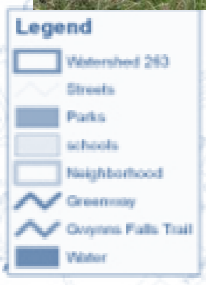
Greening Vacant Lots: Planning and Implementation Strategies

A report prepared for The Nature Conservancy as part of the NatLab collaboration



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Wenk Associates, Milwaukee; NeighborSpace, Chicago; Blueprint 2000, Tallahassee; Parks & People Foundation, Baltimore (also background map)

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About NatLab: NatLab is a collaborative effort among Natural Resources Defense Council, The Nature Conservancy, and EKO Asset Management Partners and seeks to create the regulatory, financial, and policy context that will catalyze the investment of additional private capital towards the green economy, offering green infrastructure solutions where gray infrastructure has traditionally been deployed.

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Executive Summary

Storm water and vacant lots are both underutilized resources that can improve the environmental, economic and social well-being of cities. Municipalities around the country utilize 'hard' infrastructure such as retention tanks and end-of-the-pipe treatment plants to manage storm water runoff. Vacant lots and abandoned buildings reduce quality of life and property values, discourage investment, and stress municipal budgets. Recently, cities around the country have begun to manage storm water runoff using green infrastructure to advance EPA regulatory requirements. The City of Philadelphia is a national leader; the Philadelphia Water Department (PWD) has a goal of filtering or storing the first inch of rain with green infrastructure to reduce the volume of combined sewer overflows. Many cities are greening vacant lots as one important storm water management strategy. Although, for the PWD, vacant lots hold potential as storm water infrastructure, numerous barriers exist. Ownership and transfer barriers include site control, site selection, legal and economic structures, public administration, and scalability (including site aggregation). Barriers and challenges to managing and re-using vacant lots include organizational management and structures, legal and economic agreements, and maintenance.

We provide ten case studies illuminating how leading cities plan, administer and implement programs that convert vacant lots to green space, in the context of regulatory requirements and broader redevelopment goals. Each case study traces one program or initiative led by a public agency or NGO from the planning stage through implementation, emphasizing how programs have overcome barriers. We analyze across the cases to identify effective practices cities use to green vacant lots, advancing open space and storm water management goals. We apply these findings to the context of Philadelphia.

Effective programs linked regional, neighborhood and site-specific planning. Partnerships with communities facilitated neighborhood level planning. Spatial analyses, in tandem with local stakeholder collaboration and site visits, facilitated site selection; we identify common area-wide and site-specific criteria. In terms of administration, public agencies and nonprofit organizations expanded or developed specialized programs to green vacant lots.

Frequently, new special purpose organizations or agencies filled planning or implementation gaps. Successful programs developed and sustained partnerships among specialized agencies and organizations. With respect to site use and design, successful open space programs created active and passive uses that improve quality of life, utilizing the planning process to develop political support. Similarly, successful green infrastructure projects sought to improve quality of life by incorporating multiple public uses, such as public parks, trails, greenways with pedestrian and bicycle paths, and public education. In contrast, a narrow focus on storm water-specific designs resulted in unforeseen public reactions and maintenance challenges.

To aggregate sites, single lead agencies sustained planning and implementation capacity over the long-term. These lead agencies utilized multiple acquisition strategies, particularly for aggregating adjacent properties. Interim ownership by a third party supported the aggregation of sites. In addition to aggregating adjacent parcels, several cities are planning to aggregate parcels along roadways to connect neighborhoods through greenways and trails. In terms of property transfer, we identify effective temporary-to-permanent green space programs, side lot transfer programs, transfer

mechanisms for acquiring properties from other public agencies, and transfer mechanisms for acquiring tax-delinquent and tax-current privately owned properties. Public agencies consistently owned larger sites, while both public agencies and non-profit land trusts owned smaller sites. The lack of dedicated maintenance funding presently concerns most programs; volunteerism alone is not effective. We identify four existing and emerging maintenance models.

With respect to finance, planning initiatives were frequently funded by foundations, though public agencies provided some planning grants. For acquisition and construction, parks and recreation programs relied predominately on tax levies, including property taxes, sales taxes and tax increment financing. Greening programs through public water agencies were funded through ratepayer fees. Most cities are still in the process of developing finance strategies to support storm water infrastructure maintenance. Brownfields can be prime candidates for regional storm water management. Several cities managed storm water on brownfields, creating open space and supporting businesses. With respect to economic development, greening vacant lots can support direct employment opportunities, neighborhood stabilization and business needs. Further research should develop maintenance and economic development models in greater depth.

We provide five recommendations to the PWD, based on local assets and barriers to greening vacant lots. First, we recommend that the PWD pilot a neighborhood-based vacant lots plan. This pilot should create a planning model that could be applied to other CSO areas in the city, identify institutional barriers to implementation, and develop strategies to overcome these institutional barriers. Second, to support this planning effort and coordinate among city agencies and NGOs, we recommend the PWD dedicate a position to the greening of vacant lots. Third, planning efforts should integrate active uses where feasible, potentially including larger vacant lots already used as parks. Fourth, we suggest the PWD develop a smaller sites strategy to construct and maintain storm water greenways. And finally, the PWD should consider flexible models of ownership and maintenance.

Chapter 1: Storm Water and Vacant Lots as Resources

Storm water and vacant lots are underutilized resources that can improve the environmental, economic and social well-being of cities.

Municipal Storm Water Management Challenges

Municipalities need to manage storm water to improve water quality, protect drinking water supplies and mitigate flooding. Most municipalities manage storm water as a waste. Municipalities with combined sewer systems are predominately managing storm water by constructing retention tanks and treating the effluent at sewage plants after the conclusion of a rainstorm. An estimated 772 municipalities throughout the country have infrastructure systems that combine storm water with sewage.[1] Local municipalities throughout the country are spending billions of dollars to reduce the volume of storm water runoff to meet EPA Clean Water Act regulatory requirements. Separately sewered areas typically release storm water and pollutants directly into surrounding waterbodies with minimal if any treatment, reducing water quality – frequently in violation of the EPA National Pollution Discharge Elimination System program.[2] In addition to reducing the accessibility of waterways for active uses, including the EPA goals of "fishable/swimmable" waterways,[3] storm water runoff pollutes drinking water sources in many cities nationwide.[4] Hurricane Sandy's recent impact throughout the Northeast United States reinforces the need to mitigate the hazards of natural disasters through proactive storm water infrastructure planning.

National vacant land context

Vacant land, like storm water, is frequently perceived as a liability. Vacant land is typically considered a 'blight' that encourages illicit activities and reduces property values. This perception is rooted in the experience of many urban areas where vacant land has reduced property values and quality of life, decreasing the ability to develop land for housing and economic development purposes, suppressing local tax bases, and stressing municipal budgets due to administrative and maintenance costs.[5] Vacant land contributes to a cycle of disinvestment: physical blight reduces real and perceived property values, further reducing reinvestment and development.

Vacant land exists in cities predominately because local real estate markets do not support the development or re-use of certain vacant properties. The construction of highways, lower cost housing, and the flight of wealthier, disproportionally white residents from cities to suburbs have led to population loss and business decline in many U.S. cities, particularly in the Northeast and Midwest.[6] The loss of manufacturing has reduced employment opportunities in many of these "post-industrial" cities, leaving in their wake contaminated land and residents in need of blue-collar employment opportunities. Cities with combined sewer systems, which grew rapidly during the 19th Century, also are predominately located in the Northeast and Midwest. Many of these cities, due to their common histories,

face similar vacant land management challenges – high levels of abandonment and contaminated land, also known as brownfields. According to a 2000 Brookings Institution study, vacant land comprised an average of fifteen percent of land in seventy U.S. cities.[7] We refer to *vacant lots* as properties without a building and *abandoned buildings* as properties with an uninhabited structure. Though some cities refer to natural, undeveloped areas as "vacant land," for the purpose of this study *vacant land* refers to both vacant lots and abandoned buildings.

Abandoned buildings pose numerous threats to communities. While buildings are abandoned, owners frequently do not make routine maintenance investments, and fail to meet financial obligations including mortgage payments and property taxes. Abandoned buildings are fire hazards, may host drug trafficking activities,[8] are an indicator of neighborhood decline, reduce a sense of community, and discourage investment.[9]

An increasing number of communities nationally are concerned with abandoned buildings, particularly due to increased rates of unemployment and foreclosure. While 6.8 million non-seasonal vacant units existed nationwide in 2000, 10.3 million existed in 2010 – a 51% increase.[10] In addition to cities experiencing population decline, many cities with growing populations experienced an increase in abandoned buildings. For example, Tucson, AZ experienced a 6.9% increase in population but a 57.8% increase in abandoned buildings; Indianapolis, IN experienced a 4.9% increase in population but a 48.8% increase in abandoned properties; and Las Vegas, NV experienced a 22% population increase but a 137.4% increase in abandoned buildings.[11]

Many abandoned buildings are potential vacant lots. Abandoned buildings frequently remain standing due to the high costs of demolition, which may range from $2000 to $40,000 per unit depending on building size, type, and contamination levels.[12] Many cities, such as Chicago, IL, Detroit, MI and Baltimore, MD, cannot afford to demolish all long-term vacant buildings. Baltimore, a city that has a greater proportion of vacant lots to population than most cities in the United States,[13] would need approximately $180 million to demolish all abandoned buildings citywide.[14]

Storm water and Vacant Land as Resources

Green spaces can cost-effectively reduce the need for 'hard' storm water management infrastructure, such as retention tanks. Vegetation uses storm water as a resource, capturing a significant percentage of runoff. Green spaces provide numerous additional benefits such as improving air quality and public health, cooling the air, reducing demand for air conditioning, and supporting climate change adaptation.[15] While community gardening programs have existed in cities for decades, a growing interest exists to support urban agriculture in otherwise unproductive green spaces to foster food security and provide additional environmental benefits.[16,17]

The science of vacant lot soils and hydrology is a nascent but growing field, particularly with respect to storm water management.[18] Research indicates that vacant lots may function as impervious area, even if the surfaces are vegetated, because soils are compacted from heavy equipment during demolition. For example, one study in Cleveland concluded that vacant lots retain as much storm water as a paved parking lot.[19] Given the prevalence of vacant lots in urban areas, they merit attention while developing green storm water management strategies.

Furthermore, brownfields provide a particular set of challenges. Hazardous pollutants may leave unsafe conditions on brownfields. Not only may the economic costs of cleaning up a brownfield inhibit development, but without the market conditions to foster economic growth, these sites may remain unproductive for decades. Storm water runoff can carry contaminants from brownfields to adjacent properties and urban waterways.

The benefits of green infrastructure (GI) are great enough that the U.S. Environmental Protection Agency (EPA) suggests that municipalities utilize GI to reduce the volume of combined sewage

overflows, provide additional community benefits, and ease public financial commitments.[20] We utilize the EPA's definition of GI:

"Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to storm water management systems that mimic nature by soaking up and storing water."[21]

Several cities around the country are utilizing green infrastructure to reduce combined sewer overflows, including: New York, NY; Detroit, MI; Cleveland, OH; Syracuse, NY; Nashville, TN; and Philadelphia, PA.

The Case of Philadelphia

Philadelphia's *Green City, Clean Waters* green storm water infrastructure plan is among the most ambitious in the country. The City of Philadelphia commits through this plan to invest $1.2 billion in green infrastructure over the next 25 years per its EPA Consent Order. This plan seeks to filter or store the first inch of rain with green infrastructure that covers approximately one-third of existing impervious land cover in the city's combined sewage drainage areas.[22] Approximately 60% of Philadelphia has combined sewers,[23] indicating that large-scale solutions are necessary to reach this goal.

Philadelphia experiences many common economic, administrative and programmatic barriers and opportunities to reusing vacant land. Vacant land, including brownfields from former manufacturing and commercial sites, is a consequence of the city's economic and demographic changes over the past fifty years. Since World War II, Philadelphia's manufacturing base has dramatically declined, while the city lost nearly a half million inhabitants, from 2.07 to 1.53 million residents – a 24% reduction in population.[24]

Vacant lots impose costs on community residents and the public sector, while discouraging investment from the private sector. Vacant lots deflate neighborhood property values by up to 20% in some instances,[25] and they cost the City of Philadelphia (the City) over $20 million each year in maintenance.[26] A recent study for the Philadelphia Redevelopment Authority estimated that the city's economic conditions could encourage the development of 3,400 of the City's more than 40,000 vacant parcels for residential use,[27] indicating that significant numbers of vacant parcels are likely to remain in the years to come. Cast in another light, low real estate pressure provides an opportunity for stakeholders to convert vacant parcels to green spaces, transforming them from liabilities to assets. Given the City's ambitious GI commitment and goals, vacant parcels merit analysis for conversion to green space. Brownfields deserve an additional set of analyses, given their unique environmental and economic conditions, to identify how these lots can best support green storm water management strategies. Green spaces hold several direct and indirect roles in supporting economic development, and thus should be considered in the context of broader development objectives.

Although research indicates development pressure in Philadelphia is relatively low, numerous barriers exist to repurposing vacant lots. More than 75% of vacant parcels are privately owned, requiring effective transfer of use or ownership to either the city or another private entity. Seventeen thousand of the city's 40,000 vacant lots are tax delinquent, and 11,000 have been tax delinquent for more than ten years, costing the City and the School District a minimum of $2 million annually in lost revenue.[28]

Administrative challenges exist to acquire and modify the use of vacant land, as numerous city agencies are responsible for vacant land in Philadelphia.[29] However, efforts by the City of Philadelphia, the PWD, the Philadelphia Parks and Recreation Department (PPR), and the Pennsylvania Horticulture Society (PHS) may facilitate the repurposing of vacant lots to green storm water infrastructure.

City of Philadelphia Vacant Lot Initiatives

The City of Philadelphia (the City) has begun streamlining the process to dispose of publically owned vacant land. The Philadelphia Redevelopment Authority (PRA) presently serves as a "one-stop shop" to coordinate the transactions of vacant land owned by the Philadelphia Department of Public Property, the Philadelphia Housing Development Corporation, and the PRA.[30] The City also is seriously considering developing a land bank to focus on the acquisition, management and disposition of vacant land; on October 24, 2012 Pennsylvania House Bill 1682 was signed into law, allowing municipalities to create land banks,[31] and a bill establishing a land bank to manage vacant lots and properties has been introduced to City the Philadelphia City Council by Councilwoman Maria Quiñones Sánchez.[32]

PWD Neighborhood-Scale GSI Planning

PWD regularly partners with civic groups, watershed partnerships, neighborhood organization and City Council to identify and prioritize green storm water infrastructure project sites. Presently, requests for GI undergo a community input process. PWD also partners with projects and planning efforts led by other city agencies, such sas the Planning Commission, PPR and the Mayor's Office of Transportation and Utilities.

PPR Green 2015 Plan

The PPR seeks to increase public open space by 500 acres by 2015. A 2010 study by Penn Praxis, to assist PPR develop Green2015, estimated that more than 200,000 Philadelphians do not live within a half mile of public green space, and noted that most underserved areas in the city are located in CSO areas. This study identified 558 acres of publically owned vacant lots at least ¼ acre in size in underserved areas, and 1257 acres of privately owned vacant parcels larger than ¼ acre in underserved areas.[33] Despite these greening opportunities, the PPR has not sought to green vacant lots through its program, seeking other greening strategies instead.[34]

PHS's Philly Green Program

PHS's Philadelphia LandCare (LandCare) program greens and maintains vacant lots, with the goals of improving and stabilizing neighborhoods. The LandCare 'clean and green' program cleans vacant lots, brings in top soil, plants grass, adds a post and rail fence three feet high, and maintains the greened spaces. Initiated 12 years ago, the LandCare program currently maintains approximately 7,000 parcels totaling 8 million square feet. Greening treatments are funded through Federal Housing and Urban Development programs. Maintenance is funded by the City's general revenue funds through a contract with the Office of Licenses & Inspections (L&I). Three quarters of these lots are privately owned; PHS gained legal access to maintain these sites due to L&I code violations. The lots vary in size; while some are several adjoined small parcels, others are as large as one acre; the median size is around 5,000 square feet. Approximately 15% of sites the PHS has greened over the past 12 years have been developed; its greening treatments are intended to be temporary. Many sites large enough to be considered a park (a minimum of ¼ acre in size) have been transferred to PPR; however, the PPR does not currently have a plan to convert sites maintained by PHS to permanent green space. The PHS estimates between 10% and 20% of lots it currently maintains are at least ¼ acre in size, and notes the general public actively utilizes many of these sites as parks. PHS has long-standing partnerships with numerous community organizations, and sub-contracts with several for maintenance, in addition to other landscape contractors. The Neighborhood Garden Association, a sister organization, is a land trust that owns several dozen community gardens; it has not sought to expand its role given limited funding.[35]

Research indicates PHS's greening treatments significantly improve the economic and social well-being of neighborhoods, advancing neighborhood stabilization by encouraging reinvestment. A 2005 assessment of four sections of Philadelphia, where PHS greened vacant lots in partnership with community groups and public agencies, concluded that greening treatments were associated with consistent and statically significant decreases in gun violence over a ten year time frame.[36] An economist hired by the PRA preliminarily concluded that homes within ¼ mile of a PHS greened lot increased in value by 2% to 5% annually – equal to $35,000 over five years – generating $100M in additional annual property taxes, if accurately assessed.[37] The researcher estimated that, for each public dollar invested in the LandCare clean and green program, 7.43 dollars of tax revenues were returned.[38]

Barriers to Vacant Land Transfer

The Philadelphia case, as well as additional cases, indicates several key barriers to transferring vacant land to green space:

1. *Site control*

- Private landlords own many vacant properties. Many landlords have abandoned their properties, while investors who bank land until values rise own many other vacant properties.[39]
- Public agencies may envision competing uses for vacant land; some agencies may not effectively value green space or storm water management.

2. *Site selection*

- Identifying the most strategic sites for green space and storm water management may require a public process and technical analyses.
- Brownfields are a special sub-set of vacant land that require an understanding of the site's past use, contamination levels, economic conditions, safe green space options, and remediation opportunities.

3. *Legal and economic mechanisms for site transfer*

Effective legal and economic penalties, incentives and conditions for conversion to green space need to be in place for the transfer of vacant land to green space.

4. *Public administration*

Acquiring site control of private properties and shifting use of public properties may require negotiating a complex bureaucracy with competing interests.

5. *Achieving scale*

Strategies for identifying and acquiring single sites may not be effective or efficient while seeking to aggregate vacant lots. To effectively manage storm water, location and aggregation within a particular watershed are important.

Management Challenges of Reusing Vacant Land

In addition, important challenges to managing vacant land include:

1. *Organizational structure & management*

The types of organizations, roles of public and private partnerships, and legal authority of organizations can impact their ability to manage green space.

2. *Legal agreements*

Agreements between former and new property owners, among management organizations, and between a municipality and community organizations can impact the success of GI maintenance.

3. Economic agreements

Financial arrangements and commitments to maintenance programs, and to the public administration of green spaces, can determine the health of green space.

4. Long-term care

Ensuring that agreements and organizational capacity exist in the long-term, and that uses can adapt over time, can impact program success.

Report Overview

The remainder of this report is organized as follows:

- Chapter 2 provides ten case studies that illuminate how leading cities plan, administer, and implement programs that convert vacant land to green space, in the context of regulatory requirements and broader redevelopment goals. Each case study traces one program or initiative led by a public agency or stakeholders within a municipality from the planning stage through implementation, emphasizing how programs have overcome barriers.
- Chapter 3 explains key findings across cases, and develops a set of planning and implementation strategies that local governments and agencies, as well as NGOs and private enterprise, can employ to utilize vacant lots as green space – particularly to meet storm water regulatory requirements.
- Chapter 4 recommends strategies to the PWD for greening vacant lots in Philadelphia to advance its CSO Consent Order requirements.

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Chapter 2: Case Studies from Around the Nation

Chapter 2 provides ten case studies of programs that green vacant lots to create open space and/or manage storm water. Each of the first seven cases traces a single program from inception through implementation. The final three cases describe early efforts of "thought leading" cities to manage storm water using green infrastructure on vacant lots. For each case, we also describe complementary policies and programs, which frequently help to explain why a program succeeds in converting vacant lots to green spaces.

We analyze each case in terms of planning and analysis, program administration, title transfer, finance, ownership, and preservation. We consider the impact of process (in terms of public participation and public administration) and substance (in terms of economic, spatial, environmental, and brownfield-specific analyses). For transfer tools, we describe legal and economic measures that sought to facilitate the acquisition and aggregation of vacant land. And for management, we consider what organization structures, public-private partnerships, legal arrangements, and financial commitments help to ensure the well-being of green spaces in the long term.

Most cases were selected based on outcomes achieved. Five additional criteria informed our case selection:

1. Scalability, the ability to aggregate projects;
2. Replicability, the applicability to other places;
3. Diversity of green spaces, including public parks, community gardens, urban agriculture, and brownfield reclamation projects;
4. Geographic diversity; and
5. Diversity of approaches in transfer of ownership and/or long-term maintenance strategies.

We considered twenty cities during our process of case selection and selected the ten most promising cases for our analysis.

The first three cases exemplify how vacant lots can result in greened spaces at different scales. Chicago's CitySpace plan and related programs model citywide planning and implementation strategies. Tallahassee's Capital Cascade Trail illustrates how a greenway and a network of parks can manage regional storm water. And, Milwaukee's Menomonee Valley Industrial Center demonstrates how cities can facilitate storm water management among businesses using green infrastructure at a single site.

The second three cases focus on the effective acquisition of properties. The Genesee County Land Bank successfully acquires tax delinquent vacant properties at a large scale and manages a series of short-term greening programs that can result in permanently greened space. New York's community gardens programs and Staten Island Bluebelt program utilize multiple acquisition strategies to protect and aggregate sites. And Seattle's park planning programs utilizes acquisition to increase green space to advance comprehensive plan goals.

The subsequent case, Baltimore's Watershed 263 program, demonstrates challenges that may arise throughout the process of implementation to green vacant lots while pursuing storm water credits. Our final three cases, Detroit, Cleveland, and New Orleans, are "thought-leading cities" that are still in the planning or early implementation stages of using green infrastructure on vacant lots to manage storm water. Although programs in these cities are in development, they can inform the greening efforts of other cities.

