measure of impact of this project was the creation of 2.7 acres of public green space in this densely developed environmental justice neighborhood. The Nina Scarita Park now offers walking paths, open lawns, picnic areas, a community garden, a basketball court, and playgrounds. The creation of much-needed open space in this densely developed urban area has greatly improved quality of life in this neighborhood.

**Audience for Data:** The audience for information on the land revitalization benefit is widespread. The project relied on liability protection through the Massachusetts Attorney General's office, assessment funding from EPA, and funding for park creation through the state. The Nina Scarita Park project continues to be used as a success story for state and federal programs, and as an example of the effective partnering of the public and private sector.

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**Minneapolis, Minnesota**

**Project Summary:** A former petroleum and solvent storage operation in Minneapolis, Minnesota was redeveloped into a housing development composed of 43 townhomes and 10 condominiums. Soil and groundwater contamination from previous activities on the site was addressed as part of the redevelopment project.

**Site Characteristics and History:** The five-acre site is located in a neighborhood that has been a residential setting since the 1800s. In 1906 the residential area began sharing its neighborhood with a tank farm, consisting of 69 above-ground tanks that contained gasoline, kerosene, fuel oil, lubrication oil, turpentine, and alcohol. The site was decommissioned in 1983 and the tanks removed. Cleanup activities commenced in April 2002 and were completed in April 2003. By November 2005, the 53 units of housing were constructed.

**Environmental Issues and Remediation:** Soil beneath fifty percent of the property contained concentration of petroleum hydrocarbons. Approximately 53,000 cubic yards of contaminated soils were excavated and hauled off-site for disposal. In addition, 200,000 gallons of contaminated groundwater that was perched on top of a shale layer was removed, treated, and discharged into the sanitary sewer. Final soil samples met residential standards, and the Minnesota Pollution Control Agency issued a Certificate of Completion. Because of trace concentrations of petroleum hydrocarbons that remained in the soil and groundwater, vapor barrier systems were installed beneath the townhomes and condominium building.

**Measuring Community Impact:** This contamination cleanup project resulted in the creation of 11 affordable housing units for the community (five on-site and six off-site).

**Audience for Data:** The primary audience for the information was government decision makers focused on economic development, including those in the Governor's office and Minnesota Legislature. The audience also included interested stakeholders in the business community.

**Other Benefits:** The improvement and development of the five-acre site spurred a tax base increase of \$198,410 for the 53 units of housing (48 market rate, 11 affordable units). Total development costs, excluding cleanup, were \$14,794,463 (including \$13,294,463 of private investment).

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**Lackawanna, New York**

**Project Summary:** Tecumseh Redevelopment, Inc.-Steelwinds is a 29-acre parcel located west of Route 5 in the City of Lackawanna, New York. It is part of a larger parcel, known as the former Bethlehem Steel Company's Lackawanna Works, that was used for the production of steel, coke, and related products. Currently, the site houses eight 2.5-megawatt wind turbines.

**Site Characteristics and History:** Fill material on the larger Bethlehem Steel property was impacted by semi-volatile organic compounds (VOCs) originating from a variety of sources associated with the operation of the former steel mill, coal handling, coke manufacturing, and coal tar processing. VOCs encountered at the site – specifically benzene, ethylbenzene, toluene, and xylene – are from past fuel use and coal tar processing.

**Remediation:** Remedial activities included excavation and removal or recycling of solid waste and grossly contaminated soils. The entire site was re-graded and a one-foot vegetated cover put in place. Oxygen release compound socks were installed in selected monitoring wells to passively enhance bio-degradation of naphthalene and benzene.

**Funding:** Site developers received tax credits under the New York State Department of Environmental Conservation (DEC) Brownfield Cleanup Program. Additional information on BCP tax credits can be found on DEC's website at <http://www.dec.ny.gov/chemical/8450.html>.

**Measuring Community Impact:** Steel Winds Project, LLC, entered into a long-term lease agreement with the site owner to construct and operate wind turbines and supporting power generation equipment and infrastructure on the site. The Steelwinds site now captures the constant breezes off Lake Erie and generates enough clean energy to power 7,000 homes.

