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EPA United States Environmental Protection Agency

Building a Sustainable Future

A Report on the Environmental Protection Agency's Brownfields Sustainability Pilots

October 2009

Tabor Commons – Portland, OR

Langdale Mill – Valley, AL

Cleveland Resource Recovery – Cleveland, OH

Green Recreation Center – Laredo, TX

Commercial Street Historic District – Springfield, MO

Introduction

The United States Environmental Protection Agency's (EPA's) Brownfields Program empowers states, communities, and other stakeholders to work together to prevent, assess, safely clean up, and sustainably reuse brownfields. A brownfield is real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or the potential presence of a hazardous substance, pollutant, or contaminant.

Community stakeholders across the country are formulating projects to sustainably revitalize brownfields. EPA supports projects that clean up contamination, preserve existing open space, reduce carbon footprints, reuse existing infrastructure, and revitalize communities.

To encourage and promote sustainable brownfields revitalization, EPA's Office of Brownfields and Land Revitalization (OBLR) funded 16 Brownfields Sustainability Pilots. EPA's support provided site-specific technical assistance to integrate sustainability and brownfields redevelopment at projects across the country.

The report describes each of the Brownfields Sustainability Pilots and provides findings and recommendations for future projects. It is intended for use by people, communities, organizations, and agencies helping make brownfields revitalization greener and more sustainable.

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Overview

EPA's Brownfields Program provides grants and technical support to communities and other stakeholders that are cleaning up and reusing brownfields. In response to requests by grantees and other local stakeholders, EPA's Brownfields Program considered ways to encourage sustainable activities at brownfields projects. In 2008, EPA asked its regional offices to recommend community project proposals for Brownfields Sustainability Pilots. Each applicant could request a maximum of $50,000 in technical support. Communities submitted proposals for a wide range of brownfields properties, including corner gas stations, a closed smelter, a former lumber company town, old textile mills, and an abandoned steel plant. Proposed sustainable activities at the brownfields projects were just as broad including green roof designs, stormwater management plans, green building analyses, parking lot design, solar energy feasibility plans, and reuse of materials from a variety of former operations. The proposals were reviewed and selected based on environmental benefit, project readiness, local capability, feasibility, sustainability, community need, and geographic diversity.

In July 2008, EPA announced 16 Brownfields Sustainability Pilots in 15 communities:

Roxbury, MA	Valley, AL	Laredo, TX
Burlington, VT	Detroit, MI	Springfield, MO
Lynchburg, VA	Cleveland, OH	San Juan County, CO
Allentown, PA	Houston, TX	Samoa Peninsula, CA
Greenville, SC	Oklahoma City, OK	Portland, OR (2)

EPA provided each Brownfields Sustainability Pilot with a consulting team with specialized expertise to address each project's characteristics. The consultants that provided support to the pilots included SRA International, Inc., Tetra Tech EMI, Inc., Vita Nuova LLC, International City and County Management Association, Brownfield Redevelopment Solutions, Inc., and Milestone Associates, Inc.

The Brownfields Sustainability Pilots commenced in July 2008. Each project had an initial scoping period that lasted approximately two weeks, during which the consultants and community worked together to delineate the project scope. The consultants then developed a work plan over the course of a month, after which staff at EPA headquarters reviewed and approved the plans. The consultants made site visits and worked closely with the community and EPA through the pilot duration. The amount of time each pilot required—measured from the kickoff call to delivery of the report—ranged from five to 12 months, with an average pilot duration of nine months. National calls were held to provide pilots with opportunities to collaborate and share information on the projects.

This report provides an overview of each pilot, and analyzes the background, implementation, challenges and considerations, and progress made to date since the project's completion. The pilot summaries are snapshots of each project's progress, reflecting status as of summer 2009. The term "project completed" refers to the Brownfields Sustainability Pilot, and not necessarily the entire redevelopment project.

The report is intended to identify overall best practices and lessons learned, as well as obstacles that communities may have faced in pursuing sustainable redevelopment of brownfields. Many of the redevelopment projects are still underway, propelled by information gained from the Brownfields Sustainability Pilots. For more information on the pilots, including pilot-specific fact sheets and the final pilot reports, please visit www.epa.gov/brownfields/sustain_plts/.

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Jackson Square

Roxbury, Massachusetts

Region 1

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)

At Jackson Square, Urban Edge plans to construct green roofs on each of the 15 buildings in the area. Through the Brownfields Sustainability Pilot, a comprehensive green roof planning report recommending technology, product, vendor, and cost was provided to the community development corporation.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/roxbury.pdf

Aerial view of Jackson Square with development potential for green roofs.

Background

Jackson Square is a 14.5 acre brownfield redevelopment, formerly used for private residences, blacksmithing, gas tank storage, a parking lot, a plumbing warehouse, a correctional facility, and stables. Prior investigations identified lead, arsenic, petroleum, polycyclic aromatic hydrocarbons, non-aqueous phase liquid, antimony, copper, zinc, extractable petroleum hydrocarbon, and urban fill throughout the soil and, occasionally the ground water.

Urban Edge, a community development corporation native to Roxbury, Massachusetts, developed a conceptual plan to install green roofs on each of the 15 buildings in the area. Green roofs have been linked with positive effects such as reducing building heating and cooling costs, extending the lifetime of roofing materials, and reducing the urban heat island effect. In addition, the conceptual plan called for a mixed use residential and commercial area emphasizing greenspace and sustainable street level practices. Finally, the plan also helped satisfy part of the city and state requirements for street level stormwater management. The construction was planned to be completed in four phases; at the time of the pilot, Urban Edge was in the design stage of Phase I.

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Pilot Implementation

Urban Edge's goal for the Jackson Square Redevelopment Initiative is to encourage community involvement and recreation, as well as provide a template for future green roof projects. After the initial site visit in December 2008, the EPA funded consultant evaluated green roof vendors to determine the most cost effective, viable option for Jackson Square. The consultant analyzed different types of green roofs (extensive versus intensive), considerations for each type of roof (stormwater regulations), roof components (drainage layer, filter fabric, growing medium, plant layer, and agricultural alternative), and roof accessories. Green roof vendors, including Roofscapes, Xero Flor, and Green Roof Inc., were compared based on their products, product performance, service traits, and cost estimates.

The consultants presented Urban Edge with a comprehensive green roof planning report with recommendations related to technology, product, vendor, and cost. The four phases of redevelopment could potentially yield more than 95,000 square feet of green roof area when the project is complete. The report highlights the following considerations for green roofs at Jackson Square:

- The roofs should have a minimum retention requirement of 0.5 inches of rain.
- The roof configuration and structure be coordinated among architects and builders.
- Staging the green roof installation with construction will help minimize costs.
- An extended long term maintenance and warranty contract should be obtained.
- Native vegetation should be planted to attract local and migratory birds.
- Additional programming interests for the site should be set.

As recommended in the consultant's report, Urban Edge should choose a full service vendor for the green roof installation. Even if Urban Edge selects the vendor offering the most complete array of services of the three vendors evaluated, it will still need to coordinate the roof contractor and vendor designs.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- New construction on sites larger than one acre must comply with the Massachusetts Department of Environmental Protection stormwater management guidelines. These principles define the quality and peak flow discharge of stormwater. Since green roofs reduce the need for stormwater treatment on the ground, they are a favorable alternative to traditional construction.
- Green roofs require substantial infrastructure reinforcement, so the green roof design and installation contractors must ensure the systems are installed with appropriate rooftop loading capacities, roof slopes, and space availability. The consultant considered relevant building characteristics in recommending the optimal green roof system and vendor.

Progress Since Pilot Completion

Since receiving the green roof planning report in May 2009, Urban Edge completed structural analyses of the buildings onsite. Originally, Urban Edge assumed the green roof would cover about 70 percent of the roof space. When it conducted the structural analysis, it decided to be less conservative and assume 100 percent of the roof space would be covered with the green roof. The structural report revealed that covering the entire roof space would be cost prohibitive and require substantial structural reinforcement. It also verified the original assumption that the roof could support 70 percent green roof surface coverage. Installing the green roof as currently planned will require minor structural reinforcement.

Since May 2009, Urban Edge issued a request for proposals from green roof contractors who use an extensive grid system, based on the consultant's report. Of the five bids received, four bids proposed using extensive systems and one bid proposed using a tray system. Visit Urban Edge's Web site at http://www.urbanedge.org/green-housing.php for more information.

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Moran Center at Waterfront Park

Burlington, Vermont

Region 1

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)

The Community and Economic Development Office (CEDO) of Burlington, Vermont, is revitalizing a brownfield as a sustainable community center. Through the Brownfields Sustainability Pilot, CEDO received assistance with green infrastructure design, green building design, and wetland restoration for the Moran Center at Waterfront Park.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/moran.pdf

The Moran Center, Burlington, Vermont.

Background

The Burlington Electric Department operated a coal fired electric generating facility at the Moran Center site from 1953 to 1986. Railroad, lumber, and petroleum businesses also occupied the land. Using other EPA funding, the Chittenden County Regional Planning Commission conducted Phase I and Phase II Environmental Site Assessments (ESA) that revealed trichloroethylene in the soil and ground water as well as polycyclic aromatic hydrocarbons, lead paint and asbestos in building materials. The Moran building was built with intake and outflow sluiceways to utilize lake water to cool the former power plant. Other EPA funds will be used to close off the sluiceways permanently separating the building from the lake, and to develop a cleanup plan for the interior of the Moran building.

The City of Burlington hired an architecture firm to develop detailed schematic drawings and estimate construction costs to repurpose the Moran building. In early 2008, the Community and Economic Development Office (CEDO) of Burlington issued a redevelopment plan, *Moran Center at Waterfront Park: Guide to the Redevelopment of the Moran Plant*, which proposes that the site be designed as an extension of the waterfront park with improved pedestrian, bicycle, transit, and vehicle amenities, and serve as a mixed use community center. Some of the proposed programming components include a children's splash park, a skating rink, a remodeled

skate park, a rock climbing wall, the first indoor ice climbing wall in North America, the Green Mountain Children's Museum, an expansion of the Community Sailing Center, and other community amenities.

Pilot Implementation

On October 23, 2008, an EPA funded consultant team visited the site and worked with CEDO to develop green infrastructure, green building, and enhanced wetland design recommendations for the property's revitalization. The consultants recommended over 15 site specific approaches for incorporating green infrastructure, including restoring and protecting shoreline buffer and wetland zones; separating vehicular, bike, and pedestrian circulation; using porous paving and tree structural cells to reduce runoff; and using native plants to minimize watering and mowing. The final report includes six technical diagrams highlighting site zones and parcels, a Phase I plan, a long range plan, roads and parking, pedestrian walkways, and a tree and bioswale plan.