Chicago, IL

Introduction

The City of Chicago's 1998 *CitySpace* comprehensive plan identified citywide open space needs, developed a strategy to increase open space, and laid out steps for implementation. *CitySpace* drew inspiration from Daniel Burnham's 1909 Plan of Chicago, which called a preserved urban forest "as practical and quite as much needed as were the boulevards of a generation ago,"[1] and from social reformer Jane Addam's advocacy in the 1890's for playgrounds in densely populated low-income neighborhoods.[2] In 1990, Chicago ranked eighteenth out of twenty similarly sized American cities with just 4.13 acres of open space per 1000 residents.[3] Mayor Daley sought to increase the competitiveness of Chicago, given the importance of green space to quality of life. From 1998 to October, 2012, the City and its partners acquired or converted more than 1344 acres of neighborhood parks, wetlands, natural areas, neighborhood parks, campus parks, and community gardens.[4]

Children farming. Photograph printed with permission from NeighborSpace.

Planning and partnerships among public agencies, programs by non-profit organizations, and the advent of a land trust supported the successful implementation of *Cityspace*. The City of Chicago's Department of Community Development (DCD) coordinated the demolition of city-owned properties, foreclosure of privately owned properties, and acquisition of private properties. Vacant lots were subsequently transferred to the Chicago Park District (CPD) or NeighborSpace, a public-private land trust that grew from *CitySpace*. Openlands, a non-profit organization, facilitated the transfer of vacant lots by providing temporary ownership, particularly for smaller sites. Multiple financing mechanisms including bonds, tax increment financing, and an open space impact fee supported the acquisition and development of open space. The CPD owns and cares for sites larger than two acres, while NeighborSpace owns and supports neighborhood groups who care for community managed open spaces, which are smaller than two acres. The Chicago Green Corps supports the maintenance and licensing of community gardens while training people with barriers to employment in horticulture.

The City of Chicago, the CPD and the Forest Preserve District of Cook County collaborated in 1993 to initiate *CitySpace*. In 1996, the Chicago Public Schools was formally added to their planning team. These four public entities, supported by the Chicago Community Trust, a local foundation, facilitated the participation of more than 100 public, non-profit, and private organizations to identify the open space needs of stakeholders citywide.[5] Through *CitySpace*, the City of Chicago and its partners began their analysis by developing baseline open space needs.[6] Their analysis included a citywide land inventory and mapping study that helped stakeholders to identify sites that could be converted to open space; data collected for each site included lot size, ownership, and tax status.[7] They estimated that 55,485 lots (nearly 1 in 10 lots citywide) were vacant — equal to 13,769 acres, or 14.5% of the city's land area.[8] The C*itySpace* plan suggested three types of land area with the greatest potential to create new open spaces: land surrounding schools, inland waterways, and vacant land.

In addition to increasing open space, vacant land held potential to advance *CitySpace* equity goals. The *CitySpace* plan noted that few communities actually have 4.13 acres of open space per 1,000 residents; 38 of 77 community areas in Chicago, which comprised 1.6 million residents or 61% of the city's population, had less than 2 acres per 1000 residents. Defining these communities as "underserved", *CitySpace* developed "service area standards" for the distance of residents to open space, based on National Recreation and Park Association recommendations. Service area standards ranged from .10 miles from mini-parks (.1 to .5 acres in size) to 1.00 mile from magnet and citywide parks (above 50 acres in size).[9]

Based on citywide and neighborhood open space needs, *CitySpace* developed the following three goals:[10]

1. By 2010, achieving a minimum of 2 acres of public open space per 1,000 residents in all community areas. This would require the creation of 1,250 acres of local open space, or 90 to 100 new acres of open space per year.
2. By 2020, achieving a minimum of 5 acres of open space per 1,000 residents in all community areas.
3. By 2020, realizing for all residents local and regional open space opportunities. This would require creating 2,400 new acres of local and regional open space.

The *CitySpace* plan set quantifiable goals coupled with a strategy, processes and resources necessary to acquire, green and maintain vacant lots. City agencies and Openlands followed up with local planning efforts to select sites and implement their projects. The DCD identified sites and worked with community stakeholders as part of its neighborhood planning efforts, and the CPD worked with communities on a site-by-site basis during the process of site selection and planning.[11]

Openlands: Neighborhood-scale planning

With the CitySpace plan in process, Openlands, a nonprofit organization, initiated neighborhood-scale planning to facilitate site prioritization, implementation, participation, and management. Founded in 1963, Openlands protects natural and open spaces throughout Northeastern Illinois through acquisitions, easements, wetlands restoration, greenways and trails, and community greening. Urban forestry, education, natural habitat restoration, and neighborhood planning comprise its community greening program.[12]

Openlands' neighborhood planning program, initiated in the mid-1990s, works with community stakeholders to develop and implement community garden plans. Openlands works with stakeholders such as block clubs, social service organizations, elected officials, and businesses to distinguish which vacant lots in a neighborhood should be set aside for

housing and commercial development, and which should be utilized for community gardens. Next, Openlands and local stakeholders develop site-specific community gardening plans, which are usually on two or three adjacent, former residential lots.

To support long-term stewardship, Openlands facilitates the development of neighborhood- wide coalitions of gardeners. Once a group of 10 to 12 gardeners is organized, Openlands suggests it approach NeighborSpace to ensure long- term ownership. Openlands has developed neighborhood- scale plans in about 10 Chicago communities. Although Openlands originally encouraged outside volunteers to conduct maintenance, it realized that the local community gardeners took less ownership over their gardens once volunteers consistently conducted maintenance.[13]

For example, in1996, Openlands was approached by neighborhood residents in the North Lawndale community to provide support for greening a vacant lot. North Lawndale was a low-income African-American community that had an abundance of vacant lots, remnants of fires in the 1960s and 1970s. While Openlands helped North Lawndale residents start a garden at that particular location, it also establish the North Lawndale Greening Committee and developed a neighborhood gardening plan, which identified sites throughout North Lawndale that could be converted into community gardens. About 20 community gardens have since been established in North Lawndale. The North Lawndale Greening Committee, which still meets on a monthly basis, has taken on other critical neighborhood issues such as crime.[14]

Site transfer, finance & acquisition

The *CitySpace* plan recommended the conversion and acquisition of publically owned and tax delinquent properties. Local public agencies owned nearly 30% of vacant land while private owners of tax-delinquent properties held another 17% of vacant land.[15] The DCD provided a centralized process for the acquisition of privately owned, tax delinquent properties. The DCD's centralized process enabled the public, including community stakeholders and city agencies, to readily identify and acquire privately owned vacant lots appropriate for conversion to public green space. The DCD acquires vacant land where it had ongoing redevelopment efforts, as well as land requested from community organizations and its partners, NeighborSpace and the CPD. The CPD requests sites 2 acres and larger; it has educational and recreational programming in place for these sites, and has established minimum maintenance protocols based on particular site needs. NeighborSpace, which specializes in supporting smaller "community managed open spaces", requests sites smaller than 2 acres on behalf of groups that successfully go through its application process.[16]

Transfer process: the Chicago Tax Reactivation Program

The DCD acquired over 5,000 delinquent properties through the Chicago Tax Reactivation Program (CTRP) for open space and urban redevelopment, from the late 1990's to around 2010.[17] The CTRP was initially intended for low- and moderate-income housing development, as well as commercial and industrial projects. A 1991 amendment to the Cook County No Cash Bid Program Ordinance enabled the City to acquire tax delinquent properties for parks and open space.[18] Abandoned buildings were routinely part of the DCD's acquisition process for open space, as they were frequently demolished.[19] Before proceeding with acquisition, The DCD ensured that either the CPD or NeighborSpace committed to maintaining land they will receive. Frequently, the DCD directly received

requests to acquire a property from the CPD or NeighborSpace.[20]

The property transfer process through the CTRP can be summarized through the following seven steps:

1. The DCD makes a list of all tax delinquent properties for which it would like to place a bid through the sheriff's sale, and requests from the City Council permission to acquire these sites.
2. The Chicago City Council passes a local ordinance in support of the DCD's request.
3. The Cook County Board of Commissioners passes an ordinance in support of the DCD's request.
4. At the sheriff's sale, a non - cash bid is placed on the properties. The City of Chicago's "non-cash bid" is equivalent to the value of all unpaid taxes and delinquencies, and may be placed on properties at least two years delinquent in property taxes. Should no other bidder place a greater bid on the property, the DCD acquires the right to the deed and all prior liens on the property are waived.
5. The deed is transferred to the DCD.
6. The DCD sends a list of proposed deed transfers to the Chicago Plan Commission for review.
7. The DCD transfers the deed to either NeighborSpace or the CPD.[21]

The DCD's per parcel acquisition cost was approximately $3,000. Costs included legal work to negotiate this process and notifications to the owners of delinquent properties that their properties will be auctioned. The DCD hired a consulting firm to manage the process, acquiring around 1,000 properties at a time. Presently, however, the DCD does not use the CTRP because it has a surplus of property.[22]

Openlands Temporary Ownership Program

Openlands manages a $1.5 million revolving fund, which assists state, county, and local governments throughout Northeast Illinois to acquire open space. Established in 1976, this fund has assisted public entities throughout northeastern Illinois to acquire more than 200 properties, including vacant lots in the City of Chicago, parts of the Northwest Wildlife refuge, and open spaces along river corridors. More than 50 NeighborSpace- owned properties were acquired through the Openlands temporary ownership program.[23] Through this program, Openlands acquires properties, develops lease-to-purchase agreements for up to three years with public entities, and, ultimately, sells the properties to the public entities. Openlands agrees to transfer the properties to public entities in exchange for acquisition costs, market-rate interest, and the cost of administration, ensuring its revolving fund is replenished.[24]

This interim ownership program helps public agencies overcome three acquisition barriers. First, the program provides certainty of price, so agencies can raise funds for a site without the potential for a significant price increase. Second, the program helps municipalities to avoid costly and risky time delays. Highly developable sites may be sold to a developer while an agency raises acquisition funds. Moreover, many grant programs do not reimburse recipients for costs incurred before the time of an award. Public agencies may purchase properties from Openlands once funds become available. Third, this program has helped the City of Chicago to acquire multiple adjacent properties within a short time frame of one another, facilitating large-scale aggregation.[25] For example, Openlands acquired 37 privately owned sites for the City of Chicago on an interim basis to increase the size of contiguously owned land for the Indian Ridge Marsh, ensuring private buyers could not place a bid for these properties.[26] Openlands' interim ownership program complemented the City of Chicago's use of the CTRP for the majority of 1300 parcels at the 153-acre Indian Ridge Marsh site.[27]

Financing Strategies

Financing strategies facilitate the acquisition and development of new open space projects on vacant land. The DCD runs an Open Space Impact Fee program and the CPD utilizes property assessments, tax increment financing, and concession revenues to finance open space projects.

Open Space Impact Fee program (OSIF)

The DCD has raised $53 million since 1998 by requiring residential developers to pay a per-unit fee for new dwelling units. Resources raised through the OSIF are dedicated to new open space projects in the community area where the new residential units were developed, ensuring that inhabitants of the new units benefit from the project.[28] Since 1998, the OSIF Program has helped to expand 11 existing CPD parks and create 38 CPD parks, 6 Campus Parks, 11 NeighborSpace gardens, 14 school gardens, and 5 trail projects.[29]

While the OSIF has raised several million dollars per year during periods of rapid development, the fee has raised around $600,000 annually over the last several years.[30] For eligible projects, where at least 2,000 square feet of new residential space are created, developers pay a fee based on the following formula: (new square feet) X ($12) X (30%). Fees range from $313 for residential units smaller than 800 square feet to $1,253 for units equal to or greater than 3,000 square feet. The majority of housing units fall in the range of 800 to 1,599 square feet, and are assessed a fee of $626 per unit. Developers of qualifying affordable housing units pay $100 per unit.[31] The Department of Buildings processes the OSIF while reviewing permits for new housing units; the OSIF funds are then managed by the DCD.[32]

Chicago Park District financing

The CPD stands as its own legal entity, authorized through the Illinois state charter to levy taxes and set its own budget. By having a dedicated source of revenue, the CPD can raise revenue through bonds. The CPD is directly linked with the city's political administration, however, with a board comprised of mayoral appointees.[33] The CPD has a $400 million operating budget, $2 billion in assets, 600 parks, 8,000 acres of open-space, and the largest municipal harbor system in the world.[34] The CPD typically receives between 55% and 65% of its revenue from property taxes, 25% through private contracts (including revenues from concessions at Soldier Field), 10% through the personal property replacement tax (a tax on the net income of corporations), and additional revenue from a special recreational assessment for ADA accessibility. To finance capital improvements and acquisitions, the CPD sells general obligation bonds and utilizes tax increment financing (TIF). The CPD has typically issued approximately $30 to $40 million in general obligation bonds each year for land acquisition and capital improvements; twenty-two percent of the CPD's 2012 budget is dedicated to debt service.[35] TIF funding raised $55 million from 2006 through 2010 for the development of new green spaces, with the expectation of raising a total of approximately $142 million by 2016.[36,37]

The CPD, using CitySpace as a guide, works with the DCD to identify sites for acquisition. The DCD runs an inventory of what sites in the city are city-owned, conduct a site visit, negotiates for the site through the Tax Reactivation Program or through another agency, acquires jurisdiction, and transfer the site to either the CPD or NeighborSpace.[38]

Preservation & maintenance

Several entities support the preservation and maintenance of green spaces in Chicago: the CPD, Chicago Public Schools, the Forest Preserve District of Cook County, and NeighborSpace. Due to the roles of the CPD and NeighborSpace in maintaining green spaces on former vacant lots, the maintenance activities of these two organizations are described below.

The Chicago Park District

Although, given the political challenges of raising fees for maintenance, the CPD's maintenance budget has not increased in the last decade, it creatively seeks to 'do more with less'. For example, it continues to use revenues from concessions to support maintenance, and is leasing ½ acre of land in Grant Park to a business that grows lavender for fragrances. The CPD does not acquire sites less than two acres in size, however, because its acquisition, operations and management programs achieve diminishing returns on smaller sites.[39]

NeighborSpace

As a highly specialized organization, NeighborSpace offers greater effectiveness than its public agency partners at supporting community managed open spaces less than two acres. Building from commitments made in the *CitySpace* plan, NeighborSpace, a land trust, was founded in 1996. NeighborSpace assists gardeners to acquire, manage and sustain community support for existing community managed open spaces. NeighborSpace holds title, provides liability insurance, and fosters leadership development and succession for each site. At the time of writing, NeighborSpace owned 81 sites totaling 15 acres. Sites range in size from one half a city lot (25' X 75') to 1.5 acres;[40] most sites are between one and four city lots in size. The typical city lot is around 20'X 120'.[41]

NeighborSpace ensures its acquisitions are supported by local aldermen and councilmembers.[42] A significant percentage of NeighborSpace sites were acquired through the Tax Reactivation Program;[43] some privately owned sites were received through donations. Approximately half of NeighborSpace sites resulted from Openlands' community planning efforts.[44] Numerous sites were certified by the Chicago Green Corps program, which placed a hold on publicly owned properties for a five-year time frame, allowing leadership to develop among community gardeners.

Rather than actively soliciting participants, NeighborSpace responds to applications. Application criteria include the feasibility of site acquisition, the environmental safety of the site, and whether the site is located in a *CitySpace* high priority area.[45] In terms of stewardship, NeighborSpace seeks to ensure active group leadership: At least three 'Community Garden Leaders', 10 local resident 'Site Stakeholders,' and one 'Community Organization Partner', such as a block club, CDC, school, or church, need to sign on to the application.[46] Ultimately, the residents who manage the open space, the local community organization, and NeighborSpace enter a five-year agreement delineating roles and responsibilities.[47]

NeighborSpace does not have a maintenance budget, but rather is a steward of volunteers. Through its programming, NeighborSpace ensures leadership succession, providing tools for volunteers to recruit new people, build up mailing lists, and develop signage. NeighborSpace also connects its stewardship groups with similar groups from throughout the city and region, and facilitates leadership succession. Presently, NeighborSpace is developing a water conservation program. The City of Chicago is starting to charge non-profit organizations, including community gardens, for water consumption – a cost of $10,000 across all NeighborSpace projects.[48]

Though technically a private 501c(3) organization, NeighborSpace is strongly supported by public agencies. NeighborSpace receives $300,000 annually, equally supported through a 20 year inter-

governmental agreement among the CPD, the City of Chicago, and the Forest Preserve District of Cook County. Representatives from these organizations also are members of NeighborSpace's Board of Directors.[49] This agreement was extended for two additional years until 2018; another extension will need to take into consideration the organization's increasing responsibilities, and adjust for inflation.[50]

Easements & zoning

Few easements exist in Chicago. For the North Park Village project, around 60 acres in size, the City wanted to ensure the site's preservation despite development pressures. The City transferred the site to Openlands, which also serves as a land trust, in the form of an easement.[51] This is Openlands' only easement in Chicago.

The City otherwise does not utilize easements, preferring to ensure preservation through zoning requirements.[52] In 1999, the City developed the Chicago River Corridor Development Plan requiring public access setbacks for waterfront development projects.[53] Design standards for these projects incorporated storm water management best practices.[54]

Economic Development: The Chicago Green Corps program

Although the Green Corps may not serve Chicago beyond 2012, its programs have supported community gardening and workforce development.

Since 1994, the Chicago Green Corps team has supported community managed open spaces by building the capacity of community gardening groups. The program helped community members to acquire a letter of permission from an alderman to convert a publicly owned vacant lot into a community garden for a five-year timeframe, during which time the City would place a hold on a property. Many of these properties initially became community gardens through planning efforts with Openlands, while still others were in the process of being converted to a NeighborSpace garden. The Green Corps program also provided technical assistance and education to community gardeners based on their particular needs, which at times included constructing raised beds, conducting planting, and basic maintenance. Green Corps provided maintenance for the first three years. Maintenance responsibilities subsequently became the full responsibility of community gardeners. The Green Corps also provided quarterly giveaways of community garden materials, such as bulbs and mulch.[55]

With respect to workforce development, the Green Corps educated about 30 trainees in horticulture and energy efficiency each year. Basic training was provided in the classroom, while the remaining 60% of training was in the field, where trainees improved their skills with professional project managers. Participants received training in weatherization, environmental remediation, recycling, hazardous waste removal, ecological restoration, and tree care. Certifications were provided for multiple skill sets, including: asbestos abatement; lead certification; forklift operation; OSHA Hazwoper training; Lockout/Tagout; and pesticides application. Many skills in horticulture, however, are provided but not certified, reflecting a gap in professional credentialing. Although a certified arborist credential exists, about five years of professional experience is required for receiving this license; no certification exists for entry-level horticulture workers. Approximately 75% of Green Corps participants were ex-offenders.[56]

Historically, the Green Corps program has had an annual budget of approximately $1.2 million. One third of this funding derived from corporate sources, one third from city general obligation bond funding, and one third from settlement funding from Commonwealth Edison, the local power utility. Green Corps also provides fee-for-service tree care and ecological restoration for the CPD and the Forest Preserve District of Cook County, arranged through an intergovernmental agreement. The program had an influx of about $2 million in Federal HUD Community Development Block Grant funding from the American Recovery and Reinvestment Act of 2009 (better known as the 'stimulus package'), but this money has since run out.[57] Stakeholders are planning a summit in February to discuss how to bridge the gap of services that Green Corps will no longer be able to provide.[58]

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City of Tallahassee and Leon County, FL

Introduction

The City of Tallahassee and Leon County seek to mitigate regional flooding and protect drinking water through the Capital Cascade Trail. In 2000, citizen stakeholders worked with the City of Tallahassee and Leon County to advance a 1% "extra penny" sales tax to fund a series of "Blueprint 2000" environmental and transportation infrastructure projects including the Capital Cascade Trail. The City of Tallahassee and Leon County created the special purpose Blueprint 2000 agency to manage Blueprint 2000 projects. Three of the Capital Cascade Trail's four segments serve as a storm water management network. Segment 1 will mitigate flooding at Franklin Boulevard by sending storm water through a box culvert to Segment 2, Capital Cascade Park. Segment 2, a floodable park with a retention pond in downtown Tallahassee, is a brownfield reclamation project that meets multiple state and federal regulations. Segment 3, Florida Agricultural and Mechanical University (FAMU) Way, will treat storm water from Segments 1 and 2 using green infrastructure and retention ponds, ultimately sending storm water into local water bodies. Segment 4, the Central Drainage Ditch, will manage storm water using in-line ponds. The four segments are connected through a greenway; each segment incorporates context-specific recreational and educational uses developed with local stakeholders. Blueprint 2000 is acquiring and aggregating publically and privately owned sites to develop the Capital Cascade Trail, which will cost an estimated $80 million to construct.