**Audience for Information:** DEC has posted environmental cleanup success stories, highlighting type of reuse, on DEC's website at <http://www.dec.ny.gov/chemical/50491.html>. The audience for this information includes communities surrounding the sites, the general public, and potential parties interested in the Brownfield Cleanup Program. Highlighting the reuse of Brownfield sites on DEC's website helps to educate the audience about the many possible reuses of Brownfield sites. Also, in light of recent economic conditions as well as interest in developing sustainable practices, posting success stories on the web has the added

benefits of saving costs (e.g., paper, printing, and postage), reaching a larger audience, and reducing the carbon footprint.

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**New York, New York**

**Project Summary:** The Pennsylvania and Fountain Avenue Landfills, located along the edge of Jamaica Bay in New York City, have been remediated under the New York State Superfund Program and properly closed. Native plants have been restored to the sites, which will become a public park. The project was completed under the New York Department of Environmental Conservation (DEC) Inactive Hazardous Waste Disposal Site Remedial Program (State Superfund program).

**Site Characterization and History:** These sites were operated by the New York City Department of Sanitation as landfills in the 1950s and 1960s. The shoreline along Fresh Creek was saturated with oil that was contaminated with PCBs and heavy metals. This contamination leached into Jamaica Bay.

**Environmental Issues and Remediation:** Remedial activities at the sites included capping, leachate and gas collection, and dredging of contaminated sediment. The landfills were capped with an impermeable membrane and covered by millions of tons of sand and topsoil brought in by barge.

**Funding:** Funding was provided by the State Superfund Program and New York City. The Superfund Program is the state's program for identifying, investigating, and cleaning up sites where consequential amounts of hazardous waste may exist. These sites go through a process of investigation, evaluation, cleanup, and monitoring. Additional information about this program can be found on DEC's website at <http://www.dec.ny.gov/chemical/8439.html>.

**Measuring Community Impact:** Once the remediation was completed, New York City began ecological restoration efforts at the sites, planting native tree, shrub, and wildflower species. Eventually, seeds of these species will be spread to other habitats in the New York City area. When the ecological restoration project is completed, the site will be ceded to the National Park Service to become part of the Gateway National Park system. Native plantings have already begun to attract wildlife to the area.

**Audience for Information:** DEC has posted environmental cleanup success stories, highlighting type of reuse, on DEC's website. The audience for this information includes communities surrounding the sites, the general public, and potential parties interested in DEC's remedial programs. Highlighting the reuse of Brownfield sites on DEC's website helps to educate the audience about the many possible reuses of Brownfield sites. Also, in light of recent economic conditions as well as interest in developing sustainable practices, posting success stories on the web has the added benefits of saving costs (e.g. paper, printing, and postage), reaching a larger audience, and reducing the carbon footprint.

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## Milwaukee, Wisconsin

**Site Characteristics and History:** The Menomonee Valley was a vibrant marshland blighted by 125 years of fill and manufacturing. At the corner of 6<sup>th</sup> Street and Canal Street sat an approximately 20-acre underutilized area that included one of the City of Milwaukee's DPW yards, the former Morton Salt Company, and the former Lakeside Sand and Gravel Co. The DPW yard contained numerous USTs and salt storage. Harley Davidson acquired the property in 1995 with known areas of contamination already identified at the site. The 130,000-square-foot, \$95 million Harley Museum complex opened in 2008.



*Before: The DPW yard contained underground storage tank and salt storage.*



*After: The Harley Davidson site following revitalization.*

**Environmental Issues and Remediation:** The property has undergone a complete site investigation. The studies consisted of sampling soil and groundwater across the site. Site investigation activities indicated sporadic, low-level PAH and metals soil impacts and minor metals groundwater impacts likely due to fill material and historic site activities. Chloride impacts in the groundwater and limited petroleum impacts also occur at the site.

The perception of contamination at the site stemmed from the current use of the site as a DPW yard and the remnants of the former salt, sand, and gravel operations at the site. Harley Davidson acquired the property and proceeded to complete the investigations at the site.

In February 2006, the Department of Natural Resources (DNR) approved a remedial action plan for the former DPW yard, Morton Salt Company, and surrounding areas. The plan included chloride source area excavations, as well as the use of proposed buildings and pavement as engineered barriers, natural attenuation to address groundwater impacts, and institutional controls. Now that the site has been fully capped (developed) and groundwater monitoring indicates a stable or receding plume, the site will be placed on the state's Geographic Information System to record any restrictions on the site. Although not required by

the remedial action plan, significant portions of the dock wall were reconstructed, which should enhance the protection of adjacent water bodies.