The consultant team's recommendations for green building design include over 30 approaches related to natural lighting and ventilation, incorporating a greenhouse, energy efficient mechanical heating and cooling, and other techniques for reducing the site's carbon footprint. The consultants also recommended an approach for wetland restoration that balances the perspectives of ecological, engineering, planning, and user stakeholders: combating the common reed (Phragmites australis) by shading the area and establishing a swamp forest ecosystem. The final report describes and estimates a budget for a feasibility analysis, conceptual and schematic ecosystem restoration design, development of design and construction documents, and construction.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- CEDO intends for the Moran Center to be known as a sustainable site and a community center. The consultants suggest developers and engineers use an integrated design approach to incorporate sustainable features in all phases of development. Cost effective and feasible sustainability strategies must be identified before construction begins.
- The final site plan must integrate and balance ecological, engineering, and development considerations. For example, the wetland restoration plan must balance the need for habitat creation with the need for water management.
- Incorporating sustainable design features while maintaining the brick exterior and other historic qualities of the Moran Center will require additional planning (e.g., the building will be insulated from the inside).

Progress Since Pilot Completion

The Moran Center project has received additional funding from the Burlington City Council ($46,000) to design, engineer and estimate the costs of improvements to the site around the Moran Center. The dams have been constructed permanently closing the "sluiceways" that once brought lake water into and out of the Moran building as part of the electric generating process. The U.S. Army Corps of Engineers worked with CEDO to dewater the Moran Center basement allowing assessment activities to be completed, and a $100,00 technical assistance grant from Vermont's Department of Environmental Conservation funded the removal of debris and sediments inside the former electric generating station.

In August 2009, the City of Burlington received an additional $3 million in financial support from the U.S. Department of Housing and Urban Development to continue redevelopment of the Moran Center. Once all cleanup activities have been completed, CEDO plans to build an 8,000 square foot gravel wetland to process stormwater. The Moran Center plans to apply for Leadership in Energy and Environmental Design certification.

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The Waterfront

Allentown, Pennsylvania

Region 3

(Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia)

A former steel plant is being revitalized as a publically-accessible waterfront site along the Lehigh River. Through the Brownfields Sustainability Pilot, low impact development (LID) stormwater management techniques were developed for the site.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/waterfront.pdf

Local developer Dunn Twiggar documents the current business operations at future Waterfront redevelopment site. Photo Source: Dunn Twiggar, LLC.

Background

The Waterfront site is located on a 26 acre brownfield on the west bank of the Lehigh River, in Allentown, Pennsylvania. Formerly a steel plant, the site is now occupied by multiple tenants. The site developer is planning a mixed use redevelopment at the property, with site construction to begin when the current tenants' leases expire, in approximately two years.

Separate from the Sustainability Pilot, EPA sampled the soil and ground water and found volatile organic compounds, manganese, and iron in the ground water, as well as lead, cadmium, and zinc in the soil.

The public does not currently have access to the riverfront via the property. Revitalization of the property would promote the historical, cultural, and environmental prominence of the Lehigh River. The developer plans to integrate low impact development (LID) stormwater management in the redevelopment plans, and is considering other environmentally sustainable systems such as demolition debris reuse.

Pilot Implementation

The EPA funded consultants visited the site in December 2008 to gather initial topographic information, collect field data, and meet with the site's developer, the Lehigh Valley Economic Development Corporation, and

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officials from local agencies. Based on these meetings, EPA and local officials decided that the Brownfield Sustainability Pilot project would focus on incorporating LID techniques into the redevelopment plan and enhancing the riparian buffer along the Lehigh River.

EPA's consultants developed conceptual design drawings for LID practices accounting for four potential constraints: the site's master redevelopment plan; soil and ground water contamination; floodplain construction; and riverbank limitations. The LID systems were categorized into erosion and sediment control practices, riverfront features, and site redevelopment features.

Consultants recommended specific techniques for erosion and sediment control such as silt fences, turbidity barriers, sedimentation basins, inlet protection for controlling sediment during construction, and using an erosion control blanket and a buffer zone with temporary seeding.

Because of the site's location along the Lehigh River, the Waterfront property is considered ideal for recreation. The riverwalk is a prominent feature of the redevelopment plan and the consultants recommended riverbank features that include soil bioengineering techniques to naturally reinforce bank slopes, a living wall system, naturalized detention areas with wetland vegetation, infiltration trenches and filter strips, and a riverwalk with pervious pavement.

Consultants also recommended three large scale sustainable site redevelopment features: pervious pavement, bioretention areas (rain gardens and vegetated swales), and green roofs, in addition to cisterns and rain barrels. These techniques will minimize the creation of impervious areas, maximize stormwater infiltration, and reduce stormwater runoff.

In their report, the consultants also suggested ways to enhance the project's success, including: (1) a shoreline tree survey of vegetation species to determine which trees could be removed and the potential need for riverbank stablization; and (2) a geotechnical investigation of soil permeability and stability to identify technical requirements for constructing the LID stormwater management system.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The existing ground water and soil contamination limits the LID stormwater systems that would be suitable for the property. In pursuing site cleanup, stakeholders should consider removing contaminants, installing a cap, or inserting clean soil into the current mix.
- The master redevelopment plan was developed prior to the Brownfields Sustainability Pilot and includes one million square feet of residential, retail, and office use. None of the proposed LID stormwater techniques will require changes to the plan.
- A portion of the Waterfront property is located in the 100 year floodplain zone, thus development must address high water level conditions and permitting issues. To develop a stormwater system, the developer will have to obtain a water obstruction or encroachment permit from the Pennsylvania Department of Environmental Protection.
- Although the riverbank is steep and narrow, it is currently stable due to the large trees and vegetation that are present. Future stormwater management will need to be designed to avoid disrupting this equilibrium and endangering the stability of the shoreline.

Progress Since Pilot Completion

There is a large scale revitalization plan for properties along the Lehigh River, including the Waterfront property. In addition, the City of Allentown is considering potential sites for a planned hockey arena in this area, and has considered the Waterfront property. If used for a sporting complex, the Waterfront property will still be able to use many of the recommendations from EPA's technical assistance.

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Allen-Morrison

Lynchburg, Virginia

Region 3

(Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia)

The City of Lynchburg plans to create a public park at the Allen-Morrison site. Through the Brownfields Sustainability Pilot, the city developed a material reuse inventory tool and performed a deconstruction feasibility assessment for the Allen-Morrison and Thornhill facilities.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/allenmorrison.pdf

Allen-Morrison facility in Lynchburg, Virginia.

Background

The Allen-Morrison site comprises multiple buildings previously used to manufacture goods such as wagons and metal signs, including the Allen-Morrison facility (buildings totaling 87,800 square feet) and the Thornhill facility (buildings totaling 86,400 square feet). Since 1996 when the property was abandoned, Lynchburg has been planning to redevelop the area as a public park that includes a community center, playground, and picnic areas. The city also wants to facilitate citizens' connections to the city stadium and *Lynchburg Grows*, a nonprofit urban farm, through this redevelopment. *Lynchburg Grows* hopes to demonstrate the importance of green, healthy living as well as local agriculture, through the project.

The Virginia Department of Environmental Quality (DEQ), through the Voluntary Remediation Program, conducted Phase I and Phase II environmental assessments on the Allen-Morrison site using EPA funding. The assessments revealed soil contaminated with metals and semivolatile organic compounds. Additional soil and ground water tests are currently being conducted utilizing EPA funding. Virginia DEQ will be instrumental in directing additional funding and support after the pilot is completed.

One of the city's primary goals for the project is to engage the community by providing an opportunity for education and community interaction at the park. The site redevelopment is intended to be a catalyst for similar

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sustainable initiatives, revive the site history, and stimulate the local job and volunteer market.

Pilot Implementation

To pursue its sustainability goals, the City of Lynchburg sought technical support from EPA to conduct an inventory of site materials that may be appropriate for reuse and recycling. The EPA funded consultant visited the site in November 2008 and reviewed the existing due diligence resources including maps, site plans, and estimates of hazardous materials. A local lumber salvage company representative conducted a follow up visit. The Allen-Morrison and Thornhill facilities were surveyed to determine the type and amount of reusable and recyclable materials. The EPA consultant also developed a material reuse inventory tool to collect information on material weight, quantity, and other measurements, as well as the approximate cost of lumber, metal for scrap use, and other available reusable items.

The consultant performed a deconstruction feasibility assessment for each of the facilities to measure indicators such as building condition and safety; building dimensions, accessibility, and complexity; entanglement; asbestos and hazardous materials; materials and salvage potential; mobilization; garbage; and labor.

The assessment determined that deconstruction of the Allen-Morrison facility would not be cost effective, and that demolition followed by mechanical separation of demolition debris into recyclable materials would be more appropriate. The assessment determined that portions of the Thornhill facility were more suitable for deconstruction, and that, in particular, building 7A had high potential for salvageable value. Some materials possess an industrial heritage and could be reused to revive citizens' appreciation for the site's history (e.g., onsite reuse of sliding doors, skylights, paint mixing vessels, sprinkler systems, metal signs, shelving units, as well as other equipment and machinery). The pilot report provides an approximate cost for these recommendations; however, local developers, engineers, industrial representatives, and vendors should further evaluate the reuse potential.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The city was not experienced in large scale deconstruction projects. The city developed innovative, creative solutions to plan for a deconstruction project of this magnitude and the city is now demonstrating the feasibility of future large scale deconstruction projects.
- The EPA consultant originally planned to develop a deconstruction materials inventory for the Allen-Morrison and Thornhill facilities, but the feasibility assessment results indicated that only one inventory was needed.
- The consultants could not access and assess all of the materials in the facilities, so they could not determine the exact quantities suitable for reuse.
- The consultant estimated the potential salvage value of materials based on discussions with local vendors and businesses. However, these values can change based on salvage markets and did not include transportation costs, lending some uncertainty to the analysis.

Progress Since Pilot Completion

The city asked EPA for additional assistance to prepare bid documents for deconstruction based on the consultant's materials inventory and recommendations. EPA granted this request and the city is scheduled to complete the bid documents in late 2009.