Background context

The City of Tallahassee (the City) and Leon County (the County) manage storm water to reduce flooding and protect drinking water. Storm events in Tallahassee flood four major drainage channels. As a consequence, floodwaters frequently damage surrounding buildings and properties. Flash flooding is particularly problematic. For example, the Franklin Boulevard floods within half an hour of strong storm events, endangering people and automobiles; a car can float away from a two-foot deep flood that moves at three feet per second.[1]

The City operates 29 wells, tapping a karst aquifer to provide drinking water.[2] Karst groundwater systems (which include sinkholes) are particularly vulnerable to contamination.[3] While the EPA attests that overall the quality of groundwater is good, former industrial uses have contaminated the city's water supply. The City has made significant capital and remediation investments to address this contamination. The City also has worked with the County to develop protection standards, implement education and assistance for business owners with chemical and waste issues, and provide environmental education to residents.[4]

Vacant land planning

Given the region's rapid population growth, most vacant land planning in Tallahassee focuses on conserving undeveloped properties.[5] The city's population has more than doubled since 1960, from 89,539 residents in 1960 to 181,376 residents in 2010.[6] The county's population has more than quadrupled, from 74,225 to 275,847, during the same timeframe.[7] Nonetheless, vacant lots and brownfields provide development challenges. The City of Tallahassee's brownfields program has

assessed about 10 sites over the past five years and plans to redevelop one of these sites. Others are being redeveloped privately. These projects may be the beginning of a larger initiative, as many more properties within its designated brownfields area may be contaminated.[8]

Through greenways, the City and County also seek to preserve or repurpose vacant land as publicly beneficial green space. According to Florida state law, each incorporated jurisdiction must create and update a Comprehensive Plan to inform county plans and policies. Required Comprehensive Plan elements include transportation, land use, conservation, parks and recreation, housing, and other planning-related local government responsibilities. The Tallahassee-Leon County Comprehensive Plan states that local government should seek to incorporate floodplains and natural drainage ways into the greenway network. Planners also are supposed to identify and prioritize sites that advance preservation and conservation goals, support connectivity, have historical value, and provide natural resource buffering. Bicycle trails and pedestrian pathways are also to be prioritized, where appropriate.[9]

Planning methods and processes

In 1999, the Economic and Environmental Consensus Committee (EECC) sought to unite disparate communities in Tallahassee through holistic projects that advance multiple goals. Comprised of conservation, science, commercial, real estate, and planning professionals, the EECC developed a *Blueprint 2000 and Beyond* plan recommending the extension of a 1% sales tax to fund environmental infrastructure and transportation projects.[10] In 2000, The EECC worked with City & County agency staffs to estimate specific costs and consider the feasibility of projects. Their joint analysis concluded more than $800 million would be required for all suggested projects, including $300 million for storm water infrastructure.[11] A 15-year extension of the 'extra penny' sales tax (due to expire in 2004) passed a ballot vote in 2000. Funds were dedicated to managing storm water and flooding, protecting lakes and drinking water, expanding natural areas, parks, and recreational facilities, improving transportation networks, and seeking matching state and federal funds.[12]

The Blueprint 2000 agency

Upon passage of the 1% sales tax, the City of Tallahassee and Leon County created Blueprint 2000, a special purpose intergovernmental agency, to manage and plan the construction of EECC-proposed projects.[13,14] The City and County created Blueprint 2000 because EECC projects do not fit cleanly within the jurisdiction of any single public agency. A third-party agency could focus on implementing projects across political jurisdictions. Watershed boundaries and transportation networks cross city and county lines, sales taxes are collected by the County, and the City of Tallahassee and Leon County have a long history of partnership, including a joint planning department and a joint Geographic Information System data development and maintenance department. For these reasons, Blueprint 2000 was created through an inter-local agreement between the City of Tallahassee and Leon County.[15] In addition to managing projects, Blueprint 2000 has the authority to issue and sell bonds; incur debt; establish, operate and manage a pooled loan fund; own, acquire, and lease real property; and use eminent domain.[16] Public agencies in Florida, through the as-of-right program, may offer property owners 130% of a property's appraised value as an alternative to entering eminent domain proceedings. This process can expedite, with willing sellers, the acquisition process.[17]

Blueprint 2000 is governed by a Citizen Advisory Committee (CAC), a Technical Coordinating Committee (TCC), the Board of County

Commissioners, and the City Commission.[18] The CAC, comprised of 12 representatives from environmental, economic development, neighborhood, and civil rights organizations, as well as the elderly and the disabled communities,[19] places advisory votes and comments on proposed projects. The TCC, comprised of key City and County staff,[20] considers the CAC's position and comments while developing its own recommendations. The TCC submits its comments to the Board of County Commissioners and the City Commission, who make an ultimate decision over a project's future.[21]

Blueprint 2000 has seven full-time staff members and maintains a general engineering contract with a prime consultant, which has around 10 full-time staff dedicated to its projects. Blueprint 2000's staff members, technically staff of the City and County, provide administrative and legal assistance. Through the TCC, Blueprint gains access to the expertise of City and County agencies, while its consultants provide engineering and design services. The Director of Blueprint 2000 also directs the joint City of Tallahassee-Leon County Planning Department; his position is formally known as Director of Planning, Land Management and Community Enhancement (PLACE).[22] Blueprint 2000's annual budget is approximately $2M. In addition to City and County staff, Blueprint funding supports engineers and technicians as needed from a pool of twelve consulting firms that are part of the General Engineering Consultant.[23]

Funding Blueprint 2000 projects

Blueprint 2000 receives an 80% share of extra penny sales tax revenues, while the City and County each receive a 10% share for priority transportation and environmental infrastructure projects.[24] Through 2011, Blueprint 2000 has received $198 million in sales tax revenues, averaging $28.4 million per year. Blueprint 2000 has sold $145 million in bonds to plan, acquire and construct projects.[25] Blueprint 2000 also received three below-market rate (2% interest) loans from the Florida infrastructure bank, totaling $49 million, for highway-related improvements that incorporated greenways.[26] According to its 2010 Proposed Master Plan, 43% of its budget is dedicated to environmental projects while 54% is dedicated to transportation projects. In addition, Blueprint 2000 maintains a "land banking" program that supports the acquisition and aggregation of privately owned properties. Blueprint 2000 utilizes an internal revolving fund of between $7 million and $8 million for this land banking program, replenishing the fund once other revenue becomes available.[27]

The Tallahassee-Leon County Greenways System

Blueprint 2000 provides a funding, planning and implementation vehicle for multiple projects within the Tallahassee-Leon County Greenways Master plan (the Greenways System). Initiated in 1994, the Greenways System seeks to advance Comprehensive Plan goals, manage storm water, preserve sensitive lands, improve riparian corridors and floodplain areas, protect natural habitat supporting biodiversity, and implement the Capital Cascade Trail.[28,29] The City Commission and the Board of Commissioners adopted as official policy the 2004 Greenways Master Plan. Notably, since its founding, the Greenways system has matched more than two non-local dollars for every local dollar spent: more than $6.4 million from the City, $2.9 million from the County, $7.2 million from Blueprint 2000, $30.3 million from the state of Florida (primarily through the Florida Forever program), $200,000 from Federal programs, and $4.2 million in property donations from the owners. The Greenways system has predominantly focused on acquiring large properties containing undeveloped, natural lands through fee simple acquisitions.[30] Blueprint 2000's Capital Cascade Trail project, however, supports the reuse of vacant lots in the highly urbanized area of downtown Tallahassee.

The Capital Cascade Trail

The Capital Cascade Trail is comprised of four segments that support storm water management, transportation, recreational, and quality of life goals. Segments 1, 2 and 3, a connected system of box culverts, pocket parks with retention ponds and a floodable park, mitigate flooding locally and regionally. Segment 4 seeks to improve water quality using constructed wetlands. The acquisition and aggregation of privately and publicly owned property, including brownfields, is critical to the development of this greenway/trail. The four segments, totaling more than $80 million in construction costs, are primarily financed through penny sales tax revenues dedicated to Blueprint 2000, with matching funds from state and federal programs where possible. Blueprint 2000 has spent $6 million thus far to acquire private property. While maintenance requirements vary by segment and are currently unfunded, upkeep will fall on City and County agencies. The following four sections describe in greater detail the goals, site design, funding sources, ownership, and maintenance strategies of each segment.

Segment 1: Franklin Boulevard

Segment 1 entails reconstructing Franklin Boulevard, a ½ mile stretch of roadway, to mitigate flooding, provide recreational and bicycle access, and enhance automobile transportation.[31] Franklin Boulevard floods during significant rain events, resulting in frequent road closures and damage to surrounding properties. Storm water was previously managed at Franklin Boulevard through an open ditch. Traffic studies indicated this four-lane boulevard was only busy during the peak morning and evening hours, and was otherwise underutilized.[32]

Impervious surface area was reduced by narrowing the 80' wide street from four lanes to two (one lane in each direction), providing 40' for sidewalks, a multi-use trail and bicycle lanes. Although the site's design initially considered a landscape easement, the trail and bike lane were incorporated into the site's final design using only the space created by reducing the width of the street. Transportation improvements, such as dedicated left turn lanes, were also implemented.[33]

To manage storm water, Segment 1 seeks to drain storm water from the area. Segment 1 utilizes ditch inlets and high capacity roadway inlets that drain into a box culvert, which drains into Segment 2, Capital Cascade Park. Flooding will be eliminated for most rain events; as a consequence, property values in the surrounding neighborhood are expected to increase.[34]

This $10 million project received a $4.2 million grant through HUD's Community Development Block Grant program following tropical storm Fay in 2008; Blueprint 2000 covered the remaining $5.8 million using 1% sales tax funds.[35] Though Franklin Boulevard is county-owned, the City of Tallahassee will maintain the road curb-to-curb, which will include landscaping. The County, through its Public Works Department, will care for the storm water management components; tasks will include monitoring the box culverts to ensure they are high functioning and cleaning them out periodically. The project is scheduled to be completed by March 2013.

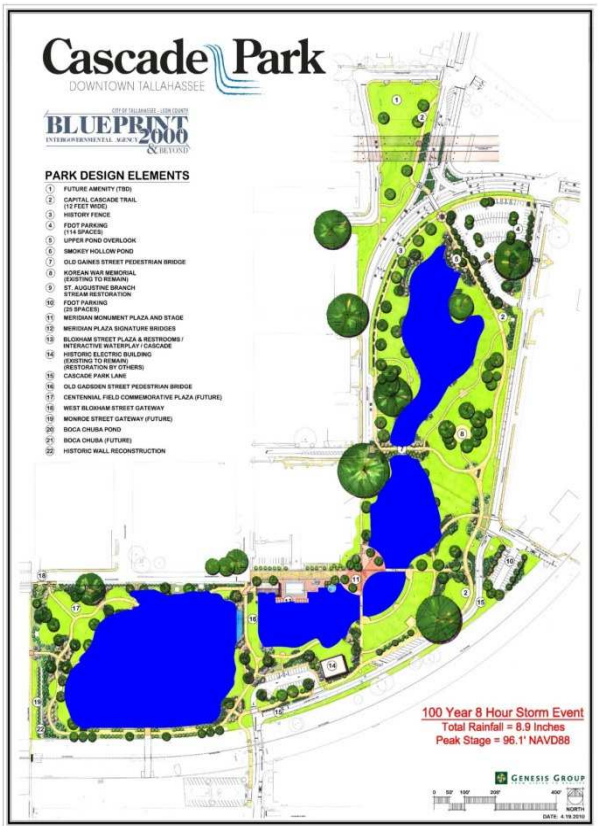
Segment 2: Capital Cascade Park

Capital Cascade Park, the trail's signature project, is a 24-acre floodable park designed to store and treat runoff from a 693 acre drainage area, including Segment 1. Capital Cascade Park is situated in the 860- acre downtown catchment area, which is consistently overwhelmed from rain events;[36]

flooding presents a major safety concern in the area. A former EPA Superfund site,[37] this project provides a model for reusing abandoned and contaminated industrial lots to manage storm water and create actively used open space.

Site history and ownership

The City of Tallahassee acquired land from the state of Florida to develop the site. The eastern two thirds of the Park was once a historically black community, known as "Smokey Hollow," with residences and commercial activity. Adjacent lay an incinerator and electric generation facility. The Smokey Hollow neighborhood was condemned in the 1950s and



Cascade Park dry (on the left) and after a 100-year storm (on the right). Image printed with permission from Blueprint 2000.

1960s to construct a state Department of Transportation building and parking depot, and a segment of the Apalachee Parkway.[38] The western third of the site once held a coal gasification facility, which ceased operation in the 1950s. The site was originally owned by the City and sold to the State of Florida when operations ended. The EPA designated the western third of the property a Superfund site, requiring the City to undertake cleanup efforts. The eastern two thirds of the site had contaminants that needed to be cleaned up to meet state regulations. In 2004, the City acquired from the state both the eastern two thirds and western third of the site to advance cleanup and open space redevelopment efforts.[39] Capital Cascade Park's construction is scheduled to be completed in January, 2013.[40]

Storm water management features

Capital Cascade Park will utilize box culverts, two detention ponds, and green infrastructure to manage storm water from a 693 acre drainage area. The box culverts will drain water from the surrounding area into the detention ponds during hard rain events to protect the park's vegetation. Two detention ponds, connected through a restored stream, are designed to flood into the surrounding wetlands and landscaping. Plantings, including reconstructed wetlands, native trees, and native landscaping will retain, detain, and

reduce the flow rate of storm water. This park is capable of storing 100 acre-feet of water (the equivalent of a 170-foot deep football field), managing a 25-year, eight-hour storm event.[41] Capital Cascade Park also utilizes an alum injection system to treat storm water in the retention ponds.[42] Planners anticipate the alum treatment system will reduce total nitrogen by 30%, fecal coliform by 75%, and total coliform by 80%, in addition to stabilizing aquatic oxygen levels, reducing turbidity, and removing additional contaminants. Water treated by the alum system will meet or exceed Clean Water Act requirements and comply with National Storm water Management Best Practices.[43] Treated water then drains through box culverts into wetlands and streams, finally reaching Lake Munson.[44]

Brownfield remediation

The City of Tallahassee addressed contamination challenges through a close partnership with the EPA and the state of Florida, which had regulatory jurisdiction over different areas of the property. In addition to contaminants from the gasification plant, petroleum from gas stations and garages was identified during pre-construction assessment phases. During 2006, the City conducted remediation activities to address the gasification plant and petroleum contamination. Blueprint 2000 also removed residual contaminants discovered during construction.[45] The City was required by EPA to implement a restrictive covenant for the western third of the site to ensure the site would not be utilized for potable water consumption; a similar covenant for the eastern two-thirds will be implemented with the state of Florida after park construction is completed.[46] A 20-year monitoring agreement between the City and EPA, which ensures that a monitoring well network is sampled and groundwater quality results are reported, was developed as part of the remediation efforts.[47]

Infrastructure improvements at the site may also improve water quality. Terracotta sewage pipes may have leaked into waterways. By replacing those pipes and providing a monitoring program, water quality may be improved.[48]

Site uses

In addition to advancing flood mitigation and water quality goals, Capital Cascade Park provides space for multiple types of recreation and historical interpretation.[49] Site uses will include an outdoor amphitheater, an existing Korean War Memorial, an interactive cascade fountain, a commemoration of Smokey Hollow, a children's playground, and 2.3 miles of walking and fitness trails. In addition, the 24 acre park includes restrooms, benches, picnic tables, bicycle racks, recycle trash receptacles and trail lighting.[50]

Finance of construction & maintenance

The construction of Capital Cascade Park cost $25 million. Blueprint 2000 provided $21 million for construction, and public grant programs provided an additional $3 million. An additional $1 million has been raised from private donors, including $600,000 from Capital Health Plan for pedestrian access within the park.[51] Brownfield remediation costs totaled approximately $11 million for the western third of the site. The City received a $7.2 million grant from the state of Florida, and an additional $500,000 from the state Department of Environmental Protection at the point of transfer in 2004. The City of Tallahassee covered the remainder of expenses through its general revenues.[52]

Maintenance

As a signature park, the site needs to be maintained to a particularly high level; additionally, alum treatment systems require a high level of maintenance. Capital Cascade Park will need at least six employees to perform basic maintenance, requiring $200,000-$300,000 annually. Three public agencies will maintain components of the park: the City of Tallahassee Department of Parks, Recreation and Neighborhood Affairs will conduct general maintenance, such as changing lights, mowing the lawn, and removing litter. The City's Underground Utilities, Water Resources Engineering Division will be responsible for the storm water system, cleaning out the retention ponds and ensuring that the chemical alum treatment injections are functioning properly. The City's Public Works

Department, Operations Division will be responsible for the 15 acres of roadways on-site. As the park lacks a dedicated source of maintenance funding, its amphitheater could potentially help to generate revenue by hosting events. Otherwise, public agencies will need to find the resources to ensure adequate funding is in place.[53]

SEGMENT 3: FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY (FAMU) WAY

This 1.5 mile stretch of greenway will incorporate two retention ponds, a five-acre pond and a four-acre pond, surrounded by open space designed for recreation. Segment 3 will receive waters from Segment 1 and Segment 2. Storm water contained in Segment 3, the St. Augustine Branch, flows into the Central Drainage Ditch, into Lake Henrietta and then into Lake Munson.[54]

Site acquisition & Ownership

To construct both retention ponds, Blueprint 2000 is aggregating privately owned vacant lots and key occupied residential and commercial properties. For the four -acre retention pond, the city is acquiring 12 vacant lots that were divided among siblings of several families, many of whom did not reside in Tallahassee. Blueprint 2000 identified property owners and directly negotiated the acquisition of the properties. Blueprint 2000 acquired property from one home owner, who initially did not want to sell her property, through the right of way process. The acquisition of the properties cost approximately $1 million. For the five-acre retention pond, Blueprint 2000 is in the process of acquiring vacant sites from siblings within a single family and commercial businesses, which Blueprint 2000 is assisting to relocate.[55] Once the sites are aggregated and construction is completed, Blueprint 2000 will transfer the properties to the City.[56]

Uses of site

The majority of the FAMU Way segment is located in the immediate vicinity of Florida Agricultural and Mechanical University (FAMU), the only remaining historically black university in the state of Florida. Blueprint 2000 has identified multiple potential uses for the linear park in partnership with the FAMU School of Architecture. They seek to incorporate moving water elements, art Deco spaces, sculptures, and, potentially, an amphitheater around the storm water ponds adjacent to the greenway. The greenway will connect FAMU with Florida State University, which lies on the other side of a rail line; these communities have been geographically separated for more than 100 years.[57]

Finance and maintenance

The construction costs for the FAMU Way segment will total about $40 million. The City will provide $25 million for roadway improvements, and Blueprint 2000 will provide the remaining $15 million for the Greenway features and retention ponds. More than likely, the Tallahassee Parks Department and Department of Neighborhood Affairs will maintain the pocket parks while the Department of Public Works or the Environmental Growth Management Department will maintain the storm water infrastructure. Construction is scheduled to commence in fall or winter of 2013.[58]

SEGMENT 4: CENTRAL DRAINAGE DITCH

The Central Drainage Ditch segment, located in a more rural section of Tallahassee, will be a 1.5 mile greenway and storm water management system intended to improve water quality. The segment will filter storm water through a series of in-line ponds that release into the “Black Swamp” of Lake Henrietta, which ultimately flows into Lake Swanson, a critical water body according to the state of Florida. A trail will be built for recreational and educational purposes along the site. The ditch itself is privately owned but the County owns a significant portion of the site. Blueprint 2000 will seek to acquire privately owned properties either as donations from the owners or as acquisitions.

Blueprint 2000 is prepared to use penny sales tax dollars to support the full project cost, an estimated $15 to $20 million. Though maintenance responsibilities have yet to be determined, it is likely that the City's storm water department will manage the site. Construction is anticipated to occur from approximately 2016 until 2018.[59]

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Milwaukee, WI

Introduction

The Menomonee Valley Industrial Center and Community Park (MVIC) is a model of green infrastructure and open-space planning that supports water quality, quality of life, and business development goals. Led by the Redevelopment Authority of the City of Milwaukee (RACM) and the Menomonee Valley Partners, Inc. (MVP), a 133-acre abandoned brownfield, known as "Wisconsin's biggest eyesore,"[1] was redeveloped into 40 acres of recreational green space, including a 30-acre storm water "treatment train" and a 63-acre manufacturing center. Early collaborative planning, in partnership with the Milwaukee Department of Public Works, the Milwaukee Metropolitan Sewerage District (MMSD), and the 16th Street Community Health Center, led to a creative design that captures 100% of storm water on-site. The storm water treatment train captures and filters industrial runoff from the site's businesses; the centralized, publicly owned storm water facility increases property values and makes it easy for businesses to meet the City's on-site storm water management requirements. Agreements at the time of sale, which will be implemented through an easement between RACM, the City of Milwaukee Department of Public Works and MVIC businesses, provides a dedicated source of maintenance revenue and delineates minimum maintenance performance standards. The site also provides space for local businesses to grow and attracts new businesses to the area; presently, eight MVIC businesses provide more than 1,100 jobs. The project earned the 2009 Phoenix Award, which recognizes 10 projects nationally for brownfield redevelopment excellence.[2]

Fishing at the MVIC park. Printed with permission from MVP. Photo credit: Menomonee Valley Partners, Inc.

Background Context

The City of Milwaukee had both storm water management and brownfield redevelopment programs that supported the MVIC project. First, however, the history of the Menomonee Valley Shops site merits attention.

Menomonee Valley "Shops" site history

The Menomonee Valley was originally inhabited by Native Americans, whose livelihoods were supported by wetlands and rice marshes along the meandering Menomonee River that flowed into Lake Michigan. The 1200-acre valley became Milwaukee's industrial center from the 1890s through the mid-20th century, where more than 50,000 people worked in tanneries, iron works, rolling mills, and packing plants. The Menomonee Road Shops facility, once the largest employer in Milwaukee,[3] employed thousands of workers who built and serviced railcars and locomotives from 1879 through 1985.[4] Although the 133 acre site was

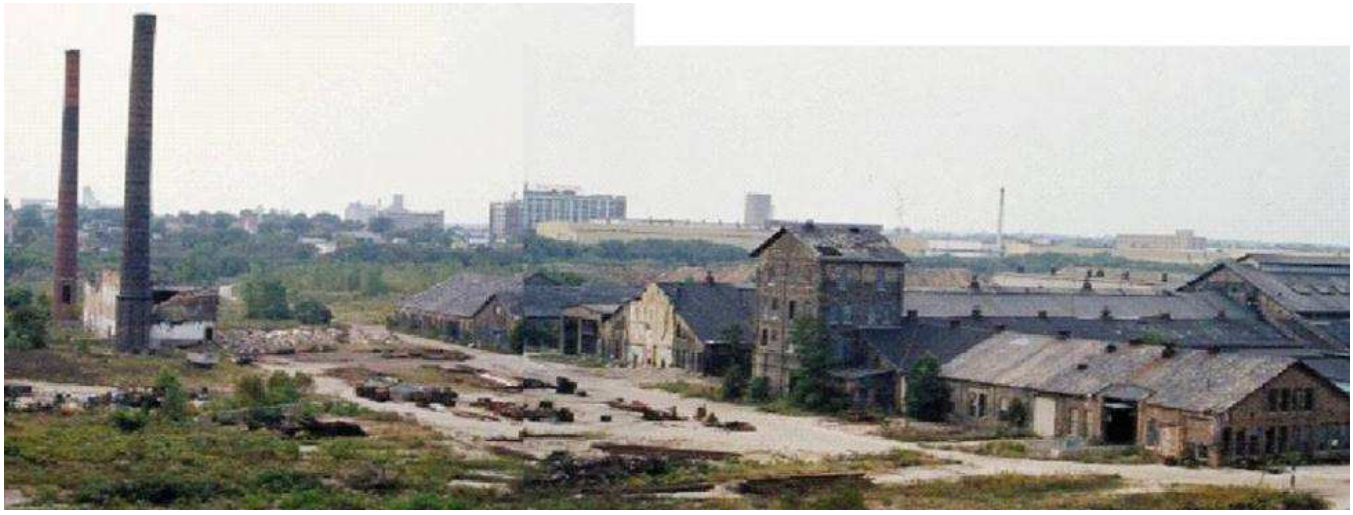
in a flood zone, it was nearly 100% impervious, had a filled-in marsh, and had an eroding riverbank; industrial runoff from the facility flowed directly into the Menomonee River. The Menomonee Valley supported fewer than 7,000 jobs by the late 1990s, reflecting post-World War II regional industry trends throughout Milwaukee and the Midwest.[5] The Menomonee Road Shops site lay vacant, with many violations and public nuisance complaints,[6] from its 1985 bankruptcy until its 2003 acquisition by RACM.[7]

Brownfield redevelopment planning

RACM is a quasi-public organization affiliated with the City of Milwaukee that supports blight elimination, job creation and housing development.[8] RACM incorporates storm water management into its projects because businesses are concerned about flooding and are required to meet storm water regulatory requirements.[9] As most waterways were channelized in the 1950's and 1960's, flooding presents challenges throughout the Milwaukee region.[10] RACM's brownfield redevelopment program provides planning, development and financial assistance for projects that the private market itself will not develop. Although the city does not have a comprehensive inventory of brownfields, more than 140 sites remain on its "do not acquire" list of contaminated projects that would necessitate specialized development assistance. This represents a dramatic decrease from 350 properties on the list 10 years ago, but remaining brownfields are a redevelopment challenge for the city. The MVIC project represented RACM's first major project incorporating green infrastructure; it has since expanded to incorporate green infrastructure into its 30th Street Corridor Brownfield Redevelopment Initiative.[11]

Storm water policies

Milwaukee's storm water management system is regulated by two entities: the Milwaukee Metropolitan Sewerage District (MMSD) and the City of Milwaukee's Department of Public Works (DPW). The MMSD, a regional utility, operates sewage treatment facilities and regulates water quality, including combined sewer overflows (CSOs). Milwaukee contains the majority of the MMSD's CSO area.[12] The MMSD constructed a deep tunnel storage system from 1977 to 1993 at a cost of around $1 billion, reducing the frequency and volume of separate sewer overflows and combined sewer overflows to 4.1 and 2.6 per year, respectively.[13]



Milwaukee Roads Shops site. Printed with permission from MVP. Photo credit: Menomonee Valley Partners, Inc.