The project received a \$1.25 million grant from the Department of Commerce's Blight Elimination and Brownfield Redevelopment Program.

**Measuring Community Impact:** Wisconsin is one of only a handful of states to measure impact to the community of land revitalization projects. This particular project expanded cultural and outdoor recreational opportunities for the surrounding community. The \$95 million, 130,000-square-foot museum complex opened in July 2008. It includes exhibits, a restaurant, café, retail store, special events space, meeting space, and 20 acres of outdoor "green space."

**Other Benefits:** The museum will have the equivalent of about 70 full-time employees. The museum is expected to bring 350,000 visitors to the Milwaukee area each year, generate \$78 million in annual spending, and bring in more than \$12.3 million in annual state and local tax revenue.

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## **SUMMARY**

### ***TAX MEASURES***

Seven of the eight case studies report assessed real estate value and increase in property tax revenue as the tax measure. The other case study reports city and county tax revenue but does not allocate the revenue to tax source, so it is impossible to know if the tax was income, sales, real estate or personal property, or some combination of those. In every case, the assessed real estate value or tax revenue increased as a direct result of the clean up and redevelopment. So, the measure at a fundamental level communicates a clear and direct benefit of the projects to any stakeholder.

The assessed real estate value and tax revenue are publicly available information. These measures would be relatively easy and inexpensive to gather for all projects. Since these measures would not rely on voluntary reporting, a complete data set for all projects is possible. A state would then have comparable data on all projects that would allow more detailed analysis and from which broader programmatic conclusions could be drawn.

These two measures would be particularly valuable in communicating with local governments and developers involved with financing future projects. Tax revenue is often used for Tax Increment Financing and repaying principle and interest on bonds that are a part of the funding necessary for cleanup and redevelopment.

Assessed real estate value and tax revenue should be a tool all states use to evaluate the benefits of land revitalization programs. The data are easy to collect, available for all projects, show direct economic benefit of projects, and can be used for analysis of the program.

### ***LEVERAGED RESOURCE/INVESTMENT MEASURES***

Because it sometimes “takes a village,” partnerships among state, local, and federal organizations; community organizations; the private sector; and others can make otherwise-impossible cleanups possible.

In one instance, a partnership was able to leverage hundreds of thousands of dollars from the state environmental agency, city, county, National Park Service, and others to revitalize a contaminated site that had sat idle for decades. In another, a vacant property that once housed USTs and constituted a blight on the urban landscape received a state environmental agency investment of \$90,000 for groundwater assessments which uncovered no signs of contamination from the property. This initial investment sparked a \$3.85 million dollar redevelopment and \$10 million secondary redevelopment of the site. And in a third case, a city-funded site assessment and state-funded cleanup program at a LUST site led to a private investment of \$2 million.

The three case studies in this section illustrate the power of partnership in achieving environmental results.

### ***JOB CREATION MEASURES***

A common goal of state (and federal) land revitalization programs is to make contaminated sites safe for reuse that creates jobs and spurs economic development within the communities in which the properties are located. In recent years, as unemployment has risen to record levels in many states, this goal is more important than ever. In some states the creation of “green jobs” and sustainability initiatives has also become an increasing priority, as states work to promote energy efficiency and reduce waste.

The 12 case studies contained in this section drive home the importance of the measure of job creation in land redevelopment at the state level. With projects ranging dramatically in size, each one demonstrates the tremendous impact land redevelopment has in revitalizing local economies through job creation. As a result

of the cleanup and redevelopment of these sites, numerous construction jobs and permanent jobs have been created, and many jobs have been retained. In one instance, the project also provided job training opportunities for residents of the surrounding community.

As evidenced by these case studies, job creation data that result from this land revitalization measure is widely used by Governors, state legislatures, and other federal and state governing bodies to make important decisions related to recapitalizing land cleanup and incentive programs.