Virginia DEQ acquired funding from EPA to finish site assessment activities at the Allen-Morrison and Thornhill facilities, including soil and ground water sampling, which is expected to be completed by December 2009.

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Greenville Workforce Housing

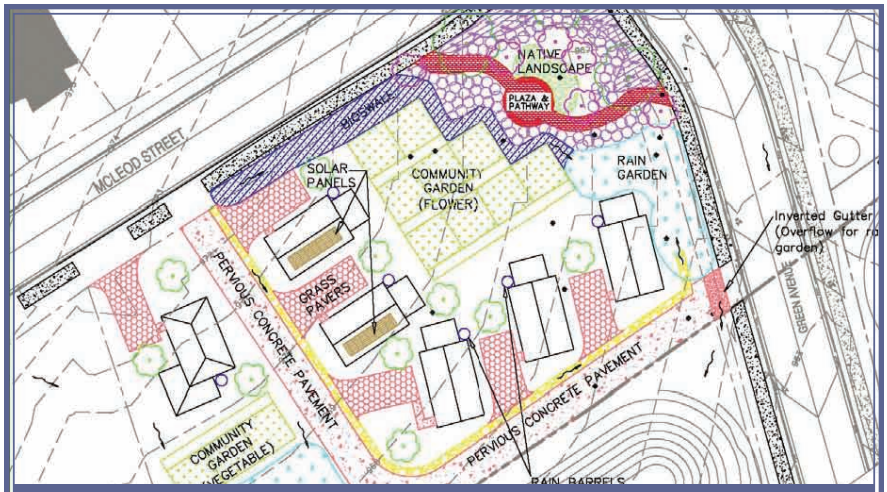
Greenville, South Carolina

Region 4

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee)

The City of Greenville plans to redevelop a brownfield into affordable housing units. Through the Brownfields Sustainability Pilot, the city developed sustainable design concepts for the site and will promote healthy living and sustainable redevelopment at similar sites.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/reports/GreenAvenueSites_TechMemo_08_09.pdf



Site design with low impact development features for the Greenville Workforce Housing project.

Background

The Greenville Workforce Housing project is a one acre brownfield, located on the corner of McLeod Street and Green Avenue, in Greenville, South Carolina. The vacant lot previously housed a gas station and a supermarket and had nine underground storage tanks (USTs), an above ground storage tank (AST), and a 6,250 square foot building containing asbestos. The USTs and AST were removed in 2009 and all structures were demolished.

Soil and ground water sampling identified several contaminants at the site, including benzene, toluene, ethylbenzene, and xylenes, methyl tertiary-butyl ether, ethylene dibromide, and naphthalene. Based on contaminant concentrations, monitored natural attenuation was selected as the remedy for the site.

The city's movement towards healthy, sustainable, and affordable workforce housing will reduce impacts from stormwater discharges and promote the project as a replicable model in other communities. Before requesting EPA assistance, the city formulated redevelopment goals and preliminary site plans. The city requested EPA assistance with recommending sustainable redevelopment features. In addition, the city hopes that by integrating sustainable features, the project will be more marketable to developers.

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Pilot Implementation

During the site visit in May 2009, the EPA funded consultant evaluated existing city plans and observed site conditions. The consultant delivered a conceptual site design that included six detached, single family units. The homes are planned as two level, 1,000 square foot units, each with a parking space. In addition, the conceptual site design included sustainable development practices including: erosion and sediment control, infiltration trenches and filter strips, pervious pavement, rain gardens, bioswales, rain barrels, community gardens, solar panels, soil amendments, downspout disconnects, native landscaping, compost bins, curb and gutter cuts, planter boxes, and vegetated curb extensions to sidewalks and curbing. Where possible, these recommendations also came with specific guidelines and design details for optimally implementing the sustainable features.

To facilitate more detailed design and full integration of green and sustainable design features, the consultant also recommended a geotechnical investigation for soil permeability and sizing green features for stormwater management. Using the site as a demonstration project and monitoring its benefits was also recommended.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- Because the city plans to construct a dry pond on a portion of the site, build new curbs and sidewalks, and expand sanitary sewer lines, the consultant developed the plan for the remaining portion of the site and avoided suggestions that would require changing the city's plan.
- The City of Greenville proposes similar redevelopment at the nearby Bell Furniture site, and at the time of the pilot project, the city was in negotiations to develop properties close to the Green Avenue site. Therefore, the consultant considered potential expansion and replication of the site plan when recommending sustainable techniques.
- The city monitors 18 wells on the property as part of the natural attenuation remediation plan. The consultant developed a site plan that would provide continued access to these wells.
- During the pilot project, a key city representative who had originally spearheaded the project, left the city. The project's progress slowed as the remaining city staff took over project responsibilities.
- Due to environmental issues at the property, the city has had challenges with finding a developer. Equipped with the pilot report, the city hopes the project will be more enticing for developers. The city also hopes to increase home ownership in the neighborhood, and plans to identify buyers to purchase the units once the project is complete.
- Often, local ordinances and lack of knowledge by stormwater management authorities can present obstacles when designing for and installing sustainable stormwater management features such as bioswales and rain gardens.

Progress Since Pilot Completion

The city is in the process of identifying a developer for this small scale residential development. The city allocated funds for the project and once it finds a developer, will be ready to start construction within two weeks. The project could be completed as early as summer 2010. The city will work with the developer to determine which of the consultant's recommendations to implement. The city also acquired other vacant properties in the surrounding area and is working to create a market for residential development. The city demolished a number of abandoned homes and is building new houses on the lots, which are located half a mile from the new baseball stadium.

Langdale Mill

Valley, Alabama

Region 4

(Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee)

The City of Valley is revitalizing the Langdale Mill to include mixed uses and recreational space. Through the Brownfields Sustainability Pilot, the city developed an inventory of potential reusable or recyclable materials at the Langdale Mill that may be used in the site's redevelopment.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/reports/langdale.pdf

View from the roof of the Langdale Mill.

Background

Langdale Mill is a 500,000 square foot former textile mill. The mill operated in Valley from 1860 to the late 1990s as a textile manufacturing facility, employing many local residents. The property is located along the Chattahoochee River, half way between Montgomery, Alabama, and Atlanta, Georgia. Starting in 1999, the City of Valley held visioning charrettes and discussions to determine a redevelopment strategy for the mill site. Participants in these meetings suggested redeveloping the textile mill into a recreation site by building a canoe trail and other features. The city partnered with Auburn University and an architect to conduct feasibility studies and renderings. Students enrolled in the University's economics classes consulted on ways to incorporate mixed use development into the mill site, such as building office space and a food co-op.

The City of Valley received two EPA Brownfields grants: a 2007 Assessment grant and a 2008 Cleanup grant. Both address contamination concerns at the mill. The city consultants on these grants provided assistance to the Brownfields Sustainability Pilot. The city hopes the project will encourage sustainable development, as well as generate local jobs and promote the site's history of industrial prowess.

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Pilot Implementation

The EPA funded consultants for the pilot project worked with the city to generate a material reuse inventory tool. The consultants worked with the city, Brownfields grant consultants, and local stakeholders to establish the scope of the field survey and reviewed existing development plans and maps. In October 2008 and February 2009, the EPA consultants surveyed several structures on the site including five warehouses, a rooftop air handling unit, and aboveground storage tanks.

The inventory tool was used to document and organize survey findings, including quantities and potential value of the agreed-upon materials, including lumber, metal for scrap or reuse, brick, concrete, and other items with value or industrial heritage. The inventory demonstrated that with deconstruction of the mill facility, an estimated 109,000 board feet of lumber, 290,000 pounds of metal, and 63,000 bricks could be recovered for recycling and reuse. Combined, these materials have an estimated value of $150,000. The consultants also conducted a mill deconstruction feasibility assessment, during which they assessed: building condition and safety; building dimensions, accessibility, and complexity; entanglement; asbestos and hazardous materials; materials and salvage potential; mobilization; garbage; and labor.

After developing the inventory of materials and deconstruction feasibility assessment, the consultants suggested options for sale or onsite reuse of the materials. Because the inventory and pilot report discusses the potential resale value of each material and alternatives to selling the items, the city can consider alternative uses of the deconstructed materials before recycling or disposal. For example, lumber could be sold, but reusing the boards onsite could promote sustainable development or create jobs if reused in an onsite furniture shop.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The consultants asked local salvage vendors to help estimate costs and values, quantity conversion factors, and units. However, transportation costs and market fluctuations may change the potential value of the materials.
- Consultants had to use computer aided design site drawings to estimate the dimensions of some inaccessible materials and to supplement field measurements, adding uncertainty to the assessment.
- The City of Valley may require additional funding to implement the consultants' recommendations; however this cost may be partially offset by the potential value of the materials if they are sold or recycled.

Progress Since Pilot Completion

The community used Brownfields grants to perform an inventory, remove above ground storage tanks, and stage future removal work. The city incorporated pilot recommendations into its redevelopment plan and into a request for proposal (RFP) to identify a contractor to deconstruct and redevelop the site. Located within an historic textile mill corridor, the city is working with Alabama's tourist board to acquire funding for a Web site. It hopes the Langdale Mill will serve as a model for similar projects. The city started a Farmers Market at Langdale Mill, giving citizens access to locally grown produce, and drawing attention to the opportunity for mixed use redevelopment.

Auburn University is interested in using the mill site for continuing education classes, conference space, and a hotel, and is negotiating with the city for use of the site for automotive job training with Kia Motors. The city plans to redevelop a mill house as a bed and breakfast as a prototype for redevelopment, and seek Leadership in Energy and Environmental Design (LEED) certification. The city would like to conduct a green building analysis for additional buildings onsite.

Green Streetscapes – Focus: HOPE

Detroit, Michigan

Region 5

(Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin)

Focus: HOPE is revitalizing a number of brownfields in Detroit, Michigan, along Oakman Boulevard. The nonprofit used the Brownfields Sustainability Pilot to develop stormwater management and sustainable streetscape designs to sustainably connect the brownfield revitalization projects.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/reports/Streetscapes_Final_7_31_09.pdf

Example of curb extension for Oakman Blvd.

Background

Focus: HOPE, a civil and human rights organization based in Detroit, Michigan, is redeveloping several brownfield properties in the Central Woodward/North End neighborhood of Detroit. These properties were used for industrial and commercial purposes including metal fabrication, warehouses, and a service station, and are all located along Oakman Boulevard, an arterial road with existing utility infrastructure. Focus: HOPE plans to build a new park at the intersection of Oakman Boulevard and Woodrow Wilson Avenue. It also plans to build a new three story residential complex for afforadable housing and redevelop an existing historic commercial high rise into a mixed use building.