The DPW is responsible for maintaining Milwaukee's storm and sewage water conveyance systems. Therefore, the DPW has an interest in cost-effectively installing infrastructure and ensuring its efficient and effective maintenance. The DPW has instituted a storm water management charge "on each and every developed property or vacant

improved property, other than public right-of-way, public streets, public alleys and public sidewalks, within the city."[14] All revenue from the city's sewer and storm water management charges supports the city's sewer maintenance fund, which "shall be used to defray operating costs related to the city sewerage system and to pay costs of operation, maintenance, extension, replacements and debt service for the city's storm water management system."[15] For properties that directly discharge into a local water body, property owners who retained all storm water on-site are eligible for up to a 60% reduction in their storm water management fee.[16]

Planning Methods and Processes

The site's design supports business needs and advances water quality and flood management goals due to early collaboration among key stakeholders. RACM and the MVP first co-hosted a working group with regulators, city and state agencies, environmental consultants, soil remediation companies, construction companies, and citizen stakeholders.[17] RACM coordinated public agencies, including EPA Region 5, while the MVP coordinated non-governmental organizations (NGOs) and businesses. RACM, MVP and the 16th Street Community Health Center hosted an international design competition that, using criteria developed by local stakeholders, spurred innovative solutions. The design competition, funded in part by the National Endowment for the Arts, was a six-month process including extensive community engagement, multi-disciplinary visioning and a juried process to select the winning design. Wenk Associates of Denver led the winning design team.[18]

RACM & the Regulators

From 1998 through 2000, before RACM acquired the site and before the design competition, staff from MMSD and the DPW provided RACM with critical feedback.[19] At first, discussions circulated around the potential to extend the city's combined sewer area, so the deep tunnel system could receive the site's storm and sewage water. Alternatively, the MMSD suggested the site utilize a separated storm water system, and that green infrastructure be a key component of the site. The recommendation was proactive; the MMSD was not under consent order for CSOs, but it did not want to move in the wrong direction given the substantial investments already made. Moreover, philosophically, green infrastructure provided an opportunity to utilize storm water as a resource,[20] particularly given the flooding that occurs at the site.[21] Building from RACM's understanding of storm water management challenges, the use of green infrastructure was a key criterion in the international design competition. The competition helped project leaders to demonstrate to businesses that green infrastructure could be an asset for them as well.[22] As the project continued, discussions with the MMSD and DPW helped to ensure design innovations would be approved.[23]

With respect to brownfield remediation, understanding contamination levels early in the process helped regulators, local stakeholders and designers to develop an appropriate storm water management strategy.[24] RACM compiled available environmental data for soil quality in consultation with regulators, including the EPA Region 5 and the Wisconsin Department of Natural Resources. Early consultation ensured that risks inherent in the project such as soil contamination were understood and could be addressed by designers, developers, regulators, and potential businesses.[25] RACM was fortunate in that the site was less contaminated than it anticipated, did not need to be sealed, and needed less soil excavation than it expected.[26]

The Menomonee Valley Partners (MVP)

Meanwhile, the MVP, a non-profit organization, strengthened relationships with NGOs and supported the project's development. The MVP is an outgrowth of the 1998 Menomonee Valley land use

plan, which identified the need for an organization supporting businesses throughout the valley while advancing regional development goals.[27] The MVP conducts land-use planning, oversees catalytic project implementation, recruits new businesses to the valley, provides business retention support services, and coordinates working committees. The MVP's working committees support the Menomonee Valley businesses, prospective investors, and neighboring residents. MVP's staff of four is financially supported by the Menomonee Valley Business Improvement District, the Forest County Potawatomi Community Foundation, the Wisconsin Energy Foundation, and other environmental and economic development oriented foundations.[28]

For the MVIC project, the MVP worked with the 16th Street Community Health Center to coordinate the engagement of NGOs and community members interested in advancing environmental and economic development goals. Participating stakeholders included the Sierra Club, the Bike Federation of Wisconsin, the Urban Ecology Center, WasteCap Resource Solutions, Inc., and the organized and non-organized trades. Based on a market analysis and follow up studies, the MVP coordinated the creation of a shared vision for the site that included sustainable development objectives, including green building guidelines for the industrial facility and economic objectives such as supporting local, labor-intensive industries. MVP also convened potential public and private funders, wrote grants submitted and received by RACM, and, for funding requiring a 501(c)(3), continues to serve as a financial conduit.[29]

Site acquisition & development

RACM purchased the site from a private owner in 2003 for $6.8 million. To acquire the site, RACM used $5.3 million of its own resources and a $1.5 million forgivable loan from the Milwaukee Economic Development Corporation,[30] a financial institution that provides businesses, city agencies, and RACM with low-interest capital assistance.[31] RACM served as project developer; construction of the storm water treatment train was completed by 2005.

The storm water treatment train cost approximately $2 million to construct; the total construction cost of the project was more than $30 million.[32] The greatest single source of funding for remediation, transportation infrastructure, and green infrastructure (including the storm water treatment train) came from a site-specific tax increment district, which raised $16 million for the project. RACM raised an additional $14 million from 20 local, state, and federal grants and numerous private donations.[33] Two green space grants supported the site's green infrastructure, one from the EPA and another from the Wisconsin Department of Natural Resources, each for approximately $125,000; these grants required that the site remain as green open space for a minimum of 20 years.[34] In addition, the MMSD provided several hundred thousand dollars of funding for cisterns, bio swales, and wetlands.[35] As previously mentioned, the MVP also has helped raise funding for the project by convening funders, writing grant proposals and serving as a 501(c)3 pass-through organization.

Site design

The MVIC utilizes a centralized storm water management system that enables businesses to share storm water management resources. The MVIC's 13 parcels, all industrially zoned, range in area from 2 to 13 acres.[36] Storm water runoff from the 63 acres of industrial buildings and 10 acres of roads are conveyed, through inlets, pipes and outfalls, into the storm water train. The storm water train is comprised of three storm water management areas, which each have underground treatment cells with permeable treatment materials that, through filtration and biological processes, remove at least 80% of total suspended solids, phosphorus, nitrogen, and heavy metals. One hundred percent of storm water from the business park is captured and treated by the storm water train. The storm water management area is designed to manage up to a 100-year flood, as it did in June, 2008.[37]

Benefits of centralized design

Four benefits derive from the MVIC's centralized storm water design. First, this design maximizes the potential build-out area for each parcel. Rather than having to pay for land dedicated to storm water management, such as a storm water retention pond, each business only purchases land it uses to directly support its operations. Second, private businesses do not need to worry about meeting storm water regulations through their siting or maintenance activities; they were built into the site's design and programming. Third, from the perspective of a public agency, RACM only needs to facilitate a single maintenance agreement, which is easier to design and oversee than multiple agreements for several smaller sites. And fourth, greater public benefits can be achieved by designing the aggregated sites to accommodate recreational activities and mitigate flooding.[38]

Site uses

The site is designed to incorporate a broad range of recreational activities. The treatment train is seamlessly integrated with a 40-acre park, which provides open space and flood mitigation benefits. Together, the 40-acre park includes the 30-acre treatment train, playing fields, a canoe launch, gathering spaces, and the Hank Aaron State Trail.[39] The MVIC will connect, through a pedestrian bridge, with a 24-acre educational park and flood management facility on the opposite side of the Menomonee River.[40]

Floodable Park dry (at left) and after a 2008 100-year storm (at right). Printed with permission from MVP. Photo credit: Menomonee Valley Partners, Inc.

Preservation & maintenance of storm water train

A creative set of agreements among MVIC businesses, RACM and the DPW ensures maintenance will be funded in the long-term. RACM's land sale agreement requires MVIC businesses to participate in a maintenance easement agreement,[41] which RACM has drafted as follows. The "Menomonee Valley Industrial Center Drainage Easements and Stormwater Management Facility Maintenance Agreements" will provide MVIC businesses the right to receive a 60% storm water credit against the DPW storm water fee. The RACM negotiated this storm water credit with the DPW, which authorized the credit pursuant to its storm water rebate policy.[42] In exchange, each business commits to contributing to a maintenance fund. RACM is the current recipient of this funding and is responsible for the maintenance, though it plans to initiate a property owners association to collectively manage these funds. Through the easement agreement, RACM will maintain responsibility for performing or subcontracting maintenance to a specified minimum standard. For the largest land owner, RACM estimates that a 60% storm water credit will save the average MVIC owner approximately $5,000 in storm water fees; when the site is fully occupied the owners will collectively save around $50,000. RACM estimates that $50,000 will be sufficient to cover annual and long-term maintenance expenses. RACM anticipates that every couple of decades contaminated soil, from filtering the MVIC's industrial pollutants, may need to be removed.[43]

Advantages of privately managed public space

The above described privately managed public space has several advantages. The storm water drainage easement enables MVIC businesses to monetize storm water credits for which RACM is not eligible, given that open space under the jurisdiction of RACM is considered public right-of-way. As the total value of the storm water credits should be sufficient to maintain the storm water train, the financial commitment of MVIC businesses for maintenance is "net zero". The administration of the funds is more efficient and equitable by having MVIC businesses pay into a separate pool of funding, rather than the DPW administrating the funding itself. The DPW is not set up to administer a relatively small program, which would be burdensome for it to run and may be difficult to keep separate from other operating expenses. Moreover, MVIC businesses have an existing relationship with RACM, which owns the property and contracts out the maintenance, so in the short term RACM is a logical administrator of the funds. MVIC businesses, however, are taking (metaphorical) ownership over the success of the storm water train, and therefore have an interest in collectively managing the maintenance funding.[44] Critical to the success of such an arrangement is the collective participation of businesses, which the RACM will encourage through the creation of a property owners' association. As the RACM maintains responsibility for the site's maintenance, however, the DPW has greater leverage than if responsibility were placed on the private building owners; conversely, private building owners need not concern themselves with the liability of successfully maintaining the storm water infrastructure.

Economic Development

The 1998 Menomonee Valley land use plan noted, "according to industry experts, in mature cities like Milwaukee, 75-80% of economic growth is due to internal expansion."[45] The essence of the MVIC and other land development efforts led by RACM is to create space that allows for internal economic growth, while creating highly-visible, unique spaces that can attract outside investors. The vision for the Menomonee Valley Shops site, developed by the MVP and its working group, was to attract labor-

intensive businesses that compensate a living wage.[46] Since construction was completed in 2005, RACM has recruited 8 businesses in the food, metal fabrication, and energy industries, which provide 1190 full-time jobs and 92 part-time jobs with wages that average $23 per hour. Seven of the eight businesses were from the Milwaukee metro area and needed space to grow.

The MVIC also has helped to recruit businesses from outside of Wisconsin, particularly Ingeteam, a Spanish company that manufactures wind turbine components. Ingeteam provides 275 full-time jobs in its eight-acre facility.[47] Given the small sizes of MVIC businesses, this project illustrates the potential for public and non-profit partners to work collectively with smaller companies to manage storm water.

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Genesee County, MI

Introduction

The Genesee County Land Bank Authority demonstrates how land banks can successfully acquire, transfer, maintain, and dispose of foreclosed vacant land to advance green space and urban redevelopment goals. A nationally recognized model, the Genesee County Land Bank Authority (the "Land Bank") has achieved tremendous scale for the acquisition, transfer and maintenance of foreclosed properties. Founded in 2002, The Land Bank acquired more than 1,200 foreclosed parcels in both 2003 and 2004,[1] and has since acquired between 700 and 1,000 properties annually. The Land Bank has disposed of about half of these properties, and has completed several large mixed-use redevelopment projects. Although storm water management remains a secondary concern for the County, which has a separated sewer system and is not under an EPA Clean Water Act Consent Order, the Land Bank has several greening programs for property it holds. Its Adopt-a-Lot program, Vacant Land Lease program, and Vacant Land Lease with Option to Purchase program provide short-, mid- and long-term solutions for transferring and maintaining greened vacant lots.

Vacant land has plagued the City of Flint, Michigan, similar to many smaller, shrinking cities historically reliant on single companies, such as Gary, IN, Cincinnati, OH and Buffalo, NY.[2] In Flint, the loss of 60,000 General Motors jobs since the 1970's and the flight of wealthier residents were major reasons for reduction in the city's population loss from 196,940 in 1960[3] to 102,434 in 2010[4] – a 48% decline.[5] Population loss, and therefore vacancy, is not evenly distributed throughout Genesee County: the surrounding county's population has increased from 270,963 in 1950[6] to 425,790 in 2010[7] – a 57% increase; the county lost just 6% of its population from 1980[8] to 2010.[9]

Multiple barriers existed for public agencies to acquire land at scale, and to repurpose land for publically beneficial uses. Until the early 2000's, abandoned properties were sold to speculators through the State of Michigan's (the State's) tax lien sale process. Properties not sold through the tax lien process reverted to the State, leaving local government out of the land use decision-making process.[10] The process of acquiring land was slow and labor intensive, particularly given the hundreds of owners whose properties lay vacant: the titles of many properties were unclear; speculators purchased land but did not invest in their properties; and properties were foreclosed without considering the context of individual home owners. Blight became contagious, as the existence of vacant properties reduced the value of neighboring properties.[11]

Michigan Land Bank Model

The Land Bank has successfully overcome the aforementioned barriers due to changes in state law, its organizational structure and strategic programming.

Two key changes to Michigan state law have enabled the Land Bank's success. First, PA 123 of 1999 resulted in a series of improvements: it banned the sale of tax liens to third parties; developed a judicial notification process for tax foreclosures meeting or exceeding state and Federal law; established a process for bundling the entire inventory of vacant properties in a county into a single foreclosure proceeding, and settled

foreclosures in a single hearing; and allowed local governments to acquire local property not sold at auction. This law also cleared the titles of properties, ensuring that properties could receive title insurance and thus be redeveloped. Second, the 2004 Land Bank Fast Track Authority Act allowed local governments to acquire all tax-foreclosed properties, not just those otherwise not sold at public auction, enabling land banks to purchase land for development. Development projects in strong market areas provide land banks with a source of revenue, supporting re-utilization strategies in weak market areas.[12,13]

The Genesee County Land Reutilization Corp. was established in 2002 and, upon passage of the 2004 Land Bank Fast Track Authority Act, became the Genesee County Land Bank Authority. The Land Bank is a public authority administered through the County, with a Board of Directors comprised of representatives from the Genesee County Board of Commissioners, the City of Flint and Flint Township.

Tax Law Comparison Chart	
Former Foreclosure Law	New Tax Law (PA 123 of 1999)
4-7 year process	1-2 year process
No clear title	Clear title judgment
Hundreds of owners	Property titled to county
Low-end speculation	Tax liens eliminated
Indiscriminate foreclosure	Hardship postponements
Homeowners at risk	Intervention
Contagious blight	

Source: The Genesee County Land Bank, 2012[14]

Genesee County Land Bank Authority Programs

The Land Bank's staff of 13 focuses on the acquisition, planning, redevelopment, and greening of tax foreclosed and abandoned properties.[15] The Land Bank promotes home ownership, rehabilitates housing and provides rental services for apartment buildings that it has redeveloped. The Land Bank also coordinates the demolition of buildings in disrepair.[16] The Land Bank held more than 8200 properties as of 2011. The Land Bank sells about half of all foreclosed properties in Genesee County; it sold 645 properties in 2011, putting more than $2.8 million of property back on the tax roll.[17] The Genesee County Treasurer's Office coordinates complementary tax foreclosure prevention services. The Land Bank has addressed the substantial rise of foreclosures in Genesee County, which averaged around 900 per year from 2002 through 2007 and increased annually to nearly 2,900 in 2011.[18]

The Land Bank's operations are supported through property sales, the county-wide Land Reutilization Fund and foundations. Property sales account for 80% of the Land Bank's income, which will total $3.6 million in 2012 and is expected to increase to $3.8 million in 2013. In addition, the 2004 land bank legislation provides a financial vehicle to generate revenue through a Land Reutilization Fund, intended to support foreclosure prevention and land banking activities. Properties that reach the second stage of foreclosure, forfeiture, are assessed a $175 fee; an additional 2% fee is assessed to these properties in the foreclosure process. These fees capitalize the Land Reutilization Fund, which raises about $1.2 million each year. The state law, however, does not clearly designate the County Treasurer and Commissioner with the authority to dictate the use of these funds. As a consequence, the County Board

of Commissioners has recently utilized the bulk of these funds for its own purposes. In 2012, only $458,000 were allocated to the Land Bank, which were used to maintain existing properties; $1.2 million is necessary to perform routine maintenance on all its vacant land. The Land Bank also receives prescribed program funding, including a recent $10.7 million Federal Neighborhood Stabilization Program (NSP2) grant for home rehabilitation.[19] Nonetheless, the Land Bank's budget has not significantly increased over the past several years; it presently has the same staff managing more than 8,000 properties as it had several years ago when managing 3,000 properties, pointing to the need to strengthen linkages between available public financial resources and public need.[20]

For redevelopment projects, the Land Bank also has utilized an innovative tax increment finance program to acquire and develop properties. Through the Michigan Brownfield Redevelopment Financing Act (Act 381), the Land Bank developed a brownfield plan. This state law expanded the definition of brownfields to include all blighted, tax foreclosed and land bank owned properties, supporting their redevelopment. Through the state brownfield program, in 2004 the Land Bank issued $13.4 million in bonds to support the implementation of a brownfield plan that included 4000 properties. Bond funds were used to pay for brownfield-eligible costs including demolition, site preparation, environmental remediation, and other brownfield related costs specified under Act 381. The plan supported more than 400 demolitions, and demolition and environmental costs associated with two downtown development projects. Tax increment revenues are the full values of all taxes assessed, because the taxable value of Michigan land bank properties is reset to zero when they acquire properties. The incremental tax revenue is captured to repay the bond funds. These revenues are largely generated from eight redevelopment projects, including two downtown mixed-use buildings and a 500,000 s.f. former auto manufacturing research and design facility that was converted into a health and medical business complex. The sales of several hundred homes throughout the county also have generated revenues. This financing scheme was developed mainly as a strategy to pay for demolition when the Land Bank had very limited access to demolition funding from state and federal sources, particularly from the HUD Community Development Block Grant and NSP2 programs. [21]

The Land Bank also provides maps of available sites to local governments,[22] and assists the City of Flint and other localities to plan and implement NSP1 and NSP2 funded revitalization efforts.[23] The Land Bank's success stands out given the City of Flint's (the City's) continued financial challenges. The City was under emergency financial takeover (receivership) by the State of Michigan in 2002 and again entered receivership in 2011.[24,25]

Of the Land Bank's 9,000 properties, 4,700 are vacant lots. The majority of these sites has no market value and is in areas with high concentrations of abandonment.[26]

Acquisition

The Land Bank benefits from a streamlined acquisition process and the opportunity to bundle foreclosed properties prior to auction. The following five steps have facilitated the Land Bank's acquisition of properties:

1. On April 1, the Genesee County treasurer provides the Land Bank with a list of all properties that will be foreclosed, in preparation for the County Sheriff's Sale.
2. The Land Bank inspects each property to verify whether anyone lives at the property and to evaluate the quality of the property. The Land Bank enters this information into a master database. At this time, it considers which properties could be strategic investments and which properties, such as burned-out buildings, it would like to acquire to improve nuisances.
3. Should the Land Bank wish to acquire a site before the September auction, it may do so for the cost of a property's existing tax lien. The Land Bank considers doing so for sites with strong redevelopment potential.
4. Prior to the September auction, The Land Bank submits a bundled list of sites to the Genesee

County treasure's office for which anyone may place a bid. The size of the bundle, which contains over 1000 properties, and the number of properties in poor condition, deter others from submitting a bid on the bundle. No bid has ever been placed on a Land Bank bundle.