### ***COMMUNITY IMPACT MEASURES***

The six case studies presented represent a fairly broad spectrum of community impacts, which are somewhat challenging to measure empirically. One site details the development of a museum and associated businesses which expanded cultural and outdoor recreational opportunities while generating significant income from visitors. Another site was redeveloped to provide 53 units of housing, including 11 affordable units, which increased the investment in the property as well as the tax base. Others focus on development of green space and public parks. One project led to the development of 25 megawatts of potential wind energy generation, enough to power 7,000 homes, while another project focused on the diversion and reuse of demolition materials which led to 30 jobs, an unquantified reduction in demolition costs, and preservation of landfill volume.

Five of the six case studies involve petroleum contamination, and three of the six sites involve metals contamination. All six case studies address soil contamination and remediation, while only three case studies involve groundwater contamination. Of the three cases involving groundwater contamination, only one case study mentions remediation of groundwater as part of the cleanup process. While most case studies mention volumes of media remediated, few quantify the extent of contamination, and none mention specific risk (either carcinogenic or non-carcinogenic) to human health. Given the potential range of concentrations of contaminants of concern in media, the cost and strategy for remediation, and the volume of media remediated, measuring the benefits of media and contaminants remediated and communicating community benefits is challenging.

### **ANALYSIS: CHALLENGES IN DATA COLLECTION**

Although economic measures of success can tell a very important story in terms of the value of environmental land revitalization programs, collecting and analyzing data can be extremely challenging. Obtaining information from developers is difficult for a number of reasons. For example, one state conducting a survey to obtain revitalization data had staff make numerous attempts to contact representatives of completed projects yet nonetheless received a poor response. The same state has received no response to a voluntary survey on over 20 more recent projects.

The case studies presented in this report focus on four categories of economic indicators: tax measures, leveraged resource and investment measures, job creation measures, and community impact measures.

Of the four, tax measures may be the easiest to collect and analyze. Tax data are easy to obtain (especially if the information is Internet-based), consistently available to the public, show the direct economic benefit of projects, and can be used for analysis across programs.

Leveraged resource and investment measures illustrate the power of partnerships to catalyze a project. The combination of financial and resource investments by a group of organizations can lead to a much better outcome than if any individual group took on the project itself. In many cases, the magnitude of such projects is beyond the means and capabilities of any one group, so without a partnership, nothing would happen. There are excellent examples of how leveraged resources can create the synergy to drive a project forward. However, it may be challenging to consistently quantify the dollar value of the investment of the partners to

make these projects happen. Furthermore, many private developers may be reluctant to release investment data.

Job creation measures are commonly used as measures of success by Governors, state legislatures, economic development agencies, and other state and federal governing bodies to make important decisions. Job creation numbers may not be publicly available but may be available to states through state employment commissions. If job numbers need to be collected from individual employers on a site, data collection can become extremely challenging. In addition, the workforce at a particular site may change over time. It may take months or years for a project to become fully built and staffed, so the job growth continues over the development phases. Conversely, other adverse economic conditions may lead to a decline in jobs over time at a project site. The timing of collection and presentation of this data can be critical to accurately describing the value added from the land revitalization program involvement in the site.

Finally, there are clearly broad economic revitalization benefits in communities and neighborhoods from the work done by land revitalization programs on community projects such as open space, gardens, and recreational lands; cultural attractions; and renewable energy sites. In many cases, cleaning up a site in a common area can lead to renewal throughout a neighborhood. However, these indirect benefits are extremely hard to quantify, and it could take several years to develop the data to document the benefits. For example, when a revitalization project is completed in a neighborhood, it is not until a house is appraised and sells for an increased value that the first data point for renewal is documented. Furthermore, it takes time before an overall document trend in property values can be realized. The much less tangible results are the positive changes that occur in the community as citizens interact in their “new” public areas.

One organization with a large community revitalization project did manage to quantify community benefits, however, by using police call data. Prior to revitalization, the property was subject to vandalism and vagrant use resulting in frequent calls to police. After the project was well established, reports to the police department for the project property ceased, and reports for the area dropped significantly, enabling law enforcement officials to address manpower issues by assigning patrol officers to other areas.

The second phase of this project will look in-depth at the challenges and suggest tools like this one that may be available to land revitalization program managers to measure the success of their efforts in economic terms. The ECOS “states’ toolbox” – assembled by states for states – will recommend methods that can facilitate quality reporting and data collection and foster a cooperative relationship with reporters.

## ADDENDUM

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