Focus: HOPE is acting both as the community organization and developer. It intends for this project to be a catalyst to revitalize the neighborhood and promote sustainability beyond individual brownfield properties.

Pilot Implementation

EPA funded consultants visited the site and met with community stakeholders to refine the project scope and develop a work plan. They agreed that the pilot report would evaluate the application of green streetscape components at the brownfields located along Oakman

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Boulevard. Consultants defined green streetscapes as "those which adhere to well established standards of sustainable design" and included six design objectives in the pilot report: improve air quality; reduce heat island effects; improve water quality; enhance the urban forest and wildlife habitat; reduce light pollution; and mitigate/rehabilitate brownfield conditions. The consultants then identified green streetscape design guidelines and prepared project concepts to meet the six objectives. The consultants surveyed the existing utility infrastructure, site features, remaining soil contamination, and existing stormwater management to inform the application of the green streetscape standards to the project site.

The consultants developed a conceptual design for the project area along Oakman Boulevard that takes the environmental conditions of the property into consideration and includes specific construction guidance for areas where the planned redevelopment meets the street. The resulting stormwater management and streetscape designs serve as a prototype for other streetscapes in the area or streets elsewhere that reside within similar contexts. The pilot study also provides technical specifications and construction details, which help designers begin to develop construction documents for implementation within the Focus: HOPE redevelopment area.

The consultants' design is expected to improve street conditions by reducing the quantity of stormwater and increasing the quality of stormwater leaving each site by incorporating permeable paving, stormwater planters, curbs extension, rain garden, curb inlet trench gate, and scored concrete. The consultants recommended three design concepts that modify the width of a new center median and use of a standard/infill crosswalk.

Focus: HOPE plans to use the pilot report for site specific redevelopment, as well as a tool for presenting its proposal to the City of Detroit. Therefore, the consultants delivered two versions of the report. One version included introductory text and graphics of the proposed designs, which could be used for posting on the internet or other distribution medium. The second version recommended the specific site design plan, and will be used to move forward with project implementation.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The site's redevelopment and stormwater systems must accommodate existing infrastructure such as cable vision and gas lines.
- Nonprofit developers, such as Focus: HOPE, often have limited capital for community development and must combine different sources of funding to cover the entire project cost (e.g., government funding and private funding such as grants from foundations, equity investments, and market rate loans).
- At the community's request, the consultants redefined the original pilot project scope from green building design to focus on stormwater management and green streetscape design. This change allows for sustainable connectivity between the proposed park and residential buildings, as well as connections with the broader fabric of the neighborhood.

Progress Since Pilot Completion

Focus: HOPE shared the study with City of Detroit staff and is working to secure support from city officials for project implementation. Redevelopment on the four properties within the project scope is slowly progressing, despite a difficult affordable housing market. As the properties redevelop, Focus: HOPE intends to implement recommendations from the study for site stormwater management, native landscaping, and green streetscapes elements to the extent both financially and operationally possible.

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Cleveland Resource Recovery

Cleveland, Ohio

Region 5

(Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin)

Through its Deconstruction Initiative, the City of Cleveland deconstructs and demolishes buildings at vacant properties across the city each year. To improve sustainability and reduce the amount of waste generated through this initiative, the city used the Brownfields Sustainability Pilot to evaluate lessons learned from past deconstruction projects.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/cleveland.pdf

Deconstruction activities of a home in Cleveland.

Background

There are a large number of vacant properties in Cleveland, Ohio. Since 2005, demolition of vacant properties increased from 195 demolitions per year, to 1,139 demolitions per year in 2008. Continuing this trend, in 2009, approximately 1,700 abandoned buildings are slated for demolition.

In Cleveland, demolition debris and construction waste are among the largest contributions to landfills. In response, in 2007, the city began its Deconstruction Initiative, which promotes deconstruction of buildings and the reuse of materials found in those buildings, rather than conventional demolition. The city is taking a proactive approach to increase the diversion of recyclable building materials from the waste stream through deconstruction.

The city is determined to improve on its past deconstruction projects and identify "lessons learned" to apply to future projects. Through the Brownfields Sustainability Pilot, the city requested technical assistance with identifying lessons learned for deconstruction at specific brownfield sites. The city will apply the lessons learned from these sites to its city-wide deconstruction and demolition efforts.

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Pilot Implementation

EPA funded consultants worked with the City of Cleveland, a materials reuse company, city contractors, a nonprofit workforce development program, and other stakeholders to establish project goals. They discussed opportunities to increase material reuse and to promote environmentally sustainable demolition and deconstruction practices. In the final pilot report, the consultants delivered a summary of Cleveland's goals, five categories of lessons learned, and potential mitigating strategies for improving the Deconstruction Initiative. The categories of lessons learned are: procurement, contract specifications, participation, portfolio management, and materials marketplace.

Consultants recommended that the city improve its procurement process, in part by establishing a construction and demolition (C&D) waste management plan, adopting improved C&D procurement regulation language, and integrating deconstruction goals and requirements into contracts. Among the lessons learned, consultants recommended that contract specifications be improved by ensuring all contracts and bid specifications include deconstruction requirements, allowing bundling of deconstruction projects to allow contractors to submit more competitive bids, and increasing the flexibility of permits and regulations.

Consultants also recommended increasing participation in the initiative through a variety of outreach and networking opportunities, and by providing incentives to local foundations and minority job training programs who participate in deconstruction. The lessons learned related to portfolio management included encouraging the immediate salvage of materials from vacant buildings to prevent vandalism, and recommendations related to establishing and managing "abandoned building" programs. Finally, recommendations specific to improving the deconstruction process were provided.

The city plans to use the lessons learned at the growing number of vacant properties across the city. If successfully implemented, the city may demonstrate its growing experience in incorporating deconstruction techniques into demolition and brownfields redevelopment and improve its chances for securing additional funding for the initiative. To support long term success, the city intends to formulate performance targets for C&D debris diversion, educate residents on personal remodeling projects, and establish "design for deconstruction" criteria for new construction.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The city is seeking opportunities to better involve the general public and appeal to private innovators and investors. As discussed in the pilot report, some regulations could be amended to encourage deconstruction and provide incentives to developers. Though implementing the lessons learned and completing more deconstruction projects may take time, it will help the city collect needed data to demonstrate results.

Progress Since Pilot Completion

The city is determining how to integrate the lessons learned from the pilot report into its deconstruction activities and it hopes to incorporate some of the site-specific recommendations into a program. Meanwhile, EPA Region 5 staff is developing a register of sustainable activities in the region, which may include the city's Deconstruction Initiative, since it demonstrates a sustainable and proactive approach to vacant property. Cleveland's approach could become a model for other deconstruction and vacant property programs.

Houston Solar Project

Houston, Texas

Region 6

(Arkansas, Louisiana, New Mexico, Oklahoma, and Texas)

The City of Houston is planning to build a 10 megawatt solar farm on a former landfill. Through the Brownfields Sustainability Pilot, the potential environmental, economic, and engineering considerations associated with developing a solar farm site design were analyzed.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/houston_solar.pdf

Aerial view of proposed solar panels on the Holmes Road Landfill.

Background

The Holmes Road Landfill comprises 300 acres near downtown Houston, Texas. The landfill was closed in the 1970s, and was subsequently capped. Over the past 30 years, developers and contractors proposed a variety of plans for the property, including a golf course and office space.

The City of Houston believes the site to be an optimal location for a solar farm, as it is expected to improve environmental quality locally and regionally, improve residents' safety, promote the site's heritage, and highlight the city's sustainability efforts at a highly visible location. Redeveloping the site will support local economic development objectives by providing Houston an opportunity to enter the emerging solar power market.

The city is interested in purchasing thin film solar panels from Applied Materials or an equivalent production line, which produces panels four times the size of conventional processes. It requested technical assistance with recommending the optimal system and design of a solar farm.

Pilot Implementation

During the field visit to the landfill, an EPA funded consultant met with the city and other stakeholders. Consultants recommended that the solar farm

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be built on the southern half of the landfill. Before building, the city must clear and grade the site, ensuring not to disturb the cap or expose any contamination. In addition to the site visit, consultants completed a regulatory assessment of all federal Resource Conservation and Recovery Act, state, and local solid waste requirements. Through the regulatory interpretation, consultants determined the proposed solar power farm is classified as a nonenclosed structure.

Consultants evaluated the system's design, wind loading, and other characteristics that will be affected by conditions at the Holmes Road Landfill. They concluded that the landfill solar power farm should install fixed tilt (30 degrees) mounting structures with amorphous silicon thin film modules.

After determining the optimal system and type of panels, consultants considered the spacing, panel alignment, required inverters for conversion from DC to AC power to allow power to be transmitted into the grid, and photovoltaic (PV) equipment specifications. They conducted a PV generation output analysis and estimated that project could generate over 12,500,000 kilowatt hours annually, equivalent to 1 percent of Houston's municipal electrical needs. Consultants estimated the construction and energy costs for the solar farm at between $4.40 and $5.90 per watt, with total project costs ranging from $44 to $59 million. The consultants recommended specific strategies the city could use to pursue development of the solar power farm. After a third party develops the solar power farm, the city plans to purchase the solar power that is generated through a power purchase agreement with a local electricity supplier.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The landfill is only visible on three sides from the road, has overgrowth that prevents walking the site, and is mostly inaccessible by foot. However, the field visit provided the information to develop requirements for the project.
- Developers must use extreme caution to not disrupt the landfill cap, especially when clearing and grading the site. Since photovoltaic systems vary in weight, foundation, and structure, developers must choose equipment and installation methods least likely to penetrate the cap.
- Developers must consider the differential settlement of the landfill surface.
- A park borders a portion of the landfill and the Regional Brownfields Program proposed expanding the park into part of the landfill. The site is large enough to sustain both uses.

Progress Since Pilot Completion

Since the pilot report, the city distributed a RFP and received bids from 11 companies. In September 2009, the city selected NRG Energy Inc. to develop the solar farm. After designing and building the solar power farm, NRG will enter into a long term power purchase agreement with the city where it will sell the solar generated power.

In addition to the RFP and power purchase agreement negotiations, the city is developing a master plan for the Holmes Road Landfill to include three primary uses: the solar farm, the park expansion, and a botanical garden. The EPA funded consultants originally suggested 150 acres would be needed for the solar farm, but the city believes that only 100 acres are needed based on recent technological advances.