5. At the September auction, other parties may place a bid on the bundle. The minimum bid is the total tax liability of all bundled properties. Should no other party place a bid, the Land Bank acquires all properties in the bundle and the minimum bid is waived. [27]

The annual process for placing a bid allows the Land Bank to have the time to investigate which sites are most strategic to acquire. The bundled process reduces transaction costs and helps the Land Bank to acquire properties in higher-value areas.[28]

Planning Strategy

The Land Bank, through its Citizens' Advisory Council (CAC) and Community Outreach Coordinator, has maintained a close connection with community members and organizations since its founding. The CAC recommends how the Land Bank staff and Board of Directors can most effectively support the needs of the Genesee County community. Eighteen members sit on this council; each of the City of Flint's nine wards and Genesee County's nine districts has an appointed representative. In 2011, the CAC met ten times while the Land Bank's Community Outreach Coordinator attended over 200 neighborhood-based meetings.[29] The Land Bank's community outreach informs all acquisitions and development projects, as well as the following greening programs.

Transfer Mechanisms

The Land Bank runs four greening programs: a Side Lot Transfer program, an Adopt-a-Lot program, a Vacant Land Lease program, and a Vacant Land Lease with Option to Purchase program. Lots are eligible for greening if they do not have any structures, are zoned residential or commercial, do not have pending sales, leases, or existing agreements, and do not conflict with the Land Bank's development strategy.[30] Eligible sites are searchable through the Land Bank's online database, classified as "residential vacant lots."[31]

Disposition: The Side Lot Transfer Program

The Land Bank disposes of vacant land to interested and engaged property owners through its Side Lot Transfer program. Property owners benefit by expanding the sizes of their properties while the City and County benefit because these properties return to the tax roll. As of Fall 2011, the Land Bank had transferred 555 vacant lots to adjacent homeowners and 770 vacant lots to local residents.[32] Most sites are former residential lots, and are typically maintained as side yards. To acquire side lots, applicants must submit a Residential Land Transfer application describing their proposed improvements to the land, and disclosing who will occupy the property if a structure exists on the site (owner, family member, or other). Applications are reviewed within 30 days.[33] The review process ensures the applicant has never had a property in tax foreclosure and the proposed re-use fits into the community's context.[34] Vacant, unimproved properties may be acquired at a discount through the Side Lot Transfer program. Applicants must share at least 75% of the lot's boundary on one side, and the applicant must specify whether the lot will be re-used as an expansion of a yard or for another use. Sites may be acquired for $1 plus $39 in processing fees.[35]

Leasing Programs

Through its Lease-a-Lot program, The Land Bank leases, free of charge, vacant lots to community members who wish to garden or maintain property.[36] Typically, this program assists residents who would like to mow the lawn of a vacant lot or create a short-term garden. A one-year lease provides green space to a property owner without the commitment of paying property taxes; if properties are not sold, users may renew their agreements. In 2012, the Land Bank had 309 agreements through this program: 41 were new agreements and 268 were renewed from the previous year.[37] The Land Bank also provides technical assistance with gardening,

Land Available for Greening and Gardening, 2011 Programs			
	Adopt-a-lot	Vacant Land Lease	Vacant Land Lease w. Option to Purchase
Cost	Free	$1 per year / lot	$1 per year / lot (while leasing)
Duration	Year-to-year	2 to 5 year commitment	2 to 5 year commitment if leased
Goals	Short-term mowing and gardening	Longer-term greening and gardening	For projects considering permanent care of land, usually greening and gardening projects that may invest in land
No. Programs	309	46 Vacant Land Lease with and without option to purchase	

Source: Pruett, N. (Spring, 2011). Land Available for Greening and Gardening. In: *The New View*. Genesee County Land Bank. Accessed Fall, 2012 from (http://www.thelandbank.org/downloads/LBA_Newsletter-Spring-2011.pdf)

property maintenance, site design, and planting materials. The Land Bank reviews simple application forms each year. [38]

To meet the growing needs of gardeners, The Land Bank developed two long-term programs in 2011. The Lease-a-Lot Vacant Land Lease program is intended for organizations interested in longer-term greening. A nominal lease agreement prevents the sites from being sold during lease terms, which range from two to five years. The Lease-a-Lot with Option to Purchase program, with a similar $1 per year agreement, allows greening organizations to purchase sites for permanent use.

Stringent review processes are in place to encourage active participation and minimize the chance of speculation. The Land Bank's Board of Directors may review applications to ensure applicants have a long-standing community commitment or that the applicant resides adjacent to the property. Any applicant who requests four or more sites in a given year must be approved by the Board of Directors. In 2011, 46 sites participated in the Lease-a-Lot and Lease-a-Lot with Option to Purchase programs.[39]

Site Aggregation & Urban Agriculture

The Land Bank's centralized management and careful application process facilitate the aggregation of multiple vacant lots to a common use. For example, urban farmers aggregated sixteen Land Bank-owned lots to create the Flint River Farm. This project grew from the Edible Flint program, a cooperative of growers that share a table at the local farmers' market.[40]

Maintenance: The Clean & Green Program

Through the Land Bank's Clean and Green program, participants green and maintain vacant lots. In 2011, 42 organizations in the Clean & Green program maintained 1,326 Land Bank lots, which average approximately 40 ft. x 100 ft. Participating organizations completed 28 innovative *Signature Greening* projects, and included dozens of youth participants.[41]

The Clean & Green program emphasizes youth participation, which begins after the school year's completion. Maintenance occurs in the summer months from mid-May until early September. Each Clean & Green group receives a stipend between $2,500 and $4,000 to support its maintenance activities, which include mowing and trash pick-up. The stipend values vary based on the plan submitted in the application, the service area, and the number of lots maintained. Signature greening projects demonstrating new greening practices, including low-maintenance plantings and pocket parks, are eligible for an additional $300 stipend. Application criteria in 2011 included creativity of greening and beautification plans, connections with the local neighborhood, commitment to hiring and engaging local youth, and experience in greening, cleaning or beautification.[42,43] Participating organizations included book clubs, greening organizations, and churches.[44] Service reports must be turned in, and

stipend checks are picked up, in three week intervals.

The Land Bank extends its capacity by coordinating with the Mott Workforce Development Program, which uses the vacant lots as a field site for 50 to 100 trainees each summer.[45]

Property Maintenance Crews

The Land Bank also partners with local job training programs and the City of Flint to maintain all other vacant properties citywide. During the past two years, crews mowed more than 20,000 properties twice during the growing season. The number and size of the maintenance crews shifts from month to month and from year to year depending on resources available through the Land Bank and through partner organizations. During the winter months, crews focus on removing debris, smaller scale housing renovation projects, partial deconstructions, and boarding; during the spring and summer, the crews focus on mowing and debris removal. The program relies on grant funds, revenue generated from Land Bank sales, and revenue provided through the Land Reutilization Fund. $1.3 million in property maintenance was cut from the budget by the Genesee County Board of Commissioners in 2011.[46]

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New York, NY

Introduction

The New York City Community Gardens and Staten Island Bluebelt cases offer unique perspectives, some of which are borne out of the City's history.

The Community Garden case is unique in that community gardens were threatened and city-owned properties, which in some cases were purchased by not-for-profits and remained in their ownership. Although some city-owned gardens had achieved protection status, non-profit organizations purchased more than 100 community gardens. Subsequently, the City of New York (the City) and the State of New York (the State) executed a Memorandum of Agreement protecting from development additional remaining community gardens on city-owned properties. Although community gardens are not designed as storm water capture parks, in a city where more than 70% of the surface is impervious, community gardens provide pervious pockets. In addition, presently, more than 80 community gardens have rain water harvesting systems, utilizing storm water for irrigation. The Rain Water Harvesting program is the outgrowth of the City's ban on the use of fire hydrants by community gardens during the 2001 drought. Since then, the concept of storm water as a resource rather than a waste has become more widely accepted. Gardeners today are interested in rain water harvesting systems as a means to more sustainably manage storm water.

Sustainable storm water management was the hallmark of the City's Staten Island Bluebelt program (the Bluebelt) long before the terms "sustainable" or "green infrastructure" became commonplace. The Bluebelt utilized existing public property and acquired private property to create wetland corridors that received storm water from the paved areas of Staten Island. The wetland corridors were coupled with Best Management Practices to remove pollutants, attenuate flow and detain storm water before discharging into the wetlands. These systems saved the City tens of millions of dollars in sewer infrastructure construction, restored and created natural areas, managed storm water in a more sustainable manner, and enhanced the character of the communities in Staten Island.

Community Gardens

Background

The City's fiscal crisis during the 1970's created more than 10,000 city-owned vacant lots. Many New Yorkers took control of abandoned lots in their neighborhood by turning them into community gardens.[1, 2] Even though these gardens provided a service the City was unable to provide (keeping vacant lots clean and in good community use), they were essentially "squatters" on public land. The City's response to the community gardening was ambivalent: on one hand the City did not recognize the gardens as officially sanctioned use of the city land fearing liability issues, but on the other hand, the City created the GreenThumb program within the Department of Citywide Administrative Services (DCAS) to manage and oversee the gardens. GreenThumb was responsible for granting permission for garden groups to turn a vacant lot into a garden. However, these gardens were "interim uses" of land and were not afforded permanent protection.[3,4]

Slow real estate development and active community stewardship supported by GreenThumb resulted in the number of community gardens growing to 750 by the 1990's. GreenThumb, which was transferred to the Department of Parks & Recreation (Parks Dept) in 1996, continued to provide technical assistance and operational oversight to gardens. In an effort to afford more protection to gardens, GreenThumb also issued long term (10-year) leases to 30 gardens. However, in 1999 then Mayor Giuliani directed DCAS to auction all disposable vacant land in its inventory, including community gardens, and charged the Department of Housing Preservation & Development with developing all its vacant land and some in the DCAS inventory.[5,6,7] Largely due to the fierce opposition from community gardeners, who harnessed the power of the internet in organizing, the Attorney General intervened to allow two non-profit organizations to acquire all 114 gardens.[8]

However, the pressure to develop city-owned land for housing continued. In 2000, Attorney General Spitzer obtained a Temporary Restraining Order that halted all further development of community gardens on property owned by the City of New York. The restraining order remained in effect until 2002 when Mayor Bloomberg and the Attorney General reached an agreement to protect hundreds of community gardens through a Memorandum of Agreement. Presently, the City has over 1,000 community gardens with multiple organizations, both public and private (non-profit), providing resources and assistance to hundreds of community garden groups. The number of gardeners is estimated to be as many as 50,000 volunteers.[9]

Site Acquisition and Transfer

There are currently more than 600 community gardens[10] registered with GreenThumb in New York City with at least three types of property owners: public agencies (e.g, New York City Housing Authority, Department of Transportation, Parks Department, DCAS, state and federal agencies), private not-for-profits (e.g., New York Restoration Project, Trust for Public Land, smaller land trusts) and private owners (e.g., corporations & individuals).[11]

Land Trust and Non-Profit Ownership

The 1999 New York City community garden case is unique in that the land ownership was transferred from public agencies to private not-for-profit ownership, rather than the more conventional private to public ownership transfer in preservation of open space. The Trust for Public Land and the New York Restoration Project purchased 114 gardens for a total of $4.2 million.[12] The TPL's purchase price of $3 million for 62 gardens was estimated to be 25% of the fair market value. Acquisition funding was raised from private sources such as foundations and individual donations.[13,14] TPL considered two main site selection criteria: level of maintenance and "publicness." TPL defined "publicness" as hours open to the public and public programming available at the site.[15] Field visits and conversations with garden groups were completed to prioritize sites to acquire.[16]

Soon after the purchase of the land in 1999, TPL held a public forum with the many active community groups to discuss the different long-term ownership options. Participating groups expressed interest in local ownership. TPL worked with community gardeners to establish three local land trusts in 2004: the Manhattan Land Trust, the Bronx Land Trust and the Brooklyn Queens Land Trust. To date, 32 gardens have been transferred to the local land trusts with the remainder to be transferred by the end of 2012.[17] TPL has a reversionary interest in the gardens; if any land trust is unable to operate their gardens and they are showing signs of abandonment, TPL has the authority to retake possession of the gardens to ensure they are properly maintained.[18]

New York Restoration Project (NYRP), a non-profit organization dedicated to reclaiming and restoring

New York City parks, community gardens and open spaces, purchased the 52 remaining community gardens that were not sold to TPL. Bette Midler, the founder of NYRP, used a combination of funds from the Midler Family Foundation, New York Restoration Project, and her personal funds.[19] Unlike TPL, NYRP has committed to holding title to the community gardens in perpetuity and providing maintenance services. Through an adopt-a-garden program, NYRP has created a $2.5M endowment that supports capital improvements and maintenance.[20]

Public Ownership and Protection of Parkland

The City of New York holds title to all city-owned lots, which are generally held by Department of Citywide Administrative Services (DCAS) except for those lots that are assigned by DCAS to another agency for specific uses, such as parkland. A site may come under the Parks Department's jurisdiction if the site is 1) mapped as a parkland, 2) assigned to the Parks Department, or 3) used by the public as a park. However, not all property in the Parks Department's jurisdiction is parkland. Under the "parkland alienation" doctrine (under New York State law), changing the use of the land from park to non-park uses requires prior approval in the form of legislation passed by the State legislature and signed by the Governor.[21] Although community gardens could be defined as "parkland", this has been debated without resolution. The Parks Department and the Department of Housing Preservation & Development rules concerning community gardens explicitly state that they are not dedicated as parkland. Some of the City's green infrastructure projects to comply with its CSO Consent Order are implemented through a partnership between the Department of Environmental Protection and the Parks Department. The language in the Memorandum of Agreement is carefully crafted to avoid designating land as parkland in some cases. Sale, lease or exchange of city-owned properties requires a lengthy public review process called Uniform Land Use Review Procedure (ULURP) as established in the City Charter.[22] Likewise, purchasing properties or acquiring an easement by the City also requires ULURP. The City has acquired about half a dozen properties in the recent past through a "third party" transaction where a land trust, such as TPL, purchases private properties using external funds (such as funding from the Port Authority of NY/NJ) and donates them to the City. These transactions were executed as environmental mitigation projects to create or restore natural areas using an environmental benefit fund, to which an entity responsible for mitigation contributes funds.[23]

In September 2002, Mayor Bloomberg and Attorney General Spitzer reached an agreement (the Agreement) that 1) protected nearly 200 gardens under the Parks Department jurisdiction as well as those under the Dept of Education, 2) transferred approximately 200 other GreenThumb gardens to the Parks Dept or to a land trust, 3) established a process for relocating 110 gardens, and 4) allowed the development of 28 gardens, which had gone through legally required process for authorizing disposition by the city.[24, 25] The Agreement also continues the GreenThumb program, which is integral to ensuring well-functioning of community gardens. A garden will not be subject to the Agreement if the main gardener (Gardener of Record) refuses to register and/or execute a license with the GreenThumb for more than two years. The Agreement also clearly states that the "City is not designating any community garden as parkland," giving a way for the City to assign land to other agencies if needed. The Parks Dept may also elect to surrender an abandoned garden. However, to date the Parks Dept has not surrendered any land back to DCAS. The Agreement was renewed in 2010 with some modifications.[26]

Maintenance Strategy

The very nature of community gardens ensures maintenance to a degree. Many community gardens are born out of local residents' interest and willingness to volunteer their time. However, support provided by the GreenThumb and others to local garden groups is critical in success of community gardens. In addition to GreenThumb and NYRP, there are numerous non-profit organizations, such as GrowNYC, Green Guerrillas, and botanical gardens, offering resources and assistance to community gardens.

GreenThumb NYC: A Publicly Funded Maintenance Model

GreenThumb, a program of the Parks Department, provides technical and material assistance to 600 community gardens operating on city-owned properties. GreenThumb administers registration and license agreements, hosts training workshops and public events, and supplies materials, such as tools, fencing, lumber to build growing beds, picnic tables, gazebos, soil, shrubs, seeds, and bulbs.[27] GreenThumb has been funded by the Federal Community Development Block Grant (CDBG) program since 1979. Currently the program is supported by both Federal CDBG funds and City tax levy revenues.[28] For the past several years, the program personnel has been funded at approximately $450,000. Other Than Personnel Services (OTPS) funding was maintained at a little over $277,000 since FY2010, but for the FY2013 (the current year), OTPS was cut to $205,000 largely due to the cut to the CDBG.[29]

The City's new urban agriculture and anti-obesity initiatives under PlaNYC reflect strengthened local interest in community gardens. City agencies are in identifying vacant lots that can be turned into urban farms. GreenThumb is tasked with creating 15 new gardens under these initiatives in FY2013 with additional funding of $400K appropriated through the City's Obesity Task Force.[30,31]

New York Restoration Project: A Privately Funded Maintenance Model

NYRP supports its own gardens and other gardens and open spaces, working in close partnership with GreenThumb, TPL and the NYC Housing Authority. NYRP has spent approximately $1 million to improve the 52 gardens it acquired in 1999, but still has 25 gardens it cares for that need improvements ranging from extensive renovations to minor repairs.

NYRP has a field staff of 40-50 people, including AmeriCorps members, who visit the gardens twice a week to perform maintenance and cleaning. Even though NYRP's long term goal is to enable local garden groups to take on maintenance responsibilities, it is committed to maintaining a clear presence and providing baseline of maintenance.

As mentioned above, NYRP has established an endowment through private donations of approximately $2.5 million. NYRP spends around $60-$100K a year from the endowment fund toward maintenance. NYRP seeks to grow the endowment over time. NYRP also invests in community engagement to ensure all gardens have active gardening groups. To support and recruit community members, NYRP offers programming, such as free yoga classes, movie nights and theater.[32]

Rain Water Harvesting in Community Gardens

Background

During the drought of 2001 community gardens were denied permission to use fire hydrants for irrigation. Fire hydrants had served as the primary source of water for gardens for decades. To develop a solution, community garden and greening groups came together to form an ad hoc committee, the Water Resources Group (WRG). The WRG educated and promoted water conservation and rain water harvesting systems and helped install them in many community gardens around the city. The WRG no longer exists but the individual organizations that comprised the group continue the work.[33]

Rain Water Harvesting System

GrowNYC, formerly the Council on the Environment of NYC and a founding member of the WRG, was one of the first organizations providing installation assistance to community gardens. The organization has built or trained others to build more than 80 rain water harvesting systems in community gardens to date.[34] Collectively, GrowNYC estimates the systems divert more than one million gallons of rain water from the sewer system annually.[35] Most systems in NYC range in size from 300 to 2,000 gallons, but some are as small as 55 gallons while others are as large as 10,000 gallons or more. The cost of installation varies depending on the specifics (size of the system, types of materials, roof configuration, etc.) but a 300-gallon system costs approximately $1,250 while a 1,000-gallon system can be built for $3,250.[36]

In gardens where there is an adjacent building with a downspout, gardeners often enter into a verbal agreement with the property owner to divert the downspout into the barrel. If the adjacent building owner requires a more formal agreement, a letter, crafted by GrowNYC with assistance from the Trust for Public Land, is available. However, such letters are rarely used. Other gardens use or build structures inside the gardens like gazebos or sheds to collect rainwater. Those structures, around 160 square feet at most, are significantly smaller than the roofs of most buildings, which can be larger than 1,000 square feet. (A one-inch rain event on 1,000 square feet produces 623 gallons of rain water in New York City).[37]

GrowNYC continues to provide installation assistance to community garden groups to build and maintain rain water harvesting systems. With a grant in 2011, GrowNYC built rain water harvesting systems in community gardens along the Bronx River. The systems together will collect 15,000 gallons of rain water.[38]

Staten Island Bluebelt

Background

Staten Island is the least developed of New York City's five boroughs and is the last borough to be served by the City's sewer system. Because of its unique geology, Staten Island has the largest acreage of fresh water wetlands in the City. Partially because of this, the City was unable to construct a conventional storm sewer system even after the opening of the Verrazano Bridge in the 1960's ushered in development on the island. Sanitary sewering was thus delayed because the City constructs both storm and sanitary sewer systems together.

In the 1970's the Special South Richmond Development District was established to better plan development on the island. The Development District also established the Open Space Network (OSN), a land conservation policy, which led to preservation of approximately 700 acres of wetlands and streams in Staten Island.[39] At the same time, flooding was becoming a frequent problem as development proceeded. Finally, in 1989, the NYC Dept of City Planning issued a visionary report calling for the use of open space and wetlands in developing a storm water management system in Staten Island. Following this report, the NYC Dept of Environmental Protection (DEP) began acquiring land to develop what is now known as the Staten Island Bluebelt Program (the Bluebelt). The Bluebelt is incorporated into New York City's NPDES MS4 permit, and is in accordance with the city's charter that maintains each resident of New York City has a right to adequate disposal of sanitary waste and storm water from his or her property.[40]

The DEP is the agency responsible for drinking, waste and storm water in New York City. It is a Mayoral agency with its own revenue source from the ratepayers, who fund most of the DEP's budget. The revenue collection is managed by the NYC Water Board, created by the State legislature in the mid-1980's. The Water Board is responsible for levying and collecting rates and charges. The NYC Municipal Water Financing Authority, also created by state legislation, is the public benefit corporation charged with providing funding for capital projects through bonds, commercial papers and other obligations.[41]

The Bluebelt Concept

The Bluebelt relies on natural "holding tanks" and conveyances (wetlands and streams) and restores pre-development hydrology in the watersheds. It is a combination of grey and green infrastructure practices in managing urban storm water. Most of the wetlands and streams in the Bluebelt program were degraded by development and in need of restoration. Thus the Bluebelt program not only provided cost-effective storm water management but also restored many existing natural areas. The DEP designs each Bluebelt project by combining the existing natural wetlands and streams with Best Management Practices (BMPs). The DEP has a menu of dozens of BMPs, which are installed where the storm water pipes discharge into the natural systems, such as a wetland or a stream. These BMPs remove pollutants from the water, attenuate the flow to reduce erosion, and reduce flooding by detaining water. Constructed wetlands range in size from 0.5 to more than 2 acres.[42] Clearly vegetation and landscaping are critical components of the Bluebelt program, which brings together experts from multiple disciplines unlike a conventional drainage system planning. The program also requires collaboration with other agencies, such as the NYC Dept of Parks & Recreation and Transportation and NYS Dept of Environmental Conservation.

Site Selection and Land Acquisition

The Bluebelt consists of 16 watersheds in South Richmond, with a total acreage exceeding 14,000 acres, managing runoff from one third of Staten Island.[43] The City has purchased 325 acres since the beginning of the project. The DEP also executed Memoranda of Understanding with NYC Dept of Parks & Recreation, NYS Depts of Environmental Conservation and Transportation for the use of their properties – between 50 and 100 acres – for the Bluebelt. These MOUs are in effect in perpetuity. Between Fiscal Years 2002 and 2011, the City spent $72 million on acquisition.[44,45]

As of 2010, the DEP has spent $300 million on sewer capital projects (includes storm and sanitary sewering) and $50 million on "drainage improvements and wetland restoration in the Bluebelt system itself (i.e., the BMPs)."[46] The capital budget for the next four years for the Bluebelt program is $153 million for the sewer and BMP construction (acquisition has been completed). Because of the success of the program, the City has committed to expanding it to three more watersheds in the mid-island section with plans to acquire nearly 200 additional acres over the next 30 years.[47]

One of the earliest actions under the program, which began in the 1990's, was the acquisition of properties along wetland corridors before specific drainage plans were developed for particular watersheds. The DEP went ahead with the acquisition of land immediately because it must have full control of the properties for building and maintaining BMPs. Not waiting for the plan development was also necessary because the development pressure in Staten Island was increasing. Approximately 90% of properties in the South Richmond Bluebelt were acquired through eminent domain. Hundreds of property owners received compensation for their properties, which were all vacant or unoccupied. Acquisition has been a gradual process, and continues to this day with the expansion of the program to mid-island. The City's Department of Citywide Administrative Services negotiates with landowners whose sites are not condemned, while its Legal Department is responsible for condemnations.[48]

Within each watershed, the DEP first put together publicly owned lands, such as parkland, nature preserves and highway rights of way. The City already owned substantial properties in Staten Island. In the 1920's properties in Staten Island were sold sight unseen to many New Yorkers from other boroughs. During the Depression, many owners defaulted on property taxes and the properties went into City ownership. Luckily for the Bluebelt program, some of these properties were in wetlands. The City still needed to acquire hundreds of acres of private properties but focused on unbuilt or abandoned properties because displacing residences or tearing down structures would have been costly.[49] More than 90% of the private properties were acquired through the use of Eminent Domain. However, the Department of Citywide Administrative Services (DCAS) was responsible for negotiations while the City's legal department took care of the legal transactions, allowing the DEP to focus on planning.[50]

Each wetland acquisition project had to be justified based on a detailed cost-benefit analysis before approval was granted by the City's Office of Management and Budget. The DEP compared the cost for acquisition of wetlands, streams, and ponds and constructing BMPs against the cost of constructing conventional storm sewer systems as outlined in the drainage plan developed decades earlier. The DEP's analyses showed that over the entire 16 watershed area, the Bluebelt program has saved the City approximately $80 million dollars in capital expenditures.[51] It is noteworthy that the suburban nature of Staten Island with low density development helped tip the scale in favor of the Bluebelt program.[52]

Following budget approval, the acquisitions then must go through the City's Uniform Land Use Review Procedure (ULURP), in which the Community Boards, the Borough President and the

City Council review and approve the acquisition. ULURP was conducted at the watershed level; the DEP went through more than a dozen ULURPs for the Bluebelt.[53]

Interagency Coordination

Because some parts of the Bluebelt system are constructed on public land not under the DEP jurisdiction (e.g., Parks & Recreation, Transportation), coordination among agencies was critical. The DEP continues to communicate with relevant agencies in expanding the Bluebelt program to other parts of Staten Island and elsewhere in the city. The DEP also needed to work closely with the NYS Dept of Environmental Conservation, the agency in charge of regulating activities in wetlands and issuing permits. Through this collaboration, the DEP was able to receive consolidated permits at the watershed level, rather than for each individual activities, which would have required 80 separate permits.[54]

While coordination among various partner agencies was critical to the success of the program, the Bluebelt is and remains to be a program of a single City agency: the DEP. A single agency being in charge eliminated jurisdictional conflicts, enabled watershed scale planning and facilitated the implementation of the program.[55]

Maintenance

Because the Bluebelt consists of many BMPs, whose performance is critical in the function of the system, maintenance is of utmost importance. The DEP has a field management in Staten Island as well as contractors to maintain the BMPs. Involving the maintenance personnel at the design stage was also important in ensuring the BMPs were maintained properly. The design team developed both short-term and long-term maintenance plans for each area of the Bluebelt. Currently the field management teach consists of the Field Manager, Deputy Field Manager and two laborers. At one time the team had seven on staff; however, the City has not filled vacancies due to budget cuts in recent years.

Maintenance tasks vary from simple (e.g., mowing, pruning, picking up litter) to extensive (e.g., "vactoring" which removes sediment from outlet stilling basins and forebays). Vactoring is required on a regular basis with the frequency depending on the particular BMP and its calculated sediment loading. It is conducted by a contractor with appropriate equipment.[56] The maintenance is funded at $700,000 annually out of the DEP's budget. A large portion of this budget is allocated to the vactor contractor.

The DEP is in the process of developing a Bluebelt Asset Management System (BAMS), in which regular inspections result in work orders, for vactoring, litter removal, rectification of illegal dumping, and other routine maintenance. The system will not only further systematize maintenance the DEP has been conducting for decades, but also 'make the case' politically for sustaining sufficient maintenance funding.

The DEP has also made an effort to engage the community in all aspects of the Bluebelt program, including maintenance, and established the 'Adopt a Bluebelt' program where a sponsor can hire private maintenance providers. Over 110 Bluebelt areas have been adopted as of 2009. The DEP also hosts volunteer clean up days. It is estimated that volunteer labor saves the DEP $100,000 each year.[57]

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Seattle, WA

Introduction

The City of Seattle has a history of ballot initiatives for tax levies for its Department of Parks & Recreation (DPR) programs. Every levy proposal is supported by a DPR plan adopted by the City Council as well as other related plans by city and independent agencies. The process for establishing and implementing the tax levies is participatory and inclusive, usually involving a citizens' committee. The City of Seattle (the City) also updates its plans periodically.

Background Context

Seattle's recent park planning efforts began with the 1993 COMPLAN, a Comprehensive Park and Recreation Plan. COMPLAN was created because a local ordinance, passed in 1988, required the DPR to develop a comprehensive parks and recreation plan and to fund such an effort. The 1993 COMPLAN contained objectives to be met by 2000, leading the way for an updated plan in 2000. The DPR has updated the plan twice, in 2006 and 2011. These plans made the City eligible for funding from the State of Washington (the State) and justified the tax levies to the general public.[1]

Shortly after the Seattle City Council passed the 1988 ordinance, the State legislature passed the Growth Management Act, which required comprehensive planning by the City of Seattle. The thirteen planning goals in the Act included natural resource industries, open space and recreation, environment, and citizen participation and coordination.[2] Seattle's population has steadily increased since the decade before the passage of the Act until 2010: in 1980 the City's population was slightly under 500,000 but by 2010 the population was over 600,000.[3] The City of Seattle released its first Comprehensive Plan in 1994 followed by an update in 2004, and is presently undertaking another update.[4] Following the adoption of the original Comprehensive Plan, the City embarked on a neighborhood planning process, resulting in 38 neighborhood plans developed by citizen groups. The recommendations in these plans were incorporated into the Seattle Parks and Recreation Plan 2000.[5]

Historically, Seattle parks and recreation projects were funded by various bonds. Between 1991 and 2008, Seattle attempted six levies for Park related programs and only one bond proposal, which was rejected (two levy proposals were also rejected: see Table 1).[6] King County, in which Seattle is situated, also passed its own parks levies during this timeframe. These levies have enabled the City to leverage other sources of funds to implement the parks and recreation plans. The sections that follow examine more fully the DPR's planning efforts and the successful institution of the levies.

Table 1. Seattle DPR Funding Sources

Year	Source of funding	Purpose
1991	Seattle Center Community Center Levy	$24 million for building 5 new community centers.
1995	Seattle Commons Levy, $111 million, DEFEATED	
1995	Seattle Commons Levy, $50 million, DEFEATED	
1996	County parks bond issue DEFEATED	Fields and Streams or Park and Conservation Bond (intended use of bond).
1999	Seattle Center/Community Centers Levy	$36 million for improving 9 community centers and 2 neighborhood civic centers.
2000	Pro Parks Levy, $198.2 million	More than 100 development and acquisition projects, maintenance, recreation programs, environmental education and more.
2003	King County Parks Levy	Four-year operations and maintenance levy.
2007	King County Parks Levies	2 six-year levies: one for parks operations and maintenance and one for park land acquisition.
2008	Parks and Green Spaces Levy, $148 million	Up to 27 park acquisition projects and more than 60 park improvement projects already identified in public planning processes, and an opportunity fund for other projects identified by community groups.

Source: Adapted from Seattle Parks & Recreation, Park History: Funding, Grants, Bonds and Major Gifts http://www.seattle.gov/parks/history/bonds.htm and King County Parks http://www.kingcounty.gov/recreation/parks/about/levy.aspx

Seattle Parks & Recreation Planning

Seattle has been undertaking comprehensive parks and recreation planning since 1993 in tandem with the City's Comprehensive Plan, mandated by the State legislation. Since the original 1993 plan, the DPR has released three updates: 2000, 2006 and 2011. The plans are generally for five to six years and lay out development and acquisition for the time period.[7]

In addition to the development and acquisition plans, Seattle DPR conducted gap analyses in 2001 and 2011 as outlined in the resolution adopting the Seattle's Parks and Recreation Plan 2000. The gap analyses reviewed various open space plans (for example, the Parks and Recreation Plan and the City's Comprehensive Plan), to identify gaps in the open space network and to evaluate the City's response to these gaps.[8] Seattle's Parks and Recreation 2011 Development Plan presents five major goals, one of which is for acquisition of properties to fill the gaps identified in the gap analysis. Specifically the acquisition goal calls for consistency with the City's Comprehensive Plan, spells out a "distribution guideline" for site prioritization, and lists various acquisition tools, such as fee simple acquisition, voluntary conservation easements, life estate, dedication or long term leasing from other public agencies, and, if no other options are available, condemnation in "highly developed areas lacking open space."[9]

The City's original Comprehensive Plan resulted in 38 neighborhood-based plans, centered around "Urban Villages." These neighborhood plans, which included many DPR-related projects, were ratified by the City Council with the commitment for implementation.[10] Armed with a list of projects, the City developed a five-year strategic capital agenda that included public service facilities and infrastructure, including parks and open space, as

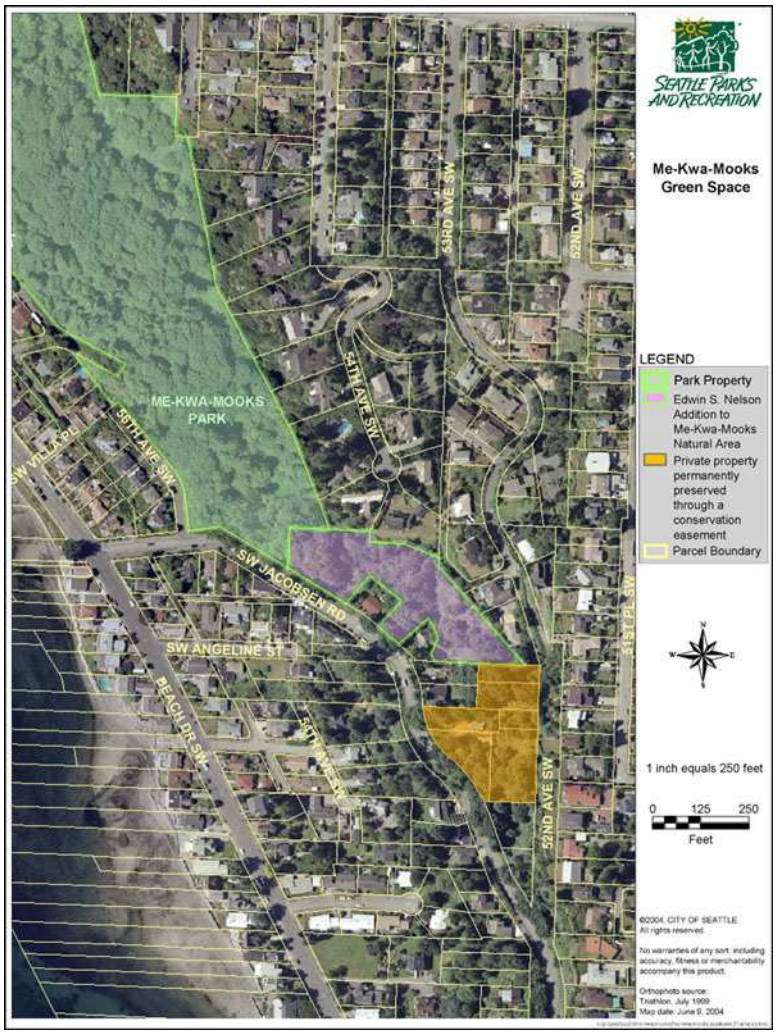
well as the neighborhood plan implementation. The strategic capital agenda recognized the deficiencies of the City's general fund to implement all the plans and recommended removing the lid on real estate property taxes (levy lid lifts) for various sectors, including parks and open space.[11]

Pro Parks Levy of 2000 and Parks and Green Spaces Tax Levy of 2008

Concurrent to the development of the five-year strategic capital agenda, the City Council (at the Mayor's recommendation) established a citizens planning committee, Pro Parks Citizens' Planning Committee, to "ensure citizen participation in the development of a package of parks, open space, and recreation projects and programs and a proposed set of options to fund the package of projects …"[12] The Committee was directed to consider bonds, levies and "junior taxing districts." The Committee held open meetings and solicited public feedback to arrive at a set of recommendations including project criteria, allocation of funding categories, additional property taxes of $200 million by lifting the lid on property taxes over eight years, and the creation of an oversight committee. Under the levy proposal, the increased cost to property owners was $0.35 per $1,000 assessed value,[13] and up to $23 million could be collected in the first year.[14] The levy also envisioned leveraging funds from pubic agency grants as well as private sources.

The levy allocations were based on four major categories: 1) acquisition; 2) parks and recreation development; 3) Acquisition and Development Opportunity Fund ("the Opportunity Fund"); and 4) environmental stewardship, maintenance and programming. The allocations, as approved by the City Council in the ordinance, are shown in Table 2. The ordinance listed specific properties and projects for acquisition, development and environmental stewardship, maintenance and programming. Except for acquisition properties, project costs were also listed.

Map showing an acquisition site under the Pro Parks Levy 2000. Image courtesy of the Seattle Department of Parks & Recreation.



The ordinance also created the Pro Parks Oversight Committee, members of which represented geographic diversity, the Board of Park Commissioners, the Pro Parks 2000 Citizens' Planning Committee, and interested constituencies. The membership on the Oversight Committee was solicited via letters of interest. The City received 58 letters for the Oversight Committee's 16 seats.[15] The Mayor appointed eight members while the remaining eight were appointed by the City

Table 2. Pro Parks Levy 2000 allocations

Category	Allocation (in millions)	Purpose
Acquisition	$26.0	Acquire neighborhood parks identified in Neighborhood Plans and other planning efforts ($16M) and green spaces to fill gaps in greenbelts and natural areas ($10M).
Development	$101.6	Development of neighborhood parks acquired through the acquisition category, existing park properties, and Major Neighborhood Parks; restoration and renovation of recreational facilities; development of trails and land along historic boulevards.
Opportunity Fund	$10.0	Development of projects identified by neighborhood and community groups. Criteria to be developed by the Pro Parks Oversight Committee.
Stewardship, Maintenance & Programming	$60.6	Maintenance for new park and green space acquired through the other categories of the Pro Parks Levy; environmental stewardship of existing properties; maintenance of existing parks and facilities; recreational programming; support for the zoo.

Source: City of Seattle City Council Ordinance 120024

Council. The Oversight Committee was charged with reviewing expenditures, dispensing advice on future expenditures, making recommendations on projects and program implementation, and developing criteria for the Opportunity Fund. The Oversight Committee was required to report to the Mayor, the City Council and the citizens of Seattle.

The levy was approved by voters of Seattle in November 2000. Seattle voters approved an extension of the levy, the Parks and Green Space Levy, in 2008. Once again, the City established a Committee, the Parks and Green Spaces Levy Citizens' Advisory Committee, to develop recommendations for "parks, open space, boulevard, trail, green infrastructure, and recreation projects and to identify strategic funding options for these potential improvements and acquisitions."[16]

The Advisory Committee recommended extending the Pro Parks 2000 Levy, but with some modifications. A levy of $145 million over a period of up to six years was recommended, with annual additional taxes not to exceed $24,250,000. The cost to a property owner whose property is assessed at $450,000 is $80.78 per year for the life of the levy. The Oversight Committee from the 2000 Levy was also continued.[17]

Three of the four 2008 levy categories remained the same as the 2000 levy categories. The fourth category, Environment, replaced the maintenance and programming category. The Environment category was comprised of three capital greening programs: forest and stream restoration; community gardens and community food gardens; and shoreline access. These changes resulted from recommendations by the Parks and Green Spaces Levy Citizens' Advisory Committee. The allocations for the 2008 levy are shown in Table 3. Toward the end of the Pro Parks 2000 Levy, the City needed to increase maintenance allocations in the General Fund for the DPR in anticipation of the Levy expiration, and concomitant elimination of the maintenance fund.[18] There may have been sentiment among the Parks & Green Spaces Levy CAC that maintenance should always be funded through the General Fund.

The 2008 levy included "inflation adjustment" to ensure projects in later years will have sufficient funds. However, to date the levy development projects have not been subject to construction industry inflation, freeing up these funds for other uses. The Oversight Committee made a recommendation, after a public hearing, to reallocate $9,758,000 from the Development category's

inflation adjustment ($14,002,000) to major maintenance projects (e.g., roof replacements) in 2011.[19] However, even with this amendment to the allocation, maintenance is underfunded due partially to budget cuts to the Seattle DPR. The City is now exploring an Operation &Maintenance Levy for DPR or establishment of a metropolitan parks district, which can assess fees.[20]

Table 3. Parks and Green Spaces Levy allocations

Category	Allocation (in millions)	Purpose
Acquisition	$35.7	Neighborhood parks (20 sites for $24M) and green space (7 sites for $6M) and $5.7M for inflation adjustment.
Development	$87.3	57 projects (Neighborhood Parks, playgrounds, cultural facilities, recreational fields, Major Neighborhood Parks and trails).
Opportunity Fund	$15.0	Development projects identified by neighborhood and community groups.
Environment	$8.0	Forest and stream restoration for $4.1M; community gardens for $2.0M; shoreline access for $0.5M; inflation adjustment for $1.4M.

Source: City of Seattle City Council Ordinance 122749

Public outreach

The City of Seattle understands the value of public support without which levies would not have been possible. The City has ensured meaningful public participation by codifying it in various relevant City Council resolutions and ordinances, supported by Washington State's comprehensive planning law. The City's Comprehensive Plan led to the neighborhood plans, development of which involved nearly 20,000 citizens and which now boasts 45 "stewards" representing community organizations.[21,22] For each levy, a citizens' advisory committee was established in developing the levy proposal and to "conduct outreach to the broader public to gather recommendation and comments."[23] Once the levy was approved by voters, a citizens' oversight committee was established to review and advise on expenditures and make recommendations for project implementation. The levies also set aside a category – Opportunity Fund – specifically for implementing neighborhood and community-nominated projects.

In addition, Seattle DPR developed the *Park Development and Acquisition Communications Plan 2001* for four DPR programs, including the Pro Parks Levy 2000. The plan's stated goal is "to engage people in the planning and design and development of these projects through active communication and participation in community meetings, workshops and project advisory teams."[24]

Implementation Status

Under the Pro Parks 2000 Levy the City acquired 47.1 acres (21.04 acres in neighborhood parks and 19 acres in green spaces) for a total of $52.7M: $26M from the Acquisition category, $5.7M from the Opportunity Fund and $21M from City, county and state grants and private donations.[25] For the Development category, as of January 2011, one hundred and ten projects were completed.[26]

Under the Parks and Green Spaces Levy of 2008, ten sites had been acquired and 19 development projects had been completed by the end of 2010. In addition, the first round of the Opportunity Fund drew nearly 100 applications, 15 of which were selected for funding for a total of $7M. By the end of the year in 2010, $26.66 million or 18% of the new levy had been spent.[27]

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Baltimore, MD

Introduction

"Watershed 263" illustrates challenges a water department may face while seeking to implement green infrastructure as a pilot project. Led by the Baltimore Department of Public Works (DPW) in partnership with the Parks & People Foundation (P&P) and the Baltimore Ecosystem Study (BES), this demonstration project is intended to serve as a national model for managing storm water through green infrastructure in an urban neighborhood. This collaboration sought to plan for the greening of a 935-acre man-made watershed, with the goals of measurably improving both water quality and quality of life for the residents. BES and DPW established two sub-drainage areas to monitor water quality in the storm drains. One of the 40-acre sub-watershed drainage areas was selected for the construction of several capital projects prepared by DPW engineers. The other sub-drainage area did not have any projects implemented. Although the DPW identified around 150 potential sites in this sub-drainage area to implement green infrastructure, including numerous vacant lots, its process of elimination resulted in the greening of just one vacant lot. Private ownership, interference from underground utilities, appropriate distance from buildings, and pre-existing community uses of sites all provided obstacles to implementation. Construction costs increased by more than 50% because designs utilized more material (i.e. concrete) than necessary; the use of low-bid contractors ultimately increased construction costs because they were not familiar with green infrastructure. Project design complicated maintenance. Tall native plantings selected by designers were cut down as an act of good citizenry by local residents out of it concern for safety, who preferred clear sightlines and wanted to avoid hiding places for pests or drugs. Transfer and preservation requirements added further challenges to converting vacant lots to green spaces. Moreover, street tree wells did not account for the accumulation of trash; Parks & People ultimately retrofitted them to reduce maintenance needs. Maintenance challenges persist, as the DPW does not provide funding for maintenance; P&P has conducted maintenance to the extent it has raised funding. The DPW may utilize a storm water remediation fee for maintenance should such funds become available.

Emerging initiatives, however, support the conversion of vacant lots to green space. The Baltimore City Housing and Community Development department has an efficient Adopt-a-Lot program that transfers pre-screened sites to public or private applicants. Through a nascent Growing Green Initiative, the DPW is presently working with multiple other city agencies and non-profit organization to develop a policy for aggregating the demolition of abandoned buildings to create green spaces. Baltimore Green Space, a land trust, worked with city agencies to re-design the transfer process for permanent ownership, and works on behalf of community managed open spaces to provide ownership and liability services.