Building from this project, the City of Houston identified other locations with potential to develop 10 megawatt solar farms. The city believes a project at a waste water facility may be cost effective, since generating the power onsite will reduce its energy demand and provide the facility with power in the event of a hurricane or other emergency when all other power sources are shut down.

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Community Center Rooftop Garden

Oklahoma City, Oklahoma

Region 6

(Arkansas, Louisiana, New Mexico, Oklahoma, and Texas)

The Latino Community Development Agency (LCDA) is constructing a new headquarters building and was planning to incorporate a rooftop garden to help connect local residents to nature. LCDA used the Brownfields Sustainability Pilot to evaluate the feasibility of building a green roof.

View the fact sheet for this project at: www.epa.gov/brownfields/sustain_plts/factsheets/com_ce_spfs.pdf

Example of a green roof. Photo source: Green Grid Roofs.

Background

The Latino Community Development Agency (LCDA) provides community programs for children, youth, and adults in Oklahoma City, Oklahoma. The city helped LCDA acquire a property with a former retail building for its new headquarters. LCDA requested EPA assistance with incorporating a green roof into the reconstruction of the building, which was vacant since the1980s.

LCDA wants to expand its current programming. It plans to use the new headquarters building to provide community services such as healthcare, daycare, senior services, and social services. Because the facility is expected to be heavily used, LCDA sought support to develop a rooftop garden that could incorporate some of the program activities while providing people with a greater connection to nature.

Pilot Implementation

EPA funded consultants met with city stakeholders, LCDA, a professor at Oklahoma University, an architect, and a contractor to assess the feasibility of installing a green rooftop on the new LCDA headquarters building. As a first step, a local green roof expert evaluated wind and sun conditions to determine the building's constraints. The consultant also analyzed the

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potential for installing a blue roof, which is a roof that stores water to eliminate stormwater runoff and cool the building.

Through these early discussions facilitated by the EPA consultant and LCDA, and the initial constraints analysis, experts determined that the building was unsuitable for a rooftop garden, as well as a blue roof, due to structural constraints. The building and existing roof structure was not able to support the additional weight associated with a green or blue roof.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- LCDA originally considered using the rooftop garden for daycare activities. Stakeholders did not want a daycare facility to be on the top of a building, so LCDA altered its plans to include programs for seniors on the rooftop garden.
- Consultants and a group of experts visited a local museum with a rooftop terrace. The rooftop terrace has experienced operational issues, mostly due to the severe winds and high temperatures experienced in the region. Many days, it is too windy for people to use the terrace, and due to the weather conditions, the maintenance costs are high. Based on this information, LCDA altered its plan to have senior programs on the roof and instead considered that middle school students could plant some of the vegetation and participate in habitat vegetation on the rooftop.
- An architect surveyed the building and determined the building and roof structure were unable to support additional weight. Experts found that the cost of retrofitting the building to be able to support a rooftop garden would be prohibitive, especially given the limited activities and programs that could be operated on the roof. The anticipated energy cost savings from the natural cooling features of the proposed green rooftop were estimated to be less than the costs.

Progress Since Pilot Completion

Through the Brownfields Sustainability Pilot, LCDA determined that a green roof is not a viable option on its new headquarters building. Because it was able to determine this early in the development process, it saved significant time and resources that would have otherwise been used to plan the space. LCDA also avoided putting staff or citizens in danger. LCDA continues to explore options regarding the building's construction and use.

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Laredo Recreation Center

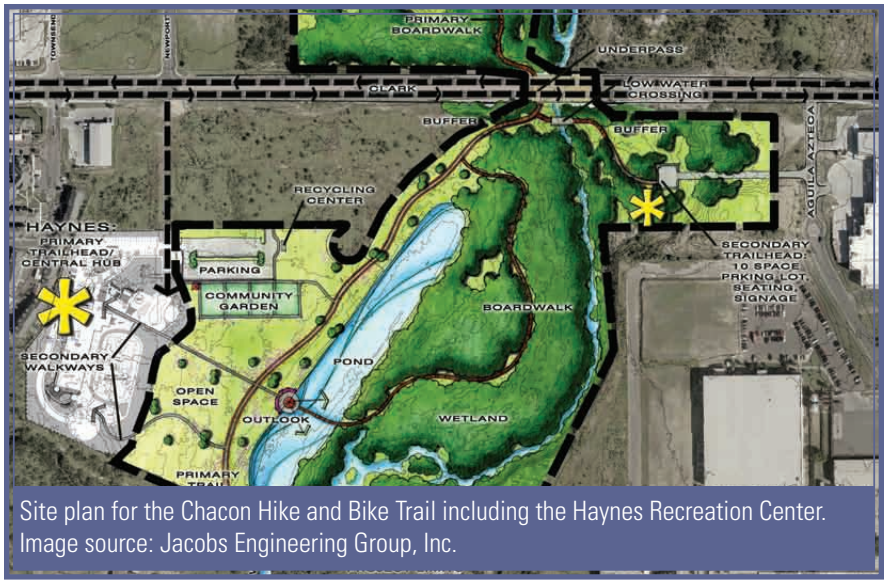
Laredo, Texas

Region 6

(Arkansas, Louisiana, New Mexico, Oklahoma, and Texas)

The City of Laredo is planning to incorporate LID features in the construction of an alternate parking lot for the Haynes Recreation Center. The city used the Brownfields Sustainability Pilot to develop design options and concept plans for the LID parking area.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/laredo.pdf



Site plan for the Chacon Hike and Bike Trail including the Haynes Recreation Center. Image source: Jacobs Engineering Group, Inc.

Background

The City of Laredo plans to develop a community recreation center adjacent to former contaminated wetland brownfields site. The Haynes Recreation Center is being designed as a place where citizens can interact with nature and learn about sustainable, green design. The center will incorporate a variety of green building techniques, including a green roof. The city also plans to incorporate LID features in an alternate parking lot for the recreation center. The parking lot is planned to accompany a "hike and bike" trail adjoining the recreation center. The city requested technical assistance to develop comprehensive designs and conceptual drawings for the alternate LID parking lot for the Haynes Recreation Center. The city needed assistance evaluating and designing for all of the sustainable parking lot components, including alternative building materials, construction debris management, and stormwater management.

Pilot Implementation

Through the technical assistance provided by the Brownfields Sustainability Pilot, the city originally wanted to develop an LID design template that could be used at sites across the city. The city also considered using an LID design template that could be used at two parking lots at the Haynes Recreation Center. After the EPA funded consultants worked with the city

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and local stakeholders, the project scope was narrowed to include developing a design for an alternate parking lot for the recreation center. This LID parking lot is planned to be built by the City of Laredo so that city employees can gain experience with building sustainable designs.

The consultant developed conceptual design drawings incorporating LID techniques at the parking lot adjacent to Haynes Recreation Center. The consultant evaluated design criteria such as landscaping, irrigation, lighting, and stormwater management techniques in developing the parking lot plans. The design drawings incorporate the site's layout, detail applicable LID strategies, and specify potential materials to be used. Some of the design features that were incorporated in the conceptual design for the parking lot included:

- Porous pavers and pervious concrete to allow for stormwater absorption below parking and walking areas
- Bioswales and bioretention swales featuring native plants to absorb stormwater runoff
- Tree locations for additional bioabsorption of stormwater runoff

The consultant provided estimated project costs along with the conceptual design drawings. The city can use the cost estimates and technical specifications when requesting and evaluating bids for contractors.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The city originally requested technical assistance to develop a design template that could be used at two parking lots at the Haynes Recreation Center, but later limited the pilot project's scope to a single parking lot adjoining the community gardens and open area. This helped alleviate funding complexities and further define the scope of both the recreation center's design and the design of the alternate parking area.
- Construction of the Haynes Recreation Center will be funded with a mix of federal, state, and local funds. The city ensured that oversight authority and funding would not be mixed between the recreation center project and the parking lot project by separating the project scopes. The city plans to fund the parking lot construction directly.

Progress Since Pilot Completion

The city is scheduled to begin construction in November or December 2009. It projects that the LID parking lot project will be complete before the Haynes Recreation Center opens, which is expected to be in April 2010.

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Commercial Street Historic District

Springfield, Missouri

Region 7

(Iowa, Kansas, Missouri, and Nebraska)

The owners of three businesses in the Commercial Street Historic District wanted to use green design techniques in their buildings' redevelopment. They used the Brownfields Sustainability Pilot to identify sustainable design features that could be used in each building.

View the final pilot reports at: www.epa.gov/brownfields/sustain_plts/reports/springfield_fr.pdf and http://www.epa.gov/brownfields/sustain_plts/reports/Final_Workshop_Report_Springfield.pdf

Commercial Club building in Springfield, Missouri.

Background

The owners of three properties along Commercial Street in Springfield, Missouri, want to incorporate green building designs into their redevelopment efforts. The sites include a microbrewery, a day spa, and an historic city owned property. The microbrewery site previously housed a feed mill, coal yard, peanut butter plant, automotive repair shop, gas station, and an iron company. Prior uses at the day spa included a print shop and gasoline filling station. The owner of the day spa plans to expand into an adjoining 5,000 square foot building and seek LEED certification as a way to brand the spa as green. The Commercial Club is a 10,400 square foot historic building. The site was used for a community club, police substation, gas tank operations, and offices. The City of Springfield now owns the property.

At the microbrewery, EPA funded Phase I and II ESAs identified aboveground and underground storage tanks, as well as floor tiles containing asbestos, which have been cleaned up. EPA funded Phase I and II ESAs identified petroleum and petroleum related contaminants and materials that potentially contained asbestos at the other two properties, but the levels do not exceed nonresidential standards.

The city requested technical assistance to develop green design strategies for each building.

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Pilot Implementation

EPA funded consultants visited the sites in December 2008. The consultants developed green design recommendations for adaptive reuse of the buildings. The primary recommendations included: 1) establish green design goals based on cost effectiveness and performance; 2) use an integrated design team approach to building design; and 3) facilitate a Commercial Street design peer consult/workshop to advance the projects and spread the initiative to other Commercial Street properties. The consultants recommended green design strategies based on the costs and benefits specific to each building, and pinpointed which green design strategies would have a short term payback of five to seven years. Of the 18 sustainable design features analyzed, consultants recommended 12 for the microbrewery, 12 for the day spa, and eight for the Commercial Club. These features include HVAC systems, cool roof, daylighting, recycling, community environmental health promotion, energy management systems, and water conservation/greywater systems.

In addition, the consultants suggested other green design features each owner could choose to install if pursuing LEED certification. The consultant estimated that LEED certification may increase a project's cost from 0 to 4 percent.

EPA technical assistance also included a Sustainable Design Workshop held on June 25, 2009 to bring together the project teams from the Commercial Street projects, architects, engineers, and other stakeholders. The workshop stressed "green value engineering" and peer consultation and helped the building owners evaluate the recommended green design elements and answer any remaining questions about their cost and function. A report summarizing this workshop was prepared by the consultants.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The Commercial Club building is historic and developers must preserve the exterior brick. The consultants considered this requirement in its recommendations for insulation and green design.
- The consultants were able to make cost-effective recommendations for the green design elements because the architectural and engineering plans were not completed for the buildings.
- Through EPA's and the city's discussions with the consultants, the project scope was clarified to include a cost benefit analysis of the green design elements. The Brownfields Sustainability Pilot helped reverse the building owners' perceptions that green design features are more expensive than standard design elements. Architects and engineers worked to find the most suitable, affordable green design elements for each building.

Progress Since Pilot Completion

The microbrewery is currently under construction. A contractor has installed skylights for daylighting and a light reflective roof material, which will decrease heating and cooling costs. The owners are also moving ahead with the consultants' design for the exterior brickwork. The owners are considering whether to apply for LEED certification.

The day spa owner has acquired the adjacent building and initiated construction. Prior to the Sustainable Design Workshop, the owner planned to build an extensive green roof; however, an expert at the workshop explained that the existing roof structure would essentially need to be replaced. Experts demonstrated how other techniques, such as skylight atrium garden areas in the interior, could be installed at a significantly lower cost and still provide daylight and green benefits. The owner of the day spa described the workshop as "transformative."

Other nearby property owners expressed interest in using the recommendations of the pilot report. A property on the same street is being planned with a dance studio, retail space, and loft apartments on each of the floors. The owner read the final pilot report and discussed green design options with a contractor and a LEED certified architect.

Anvil Mountain Neighborhood

San Juan County, Colorado

Region 8

(Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming)

The Town of Silverton plans to redevelop a mine scarred brownfield into a sustainable affordable housing neighborhood. The town used the Brownfields Sustainability Pilot to develop an optimal green design.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/factsheets/anvil_mountain_brownfields_report_final.pdf

A typical home in Silverton, Colorado.

Background

The Town of Silverton, in San Juan County, Colorado, plans to build an affordable, low income housing project at the former location of the Rose Walsh Smelter site, a mine scarred brownfield, comprising 12 acres. The property is owned by San Juan County and two nonprofit housing organizations. This project is planned as part of the Anvil Mountain Neighborhood development, which will include up to 49 housing units ranging from 1,800 to 2,200 square feet.

The town began site investigations using EPA regional Targeted Brownfields Assessment support. Site cleanup is being accomplished using an EPA Brownfields Cleanup grant and other matching and leveraged funds.

The town plans to integrate green design and construction with affordable housing throughout this project. To accomplish this, the town requested technical assistance to develop a green design for the residential development. The property's redevelopment will preserve the town's mining legacy and promote historic preservation. This project will also strengthen the tourism dependent community, as year round residents will be able to transition from renters to homeowners.

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Pilot Implementation

EPA funded consultants met in October 2008 with officials from the town, the county, and other stakeholders. The project team determined that the pilot would focus on energy efficient housing, systems efficiency, architecture standards, and land planning to support sustainability. Consultants recommended and evaluated energy efficiency options as well as suggested additional resources and funding sources.

EPA Region 8 staff received assistance from the National Renewable Energy Laboratory (NREL) through a separate Technical Assistance Project funded by the U.S. Department of Energy. NREL evaluated solar conditions and determined the Town of Silverton possesses high potential for solar energy collection. NREL also evaluated options for energy efficient building design. The EPA consulting team further evaluated design options based on NREL's energy modeling results. It analyzed orientation, neighboring structures, various wall designs, ceilings, roof material, radiant barriers, slabs, wall mass, ceiling mass, window area, window type, infiltration, heating and cooling systems, major appliances, and lighting. The consultants evaluated the cost and expected life of each option, to be used by the town in designing buildings.

The most important design options were categorized into varying house orientation, glazing (window) type, and window area options. Consultants evaluated four design scenarios to identify those with the least cost and maximum energy savings cases. The consultants recommended taking advantage of the high solar potential by designing homes with passive solar systems. Consultants determined developers should orient the homes to the east or east-southeast and suggested increasing the window area from 16 percent to 18 to 20 percent, with most windows facing south. The consultants made many additional detailed design, contracting, and funding recommendations in the final pilot report to ensure the community implements the best and most appropriate green design possible.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The county expected that site cleanup would be completed in time for housing construction to begin in 2009; however, additional soil remediation was required, pushing the construction start date to 2010.
- The county expanded the planned repository area, due to the additional volume of contaminated soils. At least one lot, that was planned to be a multifamily unit, will now be used as part of a consolidation area.
- Consultants used information from Leadville, Colorado, which is the most comparable weather location, for the solar calculations.
- The county serves as the developer in the project. It encountered issues such as funding shortfalls and lack of expertise. The consultants suggested that the county work with experienced developers when pursuing the project in the future.
- The county originally planned to use funding from the State of Colorado; due to state budget issues, the state can now only provide part of this funding and the project faces a funding shortage between $326,000 and $764,000. Consultants assisted in identifying grants with other prospective sources to fund supplemental pieces of the project.

Progress Since Pilot Completion

The county plans to focus on the remediation aspect of the project, specifically soil cleanup, for the duration of 2009. It hopes to begin constructing the residential units in 2010. San Juan County is moving forward with implementing recommendations from NREL's energy modeling. Specifically, it is adjusting the plans for orientation, window types (glazing), and window area.

Visit the San Juan Development Association Web site at http://www.sanjuan2000.org/housing.htm for more information and updates on the Anvil Mountain Neighborhood redevelopment effort.

Samoa Peninsula

Humboldt County, California

Region 9

(Arizona, California, Hawaii, Nevada, and the territories of Guam and American Samoa)

In Humboldt County, a former lumber company town is being revitalized as a sustainable community. The Brownfields Sustainability Pilot was used to evaluate the Master Plan against recognized sustainability criteria and develop recommendations for incorporating green design elements into the rehabilitation of historic buildings.

View the final pilot reports at: www.epa.gov/brownfields/sustain_plts/factsheets/samoa.pdf and www.epa.gov/brownfields/sustain_plts/reports/green_home_guide_final.pdf

Street view of historic Victorian homes in Samoa, California.

Background

The Town of Samoa, California, is a former lumber company town located on the 171 acre Samoa Peninsula in Humbodlt County. Prior uses for the site included saw mill operations and residential development for company housing. The Samoa Pacific Group purchased 65 acres including the town with 99 existing houses and several commercial structures and public facilities at auction in 2001. EPA funded Phase I and Phase II Environmental Site Assessments found 18 potentially contaminated parcels in the town. Two cleanup projects are in progress to remediate lead contamination. The developer plans to apply to Humboldt County's Brownfields Revolving Loan Fund for further remediation.

The developer completed a Master Plan and Environmental Review, which is currently under review. The Master Plan zones areas for public recreation, residences, industry, a business park, commercial, recreation and conservation, public facility, and natural resources. The Design Guidelines, developed in March 2007, include an inventory of existing buildings and features, and guidelines for new construction, and the Secretary of Interior's Standards for Rehabilitation. All development plans prepared prioritize careful rehabilitation and preservation. The developer and Humboldt County sought EPA technical assistance to evaluate the town's Master Plan for sustainable options and to assist homeowners with identifying sustainable upgrades for historic homes.

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Pilot Implementation

EPA funded consultants visited the site in December 2008, working with the developer and Humboldt County as well as other stakeholders. The consultant evaluated the Samoa Town Master Plan against the Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) rating system and the Land and Natural Development (LAND) Code. Samoa Peninsula scored well against LEED-ND for brownfields redevelopment, restoration of wetlands and habitats, walkable streets, access to public spaces, and stormwater management, among other criteria. The Master Plan scored well against the LAND Code for an integrated development that avoids a delicate ecosystem (dunes) and includes compact lots, low impact parking and plantings, and access to public transit. For both rating systems, the EPA consultant recommended ways to increase the score.

Using the above standards, the consultant recommended improvements to the development plans. Some of the recommendations include that the developer should complete remediation before subdividing lots into parcels; on private lots, the developer should address minor site design issues (e.g., stormwater runoff, capturing rainwater) up front; the Master Plan should be augmented to include improvements to the design of the public area stormwater management system; the Master Plan should include the planting of native tree species along streets; renewable energy options should be investigated for the commercial buildings if funding is available; and a Community Service District and/or Homeowners Association charged with maintaining all public spaces and enforcing codes should be established.

EPA technical assistance also included a voluntary green code and green rehabilitation guide for the historic Victorian homes in the town. This guide was created as a companion piece to the Master Plan analysis. It provides guidance to homeowners on choosing sustainable strategies to restore and rehabilitate many of the smaller, Victorian style, wood framed houses built in Northern California during the late 1800s and early 1900s, such as those in Samoa. The guide instructs homeowners on maintaining the historic aesthetic and safely dealing with lead paint, rust damage, windows, entryway and porch details, and finishes. It provides considerations for upgrading heating, ventilation, plumbing, electrical, and lighting systems to improve energy efficiency and sustainability. It also discusses sustainable materials for interior finishes as well as landscaping.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- The redevelopment area is in the coastal zone, and under the jurisdiction of the California Coastal Commission. The Master Plan must follow regulations outlined under Coastal Act of 1970.
- The town is located on a peninsula, flanked by Humboldt Bay and the Pacific Ocean. The cool climate makes it difficult to maintain a consistent temperature within homes. The consultant considered the most efficient energy upgrades to the houses, taking into account the climate and structure sensitivity.
- Local expertise was invaluable. The developer and county assembled a number of contractors, historians, woodworkers, and others who have preserved Samoa houses over time to consult on the project. The green rehabilitation manual included information from local contractors, which helped fill the gap on local building materials and climate considerations. Local staff were able to participate with support from an EPA Assessment grant for the area.