P&P, a non-profit greening organization, continues to implement 30 new projects throughout Watershed 263 with funding from the State of Maryland (the State) pursuing the original goals of the project. Water quality samples by BES and DPW indicate a greater-than-expected reduction in nutrient loads in the one sub-drainage area where BMPs have been implemented.

Background

City agencies and community planners in Baltimore City formed strategic partnerships to convert vacant lots to green space in "Watershed 263", in an attempt to advance storm water management and water quality goals. The Baltimore City Department of Public Works (DPW) sought to meet the EPA National Pollution Discharge Elimination System (NPDES) requirements by 1) reducing the volume of separate sewer overflows, which release chemicals, floatables, and other criteria pollutants, and 2) reducing pollutants in storm water systems, particularly nutrient loads, but also heavy metals, bacteria and trash.[1] P&P creates green space with community members in Watershed 263. P&P has successfully greened 400 vacant lots through a "clean and green" program, and has greened 4.2 acres of concrete and asphalt, mostly from school facilities, within Watershed 263.[2] Though the 4.2 acres of greened spaces have been approved by the Maryland Department of the Environment for storm water credits, these projects focused primarily on achieving neighborhood beautification and environmental improvement rather than achieving storm water management outcomes based on detailed engineer drawings.[3] These efforts, however, are not the focus of this case because they are not components of the Watershed 263 collaborative projects.

Vacant lots and abandoned buildings are prevalent in Baltimore. The city's population has declined by more than one-third in the last 60 years, peaking at 950,000 inhabitants in 1950 and declining each decade to a total of 621,000 inhabitants in 2010.[4] A 1995 national survey by the Brookings Institution found that Baltimore had 22.22 abandoned buildings for every 1000 residents, dramatically higher than the national average of 2.63 and second only to the Philadelphia, which had a ratio of 36.54.[5] Vacant lots in Baltimore are concentrated in certain areas of the city, such as Watershed 263. Considering that 2,000 vacant or abandoned residential sites exist throughout Watershed 263[6] compared to approximately 11,000 vacant lots and 20,000 abandoned buildings citywide,[7,8] greening these underutilized spaces holds tremendous potential to manage storm water and improve local neighborhoods. The large number of vacant properties was an important factor in the DPW selecting Watershed 263 as a demonstration area.[9]

Watershed 263

Watershed 263 is a 935-acre man-made watershed within Baltimore City's harbor watershed that drains into the Patapsco River.[10] Watershed 263 is predominately a low-income community of color, with 32,000 residents and 12 neighborhoods; 78% of its population is African-American. Watershed residents have a median household income of $19,500 per year.[11] Its land has a mix of industrial, institutional, and residential uses; one third of the watershed is industrial properties.[12] About 75% of its surface is impervious, more than the city average, and relatively little area is vegetated groundcover (19%) and tree canopy (6%).[13]

Planning Methods and Processes

In the early 2000's, the DPW mapped all 335 sewersheds throughout Baltimore City to enhance its storm water planning efforts.[14] P&P, a non-profit organization that promotes healthy built and natural environments for Baltimore through education, technical assistance and planning, developed a complementary plan in 2004 for greening Watershed 263. In 2004, Watershed 263's more than 2000 vacant lots covered 134 acres of land; about half of the lots (67 acres) were publicly owned.[15] In 2005, DPW prepared a comprehensive Water Quality Management Plan for the watershed identifying 107

green infrastructure projects to treat 25% of the 935-acre watershed, with the goal of achieving a 30 percent reduction in pollutants at an estimated cost of $7.5 million.[16]

Strategic Partnerships

In 2004, Watershed 263 was selected as a large-scale pilot by the DPW because P&P had an existing engagement with communities in the watershed,[17] and the subsequent DPW Water Quality Management Plan and its mapping analysis demonstrated the potential to implement green infrastructure in this area.[18,19] In addition, The U.S. Forest Service and the Baltimore Ecosystem Study developed a multi-faceted research agenda with the DPW and P&P. The BES also sought to develop a replicable model for urban watershed management planning and greening, develop neighborhood partnerships, identify cost-effective implementation strategies, and implement demonstration projects with measured outcomes. The jointly planned greening efforts, intended to modify 25% of the watershed's land cover, included building a greenway to connect neighborhoods, parks and schools throughout the watershed, removing asphalt from schools, and greening vacant lots. In terms of research, the collaboration sought to measure the water quality impacts of greening interventions by measuring the quantity and quality of storm water in two sub-drainage areas of approximately 40 acres, one that did not receive any greening investments and did not substantially change over the four-year study period, and another that received a set of greening interventions.[20] The partners also wanted to measure changes in quality of life as a result of the green infrastructure projects in comparison to traditional below ground storm water infrastructure.

P&P also maintains a watershed council where they work with community members to green properties. P&P coordinates meetings, prepares agendas, takes notes, and seeks funding for greening projects and programs. Several dozen residents of Watershed 263 are active participants of the watershed council.

Site selection

The DPW site selection process dramatically narrowed down possible sites for greening interventions in the evaluation area, to the point where applying for NPDES credits did not make sense. An initial assessment identified around 150 potential green infrastructure projects for Watershed 263, sub-drainage area "O". After applying criteria from the Center for Watershed Protection, just over 100 potential sites remained.[21]

The DPW then applied four criteria to further narrow down potential sites:

1. Public ownership, ensuring sites already were in the public domain;
2. No interference from underground utilities;
3. An appropriate distance from buildings, requiring a 50 foot setback before installing technology for infiltration; and, ideally,
4. Community engagement, particularly to ensure maintenance and public safety.[22]

After applying these criteria, just 35 sites were initially recommended for construction; after follow-up investigation, only 15 sites were recommended for construction, and only six were ultimately constructed; just one was a vacant lot. (The remaining five interventions consisted of one small triangular site for infiltration and four curb extensions with storm water tree pits).[23] In addition to ownership status and technical considerations, several potential sites were eliminated because communities were already actively using greened vacant lots.[24] The conflict with existing community uses arose in part because the sites were designed specifically for storm water capture, without encouraging additional uses that address community needs. This is not the typical way that P&P works with community partners, whereby it seeks to address community concerns through the design and use of green infrastructure.[25]

The transfer process and preservation requirements added additional challenges. At the time, the Housing and Community Development department (HCD) was hesitant to transfer land to DPW in the event of future development opportunities. The Baltimore Housing Authority could have acquired properties with code violations on DPW's behalf, but DPW was not prepared to take title because of the project's pilot status.[26]

Transfer

Nearly all greened vacant lots in Watershed 263, including the 400 "clean and green" sites, are publicly owned and participate in Baltimore City's Adopt-a Lot-program. Baltimore City recently instituted a process through the HCD to identify specific sites available for community gardening. The HCD pre-qualifies with other City agencies all land not planned for development for the Adopt-a-Lot program. Applicants first may apply for a one-year license. After one year of successful stewardship, participants may renew for up to five additional years at a time. The program, in existence since the mid-1980's, had about 120 participants citywide in 2011. Following a streamlined application process, including the development of an online application, and the initiation of the Mayor's Power in Dirt program, participation in 2012 grew nearly fivefold to 676 participants citywide. Power in Dirt, developed with community and environmental organizations including Parks & People, provides technical assistance to community stakeholders interested in greening vacant lots.[27]

The application and program are free, except for a $120 flat fee per garden for water access during the growing season. Lots range in size from 15' X 70' (a typical residential building) to ½ acre; some projects aggregate vacant lots to increase the sizes of their green spaces. The City maintains the right to revoke a license within 30 days, although as a matter of policy it seeks to allow gardeners to finish a growing season before revoking a multi-year license.[28]

DPW Curb Extension in sub-drainage area "O", Baltimore Street, in Franklin Square neighborhood. Printed with permission from the Parks & People Foundation.

Given challenges in implementing sites through Watershed 263, the DPW is presently working with the City of Baltimore's Office of Sustainability and Department of Planning to develop a Growing Green Initiative, which seeks to create larger green spaces by aggregating multiple sites through the demolition process. The Growing Green Initiative utilizes spatial analysis to identify sites for storm water management using three criteria: 1) where more than one publicly-owned vacant property exists; 2) where sites are irregularly shaped;[29] and 3) where infiltration opportunities exist. Members of the

Growing Green Initiative interagency task force include the DPW, the Housing and Community Development Department, the Department of Planning, the Department of Transportation, and the Baltimore City Public Schools. The Growing Green Initiative has preliminarily identified six greening typologies for demolished sites: (1) urban agriculture; (2) urban forestry; (3) community managed open space (see preservation section); (4) green parking; (5) storm water management, such as incorporating bio retention and community maintenance; and (6) temporary green use for sites that should be held for development purposes. Other considerations, such as the opportunity to provide water access for a site, are not easy to identify on the GIS map, so site visits are important to the process. One storm water management benefit is that all of the below-ground building infrastructure, such as basements, could be removed during demolition to facilitate infiltration.[30] The Growing Green Initiative will produce a "green pattern book" that identifies ideal potential uses based on considerations such as vacant lot size, shape, topography, and sunlight.[31]

P&P, as well as the US Forest Service and BES, are also working with the City on the Growing Green Initiative in part to transfer the lessons learned in Watershed 263. Parks & People has also identified with the affected neighborhoods 30 green infrastructure projects in Watershed 263 for implementation with approximately $3 million in State watershed restoration funds, and another 9 projects with $1 million in funding scattered throughout the City to also help with transferring green infrastructure projects.

DPW and Parks & People greening Vincent Street lot. Printed with permission from the Parks & People Foundation.

Use of site & design challenges

A second set of shortcomings in Watershed 263 occurred at the points of design and implementation, where project costs increased by more than 50% and created maintenance challenges. The initial site designs did not account for the trash that would accumulate in key infiltration areas. Parks & People retrofitted the components to prevent trash from flowing into tree wells. In addition, the original landscape design included tall native plantings, which local residents perceived as weeds. Safety concerns were paramount among local residents, who preferred clear sightlines and no potential hiding spaces. Moreover, local residents believed that tall plantings could harbor rats or drugs. Local residents cut down the tall, native plantings as an act of good citizenry. Their actions also may have reflected a lack of knowledge about the ecological benefits of native plantings, compared to overgrown weeds. In addition, utilizing the project's low bidder provided still more challenges. A pile-driving company that was hired to perform curb extensions used excessive amounts of concrete, increasing the project cost.[32] The six sites, collecting storm water from a total of 4.3 acres, cost a total of $491,000.[33]

Ultimately, the DPW did not seek storm water credit from the state of Maryland toward its MS4 requirements. Not only was the area covered modest, but challenges also existed in receiving credit from the State of Maryland for these

interventions, which differed from larger green infrastructure and detention ponds of which the state's regulatory agency was accustomed.[34]

Preservation

To ensure the long-term preservation of greened vacant lots, Baltimore Green Space (BGS), a land trust, was founded in 2007. BGS secures ownership of greened vacant lots by acquiring property rights from public and private land owners. One of the key functions of this land trust is liability insurance; participants in the Adopt-a-Lot program are liable for their own sites. Lack of insurance leaves particularly vulnerable the people in greater need of green space and with less capacity to acquire insurance on their own.[35] BGS has coordinated its greening efforts with the DPW, the Office of Sustainability the HCD, and P&P.

Four criteria exist for participation in this "Community Managed Open Space" trust:

1. The preservation request must come from the community;
2. A maintenance plan and capacity must be in place;
3. Projects must directly benefit the neighborhood;
4. Proposed uses must account for former uses of site to address possible contamination.

Maintenance capacity is determined, in part, by whether a project has been in existence for at least five years. In this way, projects that have been in existence through the Adopt-a-Lot program can transition to permanent status. To support the transfer and acquisition of property to the land trust, BGS worked with the City's Office of Sustainability to re-design the process for acquiring public property, as well as privately owned property with municipal liens. The City transfers these sites to the land trust for one dollar.[36] The land trust had three properties under its care as of August, 2012, but had created partnerships with City agencies and communities to facilitate the transfer of significantly more lots in the near future.[37]

Maintenance

Three key maintenance challenges arose after green spaces were implemented. First, as previously mentioned, local residents mowed down tall native plantings because they looked like overgrown weeds and could potentially harbor rats or drugs. Second, trash collection has been a consistent challenge. The curb extensions were initially designed in a way that did not account for trash. Even once this design flaw was modified, green infrastructure continues to collect debris given the nature of a dense urban area. Trash inhibits the flow of storm water, and therefore reduces the performance of green infrastructure. Third, no reliable or adequate funding for maintenance exists. Parks & People has cobbled together funding opportunities, through Federal stimulus funding and grant programs, to conduct maintenance. While these have provided opportunities for adult and youth development, they have been temporary and are not on the scale needed for sufficient maintenance.[38] The DPW has not committed any resources to maintain the sites it has installed. The DPW is considering how it may use a storm water remediation fee, which it may be required to develop according to Maryland state law.[39] One key consideration of a maintenance program would be to ensure that a maintenance crew has specialized skill sets to perform the landscaping care required.[40]

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Detroit, MI

Introduction

Detroit demonstrates how existing grassroots efforts can support emerging green infrastructure initiatives on vacant land, advancing storm water and economic development goals. Detroit lies within the Rouge River watershed, comprised of 48 communities and three counties. The Detroit Water and Sewerage Department, a regional utility, initially spent more than $750 million throughout the Rouge River Watershed on gray infrastructure. The region has re-structured its Consent Order to implement both green and gray infrastructure, reducing annual debt service payments by around $57 million.[1] Toward this effort, the Detroit Water and Sewerage Department (DWSD) has committed to spending $50M through 2030 to construct and maintain green infrastructure. Given the abundance of vacant lots in Detroit, SEMCOG, a metropolitan planning organization, is developing a strategy for the DWSD to green vacant lots, with the goal of reducing storm water flow into the combined system.[2] Reflecting the city's loss of population from 1.85 million in 1950 to about 714,000 in 2010[3] – a 57% decline – more than 25% of the City's residential lots are vacant and more than 10% are abandoned.[4,5] The Greening of Detroit, a non-profit organization that will implement and maintain components of the DWSD's green infrastructure plan, has developed effective practices over the past two decades for identifying, implementing and maintaining green infrastructure citywide.[6] In addition, Mayor Bing's Detroit Works strategy seeks to implement "green and blue" storm water infrastructure within its citywide redevelopment plan.

The Detroit Green Infrastructure Plan

Planning

The Southeast Michigan Council of Governments (SEMCOG) seeks to develop a long-term strategy for implementing green infrastructure in Detroit. SEMCOG, focused on transportation and water resource planning, represents seven counties in the Detroit region.[7] SEMCOG is funded by the state of Michigan Section 205(j) program (an EPA Program) to develop a green infrastructure storm water management plan for the DWSD. SEMCOG, using a land cover model, estimated that large scale implementation of Green Infrastructure (GI) would reduce storm water flow into sanitary sewers by 10% to 20%.[8,9] Greening vacant lots, particularly where abandoned buildings need to be demolished, is one of five key focus areas of the DWSD's plan. (The other four are tree planting, greening along roadways, GI on municipal-owned properties, and downspout disconnections).[10] Although SEMCOG's strategy will not be completed until the end of 2012,[11] its planning could inform other cities' storm water management efforts.

SEMCOG's vacant land strategy can be divided into three parts: 1) greening vacant land next to major roadways; 2) greening vacant land on a lot-by-lot basis; and 3) aggregating vacant land for large scale greening. After identifying potential opportunities to green vacant lots, SEMCOG will model scenarios estimating the potential impact of greening vacant land on storm water volume capture and develop a decision matrix based on potential outcomes. An acreage goal for greening vacant lots will be established from the long term strategy currently being developed. Achieving community benefit also holds great importance for the site selection.

SEMCOG's collaborative planning process provides the opportunity to select sites that also improve community well-being.[12]

In addition to providing technical assistance, SEMCOG facilitates collaboration among local, state, and federal public agencies, universities, utilities, and non-profit organizations across seven counties to develop planning and implementation strategies.[13,14]

Capturing Runoff from Streets

SEMCOG suggests the DWSD prioritize "off-lining" runoff from streets into both small and large greened vacant lots that are situated to capture large volumes of storm water. SEMCOG also facilitates access to roadways that are not owned by the City of Detroit (the City), such as county- and state- owned roads.[15]

Lot-by-Lot Greening

SEMCOG conducted a GIS analysis to identify vacant properties along major corridors with high "off lining" storm water capture potential. The DWSD subsequently paid $1M, allocated from the city's ratepayer-funded $50M green infrastructure commitment, for the demolition of 140 abandoned houses along major roads. The City can demolish abandoned buildings through the city's blight ordinance, but the properties will remain in private ownership until future, preservation-oriented ownership is determined.[16]

In addition, SEMCOG is investigating the potential for the DWSD to green properties comprised of one to three vacant lots, particularly in areas with low vacancies and where abandoned buildings are demolished. SEMCOG also is researching the potential to green one to two vacant lots (usually former residential properties) next to roadways.[17]

Site Aggregation

Larger, aggregated sites could potentially capture the greatest volume of storm water, but the assembly of strategically located, publically owned land presents challenges. In terms of location, SEMCOG is currently analyzing whether areas with the highest concentrations of vacant lots coincide with the areas that contribute to high volumes of CSOs. And in terms of ownership, occupied houses are interspersed throughout high vacancy areas, and multiple property owners hold title to many occupied sites. As the acquisition process for delinquent properties in Detroit is not streamlined, gaining title to vacant land requires navigating a bureaucratic process across multiple agencies at the city, county and state levels. [18]

Preservation

SEMCOG and the DWSD are still assessing what long-term ownership agreements may need to be in place to ensure greened vacant lots are preserved in the long-term.[19]

Maintenance

To maintain greened vacant lots, SEMCOG is evaluating three options. First, the City of Detroit's General Services Department (GSD) could perform "window pane" cutting along the edges of greened sites at no charge to the DWSD. Second, should the DWSD seek a higher level of maintenance, it could develop an MOU that includes a financial agreement with the GSD for the additional maintenance services. And third, the DSWD could develop a maintenance agreement with an outside contractor. Maintenance will be allocated from the DWSD's $50 million GI commitment.[20]

One promising effort is the DWSD's partnership with the non-profit organization, The Greening of Detroit (The Greening). The Greening is the DWSD's implementing partner to train local residents in downspout disconnection, rain gardens and rain barrels. The Greening also is planting and maintaining 2,000 trees, which will be completed by June 30 2013.[21] In addition, The Greening is implementing the individual lot greening program. In 2013, The Greening will pilot the first round of different vacant lot treatments working with SEMCOG, the DWSD and the Michigan Land Bank. They will develop cost-benefit comparisons for both installation and maintenance through this pilot project.[22]

Background

Though the Greening of Detroit's partnership with the DSWD is recent,[23] over the past twenty-three years The Greening has developed effective planning, implementation, and maintenance strategies. The Greening seeks to address the loss of more than 500,000 trees from 1950 to 1980 due to Dutch Elm disease, urban development and attrition, as the city lacked a program to replace dead trees.[24] Since its founding in 1989, The Greening's citywide, community-based reforestation efforts have resulted in the planting and maintenance of 1,379 vacant lots, 1,407 family, school and community vegetable gardens that reached more than 15,000 Detroit residents, and 80,924 trees.[25]

Planning

The Greening's urban reforestation program provides an adaptable model of planning and partnership building for greening urban areas. With the goal of developing a healthy, well-functioning tree canopy, The Greening utilizes Geographic Information Systems (GIS) to ensure each planting maximizes ecosystems services, such as soil and air quality improvements and storm water reclamation potential, as well as social considerations. The urban reforestation program has predominately been supported by corporate donors and foundations. Recent storm water management initiatives initiated in 2009 have been publically funded, including four grants through the Great Lakes Restoration Initiative (GLRI), worth a total of $2,093,000, for its New Growth Forest Initiative.[26]

The Greening selects New Growth Forest Initiative storm water management projects in partnership with the DWSD based on the following criteria: the availability of continuous, open space; neighborhoods with flooding issues; parks that could serve as wetlands; and 'limited maintenance' parks where the City already is conducting minimal maintenance. Species are planted based on low maintenance requirements and storm water management capabilities (fir and pine trees are particularly common selections). The Greening has planted 1500 trees in five parks to advance the initiative's goals, and is monitoring tree health with an advisory committee, which includes engineers and researchers from Wayne State University and the University of Michigan.[27]

Use & Transfer of Publically Owned Vacant Lots

The Greening has facilitated the development of more than 400 community gardens since 1989. For these projects, The Greening helps community members to access publically owned vacant lots through the city's "dollar-lot" program, which provides an annual gardening permit during the growing season. The Greening generally avoids privately owned lots, as the process for identifying and partnering with a private building owner can be onerous.[28] Acquisition of publically owned vacant lots for gardening is expected to become more common in 2013 as the City of Detroit streamlines its side lot acquisition process and passes a new ordinance governing food production on privately owned lots.[29]

Maintenance

Green Corps program

Shortly after launching its tree planting program, The Greening realized the limits of volunteer-based maintenance. Initially, The Greening developed 3-year stewardship agreements with volunteers in neighborhoods where they planted trees. Key stakeholders who signed these good-faith agreements, however, frequently moved away, passed away, or were not interested in conducting maintenance when it was most needed, during periods of extreme heat. [30]

To ensure their plantings were well maintained, The Greening initially sought to develop a professional maintenance crew. Although The Greening's tree planting initiatives had been funded by foundations and corporations, they would not support a professional maintenance crew. In response, The Greening developed a highly fundable "Green

Corps" summer youth employment program, which maintains a $1 million annual budget and has received funding from foundations, corporations, and the Michigan State Youth Employment Program.[31]

Through its Green Corps program, The Greening maintains trees it planted over the previous three to four years. The Green Corps maintains about 20,000 to 30,000 trees annually, caring for each tree five times per summer. The Green Corps also consistently maintains recreational and pocket parks, but maintains agricultural sites on a limited basis because they are typically maintained by gardeners. About 200 youth participate in the program each year. The youth conduct tree pruning (using hand pruning techniques, as they cannot use mechanized equipment), hand watering, mulching, litter pick up, and weeding at each site they visit. The youth receive a paid hourly wage of $7.50 / hour, are required to work 32 hours per week, and may participate in 3-week, 6-week, 8-week, or 12-week programs based on their particular schedules.[32]

The Greening also has four professional, adult work crews, who work from March through Thanksgiving, to care for around twenty miles of greenway and 5-10 community parks. Each crew has one leader and five members. In addition to conducting maintenance, they organize volunteers in neighborhoods for day-long cleanups. The Greening also trains 150 adults per year through an eight-week certification program, in which they learn technical skills in the landscaping industry such as tree care and horticulture propagation. [33]

Clean and Green program

The Greening also cleans and maintains vacant lots through neighborhood-scale initiatives, seeking to stabilize the price of rental units in transitional real estate markets. Through this program, The Greening assesses all vacant lots within a given neighborhood, prioritizing vacant lots with the greatest potential to improve a community. While greening priority vacant lots, the remainder of the neighborhood also is greened and cleaned. For example, when a pocket park is created on several contiguous lots, street trees are planted and vacant lots are cleaned throughout an entire neighborhood. The Greening leverages local volunteers to help with basic maintenance, such as trash pick-up and mowing. Maintenance typically occurs for a two to three year timeframe, though in some cases when communities remain engaged maintenance continues for many more years. The Greening's first Clean and Green project occurred in the 1990's, when it greened more than 2,000 vacant lots; this initiative was funded through the Federal Housing and Urban Development's Empowerment Zone program. The program has expanded to include a fee for service component, where neighborhoods and corporate partners can contract The Greening for maintenance; work crews are created from neighborhood residents.[34] In total, the Greening has improved approximately 10,000 vacant lots; around half have been greened, and the remainder cleaned. Funding from city, state, and federal sources have continued to support this program, with limited support from corporations.[35]

Economic Development: The Detroit Works Project (Detroit Works)

Detroit Works will be a comprehensive, data-driven revitalization plan for the City of Detroit, rooted in the competitive advantages of the city and region. Detroit Works will include land use, infrastructure, economic development, and landscape plans. Though not yet complete (the plan is scheduled to be released by the end of 2012), the Detroit Works plan will suggest strategically implementing green and blue infrastructure (such as retention ponds) based on market principles.