Progress Since Pilot Completion

The project is on hold pending approval of the Master Plan by the California Coastal Commission and site cleanup. Humboldt County and EPA sent copies of the reports to the Coastal Commission and will be distributing copies of the green rehabilitation manual to the general public, including the renters of the historic homes.

June Key Delta House

Portland, Oregon

Region 10

(Alaska, Idaho, Oregon, and Washington)

Delta Sigma Theta Sorority, Inc. is redeveloping a former gas station into a community and mentoring center. The Brownfields Sustainability Pilot was used to develop an enhanced stormwater management system, including a rainwater harvesting system, and sustainable landscaping.

View the final pilot reports at: http://www.epa.gov/brownfields/sustain_plts/reports/June_Key_Delta_final_report.pdf and www.epa.gov/brownfields/sustain_plts/reports/Rainwater_Harvesting_System_Design_8_3_09.pdf

Groundbreaking ceremony at the June Key Delta House.

Background

Delta Sigma Theta owns a site in Portland, Oregon. Formerly a gas station, the property is 15,090 square feet and contains fuel storage tanks. The redevelopment plan will almost triple the functional area of the June Key Delta House, provide meeting space for up to 120 people, expand the usable landscaped exterior, and allow for future site development.

Delta Sigma Theta is planning the development to qualify for the Living Building Challenge. The Challenge uses development criteria to encourage responsible site selection, promotion of inspiration and education, net zero energy and water, and limitation of construction waste. Some of the design components Delta Sigma Theta plans to use to meet the challenge include: reusing metal cargo containers as rain and stormwater management harvesting systems; using energy conservation and photovoltaic technologies; and ensuring 50 to 70 percent of the building materials are from recycled sources. Delta Sigma Theta requested technical assistance with designing custom sustainable landscaping approaches and a rain/stormwater management system.

Pilot Implementation

EPA's consulting team developed a Phase I report that recommends landscape design and stormwater management that meet the requirements of Portland's 2008 Stormwater Management Manual (SWMM). The

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design plans include vegetated swales and a hybrid planter that are hydrologically connected to distribute water runoff. The eastern section of the site will be landscaped and remain permeable. A trench drain will collect runoff from the parking lot, and planting strips along sidewalks will manage that runoff. No stormwater will reach the sewers, and any overflow will be distributed to the drywell facilities. Under this plan, the June Key Delta House will exceed compliance requirements in Portland. The consultants recommended landscape design considerations, including planted swales and water retaining cells at tree basins, a rainwater retention system, native planting, tree planting, structural soil cells, and porous paving.

During the pilot, consultants determined the site is also suitable for stormwater reuse. EPA gave additional assistance for this portion of the project, completed after the Phase I report. The consultants designed a rainwater harvesting and reuse system for the June Key Delta House that will use the stormwater for irrigation and flushing toilets. The rainwater reuse portion of the plan is designed as a "clip on" to the stormwater management and landscaping plan, therefore it can be added after construction begins.

The Phase II report was developed in accordance with State of Oregon and City of Portland Code Guide regulations on residential properties. Consultants engaged with the city's Office of Planning and Development Review as well as the commercial plumbing inspector assigned to evaluate rainwater harvesting plans. Delta Sigma Theta may use these performance specifications and design schematics when moving forward with approval by the city and state.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- Delta Sigma Theta will need expertise to implement the design for the basins, swales, and planters to meet Portland's SWMM guidelines.
- Though the site has received a no further action determination from the state, the City of Portland funded additional assessments to show that stormwater reinfiltration would not mobilize contamination left onsite. Delta Sigma Theta must ensure that stormwater does not infiltrate the soil when installing the stormwater management and reuse systems.
- Stormwater reuse triggers a different type of permit review from the city than stormwater management. Delta Sigma Theta must submit all site plans before selecting a contractor.
- Delta Sigma Theta does not currently have sufficient funding for the recommended landscape and stormwater systems.
- Delta Sigma Theta is negotiating with the Oregon Department of Transportation regarding adding sidewalk improvements to the plan and the effect of parking requirements on local residents.
- The Living Building Challenge limits buildings to using local materials as well as non-polyvinyl chloride (PVC) piping material. There is no local non-PVC piping vendor, so Delta Sigma Theta and the contractors must acquire an exception from the Living Building Challenge.

Progress Since Pilot Completion

The City of Portland offered ways to simplify the landscape and stormwater management design to meet city criteria. Delta Sigma Theta distributed the design plan to bidding contractors, anticipating that the selected contractor will finalize the stormwater system design and subcontract the landscaping piece.

The June Key Delta House was featured in an article by the Daily Journal of Commerce. Delta Sigma Theta promotes the project and conducts fundraising. Delta Sigma Theta and the City of Portland are applying for grant funding for implementation; the city will assist with installation. Delta Sigma Theta initiated project work in early August 2009 and a groundbreaking at the site took place in October 2009. Completion is expected in January 2010.

Tabor Commons

Portland, Oregon

Region 10

(Alaska, Idaho, Oregon, and Washington)

Three nonprofit organizations are working together to redevelop a brownfield into a community center. Oregon Tradeswomen used the Brownfields Sustainability Pilot to develop the curriculum for a green job training program.

View the final pilot report at: www.epa.gov/brownfields/sustain_plts/reports/Tabor_Commons_Green_Jobs_Training.pdf

Tabor Commons site during on-site stormwater management implementation.

Background

The Tabor Commons site in Portland, Oregon, formerly housed a gas station, used car dealership, convenience store, and coffee shop/deli. The deli was seized by the U.S. Marshals Service because its owner was distributing illegal narcotics. After the criminal case was finalized, the property was donated to Southeast Uplift Neighborhood Coalition, an independent nonprofit organization serving 20 neighborhood associations in inner southeast Portland.

After community meetings, stakeholders determined that the Tabor Commons site would be best used for a community space. Café au Play, a nonprofit in Portland, Oregon, is developing Tabor Commons into a coffeehouse for community members. The coffeehouse will be family friendly, providing a place for all generations to interact. Current site plans include a south facing trellis, greenspace, onsite stormwater management, farm stand, and large meeting area.

In 2007, underground storage tanks were removed from the Tabor Commons site using funds from EPA, Oregon Economic and Community Development Department, and City of Portland Bureau of Environmental Services.

Oregon Tradeswomen is a nonprofit organization that provides training in building, construction, mechanical, technical, and utility fields. Oregon

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Tradeswomen is assisting Southeast Uplift and Café au Play by bringing job training participants to the Tabor Commons site. The job training is a seven week program in which participants enroll in free, pre-apprenticeship classes that prepare them to enter the workforce. Each week, participants attend one day in the classroom, one "hands on" field day, and one field trip day where they apply their newly acquired skills.

Oregon Tradeswomen requested technical assistance to incorporate a green jobs component into their job training curriculum. Students applied these green job skills at Tabor Commons and are prepared to begin applying their new skills at other sites as well.

Pilot Implementation

EPA funded a consultant who assisted in developing a green job training curriculum for Oregon Tradeswomen. The curriculum includes case studies, examples, and resources on green jobs and green building, as well as defines key terms.

It covers topics such as energy efficiency, passive solar, solar panels, green roofs, solar thermal panels, stormwater management, the effects of water pollution, natural resource conservation, and building life cycle. Job training participants are also instructed on a variety of green building certifications. They learn about green building elements such as recycled materials, installing energy efficient heating and cooling, weatherization, and avoiding volatile organic compounds.

The curriculum covers necessary job skills, potential employers, as well as information on how to identify sources of financial support for integrating green features into site planning. Workers can apply their skill set across multiple green job fields, including green building, green remediation, deconstruction, stormwater management, ecoroofs, solar roofing, and weatherization.

An innovative component of the green job training program is that it uses the Tabor Commons site as a case study. Redevelopment plans for Tabor Commons demonstrate brownfields redevelopment, deconstruction, green building techniques, and passive solar design with south facing glass, concrete floor to retain heat, and minimal glazing on the west side. The site is also planned to include a water garden, new curbs, and bump outs to redirect stormwater from 57th Street. Visit http://www.cafeauplay.org/index.html for more information, updates, and pictures of the site renovation.

Challenges and Considerations

The pilot project team encountered the following challenges and considerations during the project:

- Preliminary discussions were necessary to better define the scope of the project and specific project needs. The EPA technical assistance team convened the Oregon Tradeswomen and other project stakeholders, which led to a decision to use the Tabor Commons site as a case study for designing a green jobs curriculum.
- During the pilot period, Oregon Tradeswomen received a separate EPA Brownfields Job Training grant. Consultants funded through the Brownfields Sustainability Pilot developed the green job training portion of the curriculum. After receiving the curriculum, Oregon Tradeswomen used the Job Training grant to implement the program and enhance the Tabor Commons site and other properties.

Progress Since Pilot Completion

After receiving the curriculum, Oregon Tradeswomen incorporated the green jobs training into its suite of training offerings. The eight hour green job curriculum includes handouts, PowerPoint slides, lectures, and hands on components. Oregon Tradeswomen piloted this curriculum immediately after receiving the consultants' curriculum. Over 20 people participated in a pilot job training program that incorporates the green jobs component. Currently, 16 people are enrolled in the second class. During the training, participants practice their skills on nonprofit sites such as Tabor Commons. For example, students have recently installed sheetrock and built an ecoroof on an existing informational kiosk.

Findings and Recommendations

The Brownfields Sustainability Pilots serve a dual purpose: furthering site specific brownfield projects as well as promoting general sustainable approaches across the United States. By assessing the land, removing contamination, and redeveloping the property, communities are stimulating the local economy and reducing threats to the environment. Overall, the Brownfields Sustainability Pilots give communities the tools they need to better evaluate and move forward with the sustainable redevelopment of brownfields. This report discusses five findings from the Brownfields Sustainability Pilots and subsequent recommendations for future projects.

Finding 1: Communities need both site specific support and broader community wide sustainability assistance.

The sustainability pilots provided technical assistance at specific brownfield properties. This was done both to keep the pilots focused and to fit within the authorities of the EPA Brownfields Program. Several of the communities with Brownfields Sustainability Pilots sought to expand beyond the initial pilot scope to provide information on sustainable redevelopment to other property owners and developers in the area.

For example, the City of Springfield held workshops with local property owners to share information on the green building designs from the pilot sites. In another example, the green design recommendations for the Samoa Peninsula pilot were included in a report that could be used at other properties with similar regulatory and climactic conditions. The resource recovery pilot in Cleveland was designed to use information from specific deconstruction projects to improve the city wide program. Program changes and community roundtables are anticipated to transfer the experience from the pilot sites to more projects in the area.

RECOMMENDATION: Public assistance for sustainable brownfields development should reflect site specific and community wide needs. To get the most local benefit, brownfields sustainability support should include both property specific assistance and community sustainability planning. Partnerships with other organizations and agencies may be needed where statutory limits restrict EPA's ability to go beyond individual site assistance.

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Finding 2: Sustainable brownfields projects can take many forms requiring flexible tools and an array of technical expertise.

At the outset of the sustainability pilots, EPA was uncertain about the range of support for greener, more sustainable brownfields projects that communities would need. The pilots demonstrated that sustainable redevelopment needs a range of techniques and approaches including green building design, energy efficiency, greenhouse gas reduction, materials reuse, stormwater management, landscaping, and others. Several pilots required consultant teams with varied skills that reflected the multifaceted needs at a particular site.

For example, the Jackson Square project in Boston focused on green roofs and required consultation between building designers, roofing contractors, stormwater management experts, and landscape designers. The team for the green streetscapes project in Detroit required expertise in brownfields cleanup, transportation design, green building design, stormwater management, and park design. The Tabor Commons project in Portland brought sustainability consultants together with workforce development experts to development a sustainable redevelopment curriculum.

RECOMMENDATION: Programs supporting sustainable brownfields projects cannot be limited to narrow specialties. The pilot projects succeeded by offering communities access to professionals from a variety of disciplines. Integrated design approaches can bring experts together during initial project development. Public sector tools should be flexible enough to allow project teams to be assembled based on the individual needs of particular projects and communities, including local and national consultants. One size fits all approaches do not draw on the diversity of skills needed for sustainable brownfields projects.

Finding 3: Plans change.

Brownfields project plans can be affected by both site conditions and broader economic and social forces. Several of the pilots needed to make midcourse corrections due to events that occurred while the pilots were underway. Some changes require adjustment in project direction. Other situations required a shift in the makeup of the consultant team. In some cases, the work changed significantly enough that the contractual agreements between EPA and the consultants needed modification. Since it is likely that some changes will occur between proposing and implementing a project, the assistance tools need to have flexibility to adapt to changed circumstances.

For example, the Anvil Mountain pilot sought EPA assistance with green building design anticipating that the State of Colorado would fund up to two thirds of the project costs. Due to economic conditions, the state did not provide the expected funding, slowing the project pace. In another example, the City of Greenville initially planned to seek developers to develop green affordable housing. Environmental and

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economic concerns created challenges with finding a developer, so the city altered its plans and started the project itself and will seek developers later in the process. Changing prices for recycling markets affected pilots with materials reuse components such as the Cleveland, Lynchburg, and Valley projects.

The Oklahoma City pilot went through several reconsiderations in evaluating feasible uses for a building rooftop. Severe winds and high temperatures rendered many uses untenable and engineers determined the structure inadequate to support roof activities. Ultimately, the entire project was reconsidered and the owner is exploring future reuse options.

RECOMMENDATION: Communities, organizations, and agencies engaged in sustainable brownfields projects should be prepared for plans to change. New environmental and engineering information can cause design changes. Economic changes at the local, regional, and national level can affect cost calculations and impact project feasibility. Projects and plans need to be flexible in order to accommodate changes. Funding and technical assistance tools needed to be able to handle shifting priorities and project needs.

Finding 4: There is high interest and strong support for greener, more sustainable brownfields projects.

The pilots were EPA's initial effort to support local projects needing sustainability assistance. It was uncertain how much local interest and support the pilots would receive. During the course of these pilots, EPA and communities found that the pilots provided heightened visibility for the particular projects receiving help and support for broader sustainability efforts. EPA received many requests to assist additional projects and plans to continue to offer such technical assistance in the future. EPA also heard from the pilot communities that they would like more help with communicating their results locally and nationally.

For example, the Houston Solar project received numerous inquiries from other communities that are considering locating solar energy facilities on brownfields and other contaminated sites such as landfills and mine scarred lands. The Allen-Morrison site in Lynchburg, Virginia has been presented at conferences as an example of inventorying materials for reuse and recycling. The pilots in Springfield, Missouri and Valley, Alabama held community meetings to discuss and share the pilot results with the rest of their communities.

RECOMMENDATION: EPA should continue to provide assistance to communities interested in pursuing greener, more sustainable brownfields projects. Project plans should include consideration of how to share information locally and more broadly. Information sharing through presentations and Web sites should be a priority to get the maximum benefit from successful projects.

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Finding 5: Project status affects the type and effectiveness of technical support.

Some pilots requested technical assistance with specific system designs or detailed site plans. In these cases, the projects were generally further along and already had detailed architectural or engineering plans for the site. In these situations, the sustainability consultants were tasked with specific goals with shorter scoping periods that could be plugged right into the project. For example, the green roof designs for the Jackson Square project, the green infrastructure for the Moran Center in Burlington, Vermont, the sustainable parking lot for the Laredo Recreation Center, and the landscape design for the Tabor Commons project in Portland required shorter scoping periods because the projects were further along in the site design process.

Other pilots sought broader conceptual plans to help guide project development. This support came earlier in the project's timeline, allowing for a broader consideration of sustainable approaches. The scoping periods tend to be longer and results come later because a wider range of options was evaluated and there is much work still to be done. Community involvement can play a larger role in such pilots in order to refine options and gain acceptance. Consultant assistance in these cases can be significant due to the ability to provide communities with help identifying and narrowing choices. Examples include the Waterfront pilot in Allentown, Pennsylvania, where a developer requested help making his redevelopment project more sustainable, and the Green Avenue pilot in Greenville, South Carolina where the local government sought help with designing green, affordable housing on its former supermarket and gas station site.

The lesson here is that the type of assistance should reflect the status of the project. Each project is different with a unique history and site conditions. The consultants providing assistance and the communities receiving help need to be clear on the project goals and objectives, and make sure that they are consistent with the development stage of the project. Some projects need focused design assistance, others projects need help evaluating options.

RECOMMENDATION: EPA and its consultants need to work closely with communities to make sure that the tools being used are appropriate to community needs. Flexibility is needed to allow support to include both broad sustainability planning and more focused site designs.

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Conclusion

The Brownfields Sustainability Pilots fulfilled an invaluable role. Properties are being cleaned up and reused in greener, more sustainable ways. Materials are being reused, buildings constructed in energy efficient ways, and water managed more effectively. There are many lessons to be learned for future EPA and community efforts to increase sustainable redevelopment. There are also challenges and issues to be addressed. Stakeholders should consider these findings and recommendations when designing a program around sustainability, brownfields, or other redevelopment initiatives. The pilot program facilitates projects that educate city staff, developers, citizens, and other stakeholders. The process itself is an educational tool, as those involved in the project develop new knowledge and skills that can be applied to future endeavors. Once the projects are complete, residents and other stakeholders can interact with each site and learn about sustainability.

The Brownfields Sustainability Pilots assisted communities that are transforming past infrastructure into innovative, cutting edge developments. These pilots are one way EPA is assisting in building a better future, by reducing greenhouse gas emissions, lessening the carbon footprint, and supporting innovative technology. Promoting sustainability, especially sustainable redevelopment of brownfields, will affect the climate, national security, as well as economic and community development.

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Resources

An index of all information related to the EPA's Brownfields Sustainability Pilots can be found at the following address: http://www.epa.gov/brownfields/sustain_plts/index.htm

The final pilot reports can be accessed using the links below.

- Jackson Square - Roxbury, MA
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/roxbury.pdf)
- Moran Center at Waterfront Park - Burlington, VT
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/moran.pdf)
- The Waterfront - Allentown, PA
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/waterfront.pdf)
- Allen-Morrison - Lynchburg, VA
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/allenmorrison.pdf)
- Greenville Workforce Housing Project – Greenville, SC
  (http://www.epa.gov/brownfields/sustain_plts/reports/GreenAvenueSites_TechMemo_08_09.pdf)
- Langdale Mill - Valley, AL
  (http://www.epa.gov/brownfields/sustain_plts/reports/langdale.pdf)
- Green Streetscapes (Focus:HOPE) – Detroit, MI
  (http://www.epa.gov/brownfields/sustain_plts/reports/Streetscapes_Final_7_31_09.pdf)
- Cleveland Resource Recovery – Cleveland, OH
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/cleveland.pdf)
- Houston Solar Project - Houston, TX
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/houston_solar.pdf)
- Laredo Recreation Center - Laredo, TX
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/laredo.pdf)
  - Laredo Recreation Center (cost estimates) - Laredo, TX
    (http://www.epa.gov/brownfields/sustain_plts/factsheets/laredo_ci.pdf)
- Commercial Street Historic District (Recommendations Report) - Springfield, MO
  (http://www.epa.gov/brownfields/sustain_plts/reports/springfield_fr.pdf)
  - Commercial Street Historic District (Workshop Report) - Springfield, MO
    (http://www.epa.gov/brownfields/sustain_plts/reports/Final_Workshop_Report_Springfield.pdf)

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- Anvil Mountain Neighborhood – Silverton, CO
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/allenmorrison.pdf)
- Samoa Peninsula (Master Plan Analysis) - Humboldt County, CA
  (http://www.epa.gov/brownfields/sustain_plts/factsheets/samoa.pdf)
  - Samoa Peninsula (Green Home Guide) - Humboldt County, CA
    (http://www.epa.gov/brownfields/sustain_plts/reports/green_home_guide_final.pdf)
- June Key Delta House (Recommendations Report) – Portland, OR
  (http://www.epa.gov/brownfields/sustain_plts/reports/June_Key_Delta_final_report.pdf)
  - June Key Delta House (Rainwater Harvesting Report) – Portland, OR
    (http://www.epa.gov/brownfields/sustain_plts/reports/Rainwater_Harvesting_System_Design_8_3_09.pdf)
- Tabor Commons – Portland, OR
  (http://www.epa.gov/brownfields/sustain_plts/reports/Tabor_Commons_Green_Jobs_Training.pdf)

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United States Environmental Protection Agency
Office of Brownfields and Land Revitalization
EPA-560-F-09-500
October 2009
www.epa.gov/brownfields

Samoa Peninsula –
Humboldt County, CA

Moran Center at Waterfront Park –
Burlington, VT

Anvil Mountain Neighborhood –
Silverton, CO