The Detroit Works research team has segmented the city into three markets typologies: low vacancy areas that have vacancy rates are around 6% to 8%;

moderate vacancy areas with vacancy rates in the range of 20% of 30%; and high vacancy areas, where vacancy averages around 60%. These vacancy rates are based on vacant lots only, and do not include abandoned buildings. Therefore, there are higher rates of underutilized properties, particularly in areas with the highest rates of vacancy and abandonment. A fourth neighborhood category is the 'greater downtown' area that includes Detroit's central business district. [36]

The landscape strategies are aligned with local market conditions. For areas of low vacancy, the Detroit Works team seeks to target community gardens, providing a community asset, and potentially implementing blue infrastructure. For areas with moderate vacancy, it seeks to integrate green infrastructure into the neighborhoods through a variety of screening interventions. And in areas with the highest vacancy rates, it suggests reestablishing natural habitats in the long-term, i.e. 20 to 50 years.[37]

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Cleveland, OH

Introduction

Several nascent initiatives in Cleveland seek to reutilize vacant lots to manage storm water, improve communities, and restore the local ecology. The Northeast Ohio Regional Sewer District (NEORSD) needs to use green infrastructure (GI) to meet its Consent Order; it is in the process of identifying suitable sites. The Cleveland Land Bank holds a significant number of vacant properties throughout Cleveland, facilitating the site aggregation process. The NEORSD seeks to advance community development goals through some of its projects, such as its plan to use green infrastructure to manage storm water throughout most of the Urban Agriculture Innovation Zone. The NEORSD also is partnering with the Cleveland Foundation and LAND studio to develop a vision plan for implementing green "leave-behinds," above grey tunnel infrastructure construction sites. A complementary initiative, led by the City of Cleveland and the Cleveland City Planning Commission, identified three strategies to repurpose vacant lots: 1) neighborhood stabilization; 2) green infrastructure; and 3) productive landscapes. An analysis among city agencies and NGO stakeholders identified processes, strategies, and data analyses that would support these goals. A follow-up study identified five greening strategies to improve the ecological services of greened vacant lots through short-term interventions.

Storm water policy

The Northeast Ohio Regional Sewer District, through a settlement with the EPA and Department of Justice, committed to utilizing green infrastructure as part of its CSO volume reduction plan pursuant to the Clean Water Act. At the time of this agreement in December, 2010, 4.5 billion to 5 billion gallons of CSOs were released from 126 outfall locations throughout the region;[1] most outfall locations were located in Cleveland.[2] The NEORSD is a regional utility district comprised of 61 communities across northeast Ohio, including the City of Cleveland. This utility operates three treatment facilities and maintains large interceptor sewers that are above 30 inches in diameter. Through this Consent Decree, the NEORSD has committed to preventing 44 million gallons of CSO by using green infrastructure and postponing gray program implementation. The NEORSD's $3 billion Long Term Control Plan (LTCP) focuses primarily on gray infrastructure solutions.[3] Thus its green infrastructure plan is a large-scale pilot that could potentially be incorporated into future LTCP planning efforts.[4]

The NEORSD officially committed to spending $42 million to prevent 44 million gallons of CSOs post-gray program implementation, but it anticipates the cost will be significantly higher. Its original estimate was in the range of ninety cents to one dollar per gallon of CSO control (infiltration or diversion), but it has realized that the cost will more than likely be in the range of two dollars to two dollars and ten cents per gallon. The NEORSD estimates that between 5 and 12 gallons of storm water will need to be managed annually to prevent one gallon of CSOs.[5] Costs are higher because of the volume of storm water control necessary to capture residual 'post-gray implementation' overflow volumes. Additional factors may include environmental site conditions, restoration costs of

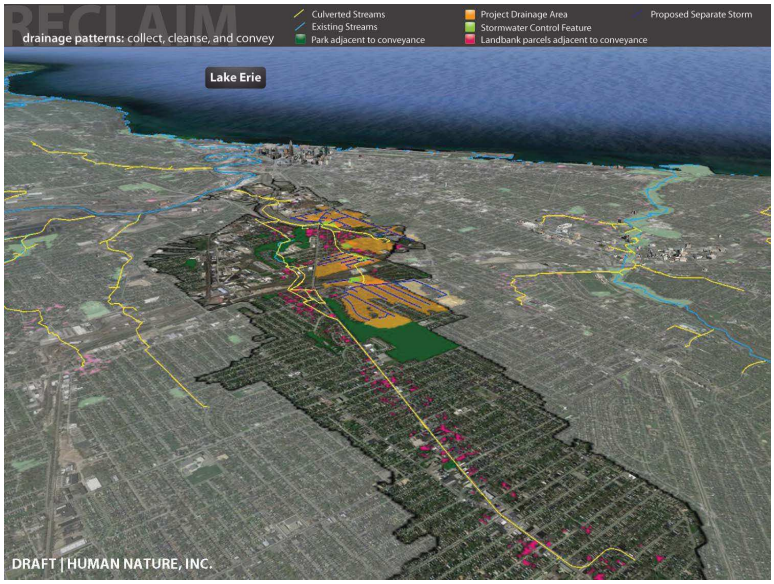
storm sewers that drain storm water runoff into GI features, and land acquisition costs.[6] The NEORSD must implement its green infrastructure plan in an eight-year timeframe (by 2018).[7]

Vacant lot planning

It is not surprising the NEORSD seeks to implement green infrastructure on vacant lots, given their prevalence in Cleveland. Around 20,000 vacant lots exist in Cleveland,[8] providing 3,300 acres of land, in addition to 15,000 vacant buildings. Every year, the City of Cleveland demolishes an additional 1,000 buildings.[9] Vacancy is likely to increase in Cleveland. The city's population has declined from 914,808 in 1950 to 396,815, in 2010,[10] – a 57% percent decline; its population is projected to further decrease to around 387,000 by 2016.[11]

Planning & Analysis

The NEORSD is still developing its plan for implementing green infrastructure on vacant lots; site selection presents the greatest immediate challenge. Preliminary site selection criteria include large parcels of land, areas where gray infrastructure does not eliminate CSOs, and properties that could potentially divert storm water runoff away from the CSO system. Two main possibilities exist to divert runoff: infiltrating storm water into soils, or draining storm water runoff directly through green infrastructure and then into surrounding creeks or lakes. One perceived challenge is vacant lots are scattered throughout the city. The NEORSD estimates that smaller sites are more expensive to maintain than larger sites due to the significant number of sites required to meet Consent Order mandates. The NEORSD is required to maintain green space in perpetuity per its Consent Order.[12]



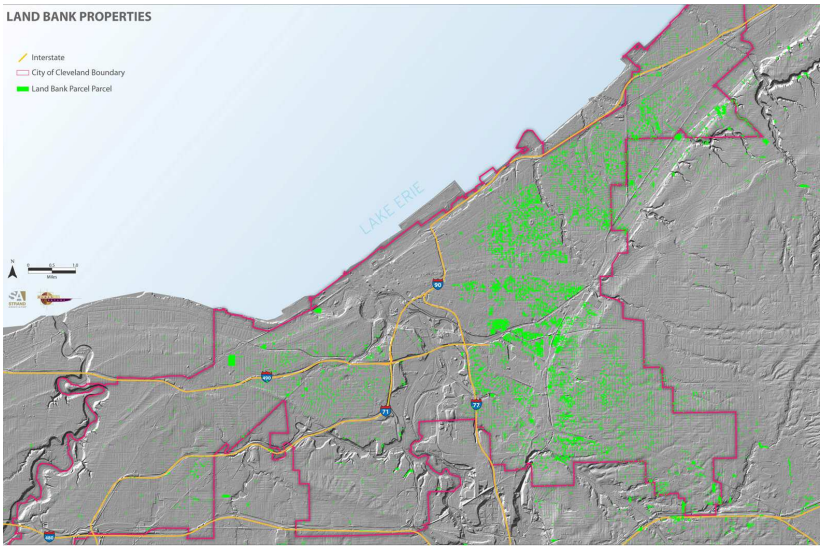
NEORSD analysis of potential sites along culverted streams (Draft). Printed with permission from the NEORSD. Image credit: Human Nature & Strand Associates

Although some studies have helped to identify potential neighborhoods and a handful of specific lots that would be appropriate to green, the NEORSD still needs to identify numerous additional suitable sites and receive community buy-in for each lot. Presently, the utility is meeting with Community Development Corporations (CDCs) to identify which specific sites are ideal candidates for greening, as well as which neighborhoods it should target. CDCs have expressed particular concern about whether certain sites under consideration may present development opportunities down the road. To address the challenge of greening sites that may have future development potential, the NEORSD is considering the development of an agreement for vacant lots that receive green storm water infrastructure treatments, which would require a developer to manage storm water on-site.[13] Many of the NEORSD's candidate green infrastructure projects include conveyance systems to drain storm water runoff to sites that will be used for green infrastructure features. These features include infiltration basins, wetlands and bio-retention basins.[14]

The NEORSD may acquire land-bank owned sites adjacent to culverted streams, as depicted in the image on the previous page. These sites could potentially manage and treat storm water from the surrounding area before it enters the sewer system, given the sites' proximity to underground conveyance infrastructure. The orange area in the above illustration represents where the NEORSD already expects to control storm water using green infrastructure in one outfall area.[15]

Transfer: the Cleveland Land Bank

The NEORSD is working with the Cleveland Land Bank (Land Bank), a program of the City's Housing and Community Development Department, which may facilitate the process of site aggregation and acquisition.[16] Founded in the late 1970's, the Community Development Block Grant (CDBG) funded Land Bank program only acquires sites without structures; presently, its inventory includes more than 11,000 vacant lots. The Land Bank facilitates the reuse of vacant lots in four ways. First, while acquiring sites through the Sheriff's sale, the Land Bank clears title, resolving ownership ambiguities. Second, the Land Bank provides a centralized process for city agencies to analyze and acquire privately owns vacant lots, reducing confusion and mixed incentives among multiple public agencies. The Cleveland Land Bank focuses on acquiring properties within Cleveland's 15 Neighborhood Stabilization Program target areas, where the City concentrates its CDBG investments. Third, the Land Bank provides a one-stop shop for developers, helping them to avoid the more complicated Sheriff's sale process.



Cleveland Land Bank-owned Properties, 2012. Printed with permission from the NEORSD. Photo credit: Human Nature & Strand Associates

And fourth, the Land Bank may acquire tax delinquent and foreclosed properties, facilitating site aggregation. The County treasurer provides the Land Bank with a set of tax delinquent properties that are in foreclosure and slated to go through the Sheriff's sale process. The Land Bank compares that list with areas where it and other city agencies are interested in acquiring property, and conduct due diligence on prospective properties. The Land Bank seeks to acquire between 100 and 200 properties per Sheriff's sale, which occurs every three months, and the treasurer places a "hold" on those parcels. The Land Bank places a bid on properties at the Sheriff's sale, equal to the tax lien on the property, which is the minimum required Sheriff's sale bid according to state law. The tax liens on properties are forgiven when the titles transfer to the Land Bank, which may seek to recover liens from the prior owner if interested.[17]

Should the NEORSD seek to directly acquire a property from a private landowner, it would use ratepayer funds. The District may acquire properties that are required for the construction of green infrastructure projects. Planning efforts that are underway seek opportunities to maximize use of land bank parcels, although the NEORSD will acquire private property as necessary to implement cost-effective green infrastructure projects.[18]

Site use: urban agriculture

While the NEORSD is determining the range of uses for sites, one project in particular, the Urban Agriculture Innovation Zone (the Zone), stands out. The Cleveland Urban Design Collaborative and the NEORSD, along with local CDC's, have supported the development of a 28 acre site within the Zone in the 'forgotten triangle' neighborhood, which has a greater proportion of vacant lands than most Cleveland neighborhoods. The site presently sustains two main uses. One use is a farming business incubator the size of two city blocks. The incubator has approximately twenty ¼ acre individual parcels for local entrepreneurs to develop their own agriculture-related businesses. The Ohio State University extension program provides technical assistance, such as business plan development and soil testing. A second use, the Rid All Green Partnership, supports commercial food production, including tilapia farms, a greenhouse nursery and commercial-scale composting.[19]

The NEORSD seeks to detain and divert storm water from a 72 acre area that predominately includes the Zone. Former uses throughout the tributary drainage area include residential, commercial and industrial properties. New storm sewers would divert storm water runoff into two bio-retention basins that discharge into the Kingbury Run. The Kingbury Run is a culverted stream that discharges into the Cuyahoga River and, ultimately, Lake Erie. Two million one hundred thousand gallons of the 44 million gallon Consent Order GI mandate will be met through GI projects within the Zone. All storm water runoff generated in the drainage area tributary to the proposed GI will be managed. The NEORSD will implement two bioretention basins within the vicinity of the Zone. An additional bioretention basin to be constructed by the compost facility will connect to the combined sewer system because of the high level of nutrients in its runoff. The proposed GI features will control up to 12 million gallons of storm water runoff each year. The preliminary project cost estimate for the conveyance and bio-retention basins is $5.2 million.[20]

The NEORSD and its partners initially sought to utilize storm water as a resource for watering plants. The utility district, however, was concerned that storm water may not be a safe water source for crops, due to environmental contamination within the drainage area that was identified through past evaluations conducted by other agencies.[21]

The Land Bank is instrumental in facilitating the aggregation of sites. The Land Bank holds title to approximately 50% of the several hundred vacant lots in the drainage area tributary,[22] and is acquiring additional properties in the innovation zone through the foreclosure process. The Land Bank also facilitates access for sites it does not own through nuisance abatement proceedings.[23] Ultimately, the District will own properties acquired. Construction may begin in 2014.[24]

Maintenance

The NEORSD plans to dedicate ratepayer funds to maintenance. It is considering planting low or no-mow vegetation, to reduce maintenance needs. While presently the NEORSD plans to contract out maintenance practices, it may perform the maintenance in-house with its operations and maintenance crews. It anticipates dedicating around 10% of annual construction costs for operations and maintenance. In other words, the NEORSD is prepared to spend $100,000 annually on operations and maintenance for every $1M of green infrastructure capital expenditures.[25]

In addition, the NEORSD is pursuing potential opportunities for partnership with the Cleveland Botanic Garden's Green Corps program. Green Corps provides training and employment opportunities for youth. The NEORSD is considering the possibility of utilizing the Green Corps program as a maintenance contractor. This arrangement could be particularly beneficial because the Cleveland Botanic Garden possesses expertise in the types of maintenance required, such as invasives removal, pest control, and horticultural expertise, which the NEORSD does not possess.[26]

The NEORSD Green "Leave Behinds"

In addition to implementing Consent Decree-mandated green infrastructure, NEORSD and its partners are interested in maximizing the community benefit of areas above gray infrastructure tunnels. Many underground tunnels will be located in low-income communities of color with poor housing quality that have been particularly hard hit by the foreclosure crisis. NEORSD, the Cleveland Foundation, and LAND studio, a nonprofit organization that uses planning, design and public art to improve neighborhoods, have partnered to develop a green "leave behinds" vision plan. Funding from the Cleveland Foundation supports the "leave behinds" planning effort. NEORSD will be investing both in the digging and cover-up of areas where it is constructing access shafts and low level consolidation sewers for its deep tunnel storage. NEORSD, the Cleveland Foundation and LAND studio are working together to develop a plan for a series of strategically placed green leave-behinds that could contribute to the regrowth of neighborhoods and communities. The green leave-behinds would be located at specific points where construction would need to take place for installing the gray infrastructure build-out. NEORSD may acquire and possibly modify the direction of its tunnel slightly to coincide with existing vacant land, including blighted structures, which could be removed as a part of the construction process. LAND studio is managing the contract for assessing potential areas for leave-behinds that leverage existing community assets. Leave-behinds could include pocket parks, community gardens or other greened spaces. Although beyond the scope of the Consent Decree, this initiative may utilize vacant land as green space to benefit communities and reduce the volume of storm water runoff collected into the NEORSD's combined sewer system.[27]

Re-imagining a More Sustainable Cleveland

A synergistic initiative is being led by Neighborhood Progress, Inc. and the Cleveland City Planning Commission. The Cleveland Land Lab prepared the report *Re-Imagining a More Sustainable Cleveland: Citywide Strategies for Reuse of Vacant Land* throughout the City of Cleveland, which was adopted by the City Planning Commission in December, 2008. This plan developed goals, principles, and strategies for productively re-utilizing vacant land. The plan focuses on areas in the city with weak and transitional real estate markets with an emphasis on opportunities to strengthen the city's natural environment. Their plan focused on three main land reutilization strategies: 1) neighborhood stabilization; 2) green infrastructure; and 3) productive landscapes. In terms of neighborhood stabilization, the City of Cleveland seeks to implement low-maintenance landscapes including low-mow planting materials to "hold" land with a strong potential for development in a five year timeframe. By utilizing low-costs and low-maintenance measures, the City of Cleveland would not invest substantially on sites that may change use in a short time frame, while encouraging stewardship, increasing property values and improving livability.

The Cleveland Planning Commission developed a flowchart to facilitate the prioritization of land disposition. This flowchart clearly delineates between "holding" strategies, as described above, and "preservation" strategies, which are intended to results in long- term or permanent environmental infrastructure.

With respect to green infrastructure, the plan sought to develop site prioritization and design concepts of greening vacant lots. In particular, with respect to water management, the plan focuses on sites where green space could restore or mimic the natural flow

of water. The plan suggests prioritizing sites in a flood plain, a riparian setback, or other areas likely to be flooded where development should not take place. Property types suggested for GI included: sites identified by the NEORSD's regional intercommunity drainage evaluation study as problem areas; sites where a riparian area could be restored, conserved, or re-utilized as open space; sites within a headwater area that could be restored, conserved or reutilized as open space; sites identified as a wetland; and sites with habitat protection value.[28]

With respect to productive landscapes, the plan identified opportunities for urban agriculture, community gardening, particularly in food deserts, and energy generation on vacant lots.

The plan also makes two relevant policy recommendations with respect to data. First, it suggests "develop[ing] new ways to classify and geo-code vacant land in the city's GIS system to identify sites that have the strongest potential for real estate development, green space expansion, and the provision of specific ecosystem services, as well as sites that have environmental contaminants."[29] Second, it suggests that the Cleveland City Planning Commission, as well as City and County brownfields staff, "develop more detailed, parcel-based mapping of environmental contamination that distinguishes highly contaminated sites from those with lower levels of contamination; [and] include this information in the city's GIS parcel data."[30]

The [Greater] Cleveland Action Plan

The 2010 [Greater] Cleveland Action Plan for Vacant Land Reclamation, a follow- up study from the 2008- 2009 *Reimagining a More Sustainable Cleveland* report, sought to develop a vacant land reclamation strategy at the county scale. This study began by identifying the multiple ranges of vacancy conditions in Cuyahoga County, ranging from "concentrated urban vacancy" to "prime development sites."[31] Within the City of Cleveland, HUD Neighborhood Stabilization Program 2 target areas are the focus of vacant land reclamation efforts.[32] The *Action Plan* utilized several development principles, including: retaining land for new development projects; greening initiatives focusing on ecology, access to park space and community benefits, and public health; and creating economically productive uses of vacant land, such as urban agriculture and renewable energy. Pilot projects included storm water management, bioremediation, community gardening and agriculture, and native plantings.

Vacant land soil stabilization: interim uses

The study also puts forward potential alternative vacant land stabilization strategies. This study noted that the City of Cleveland sows grass seed on vacant sites post-demolition, with the owner – typically, the Cleveland Parks Department – responsible for mowing. Each year, the City of Cleveland spends around $3.3 million to mow and maintain properties in the City's Land Bank, as well as privately owned abandoned vacant lots. As the city's vacant land holdings have grown, its management costs and responsibilities have increased. This challenge extended beyond the city to inner-ring suburbs, as many foreclosed houses, consequences of the housing crisis, have been demolished. Ecologically, however, turfgrass provides minimal ecological service; it does not effectively support wildlife habitat or biodiversity. According to soil tests by the EPA, vacant but grassy sites in Cleveland are as effective at retaining storm water as paved parking lots, more than likely a consequence of compaction caused from heavy demolition equipment.[33]
The *Action Plan* recommends five strategies to improve the ecological services of greened vacant lots. First, the plan recommended a multi-tasking landscape that utilizes locally available resources, such as poultry litter, manure, and feathers from poultry farms, to provide phosphorus, organic matter, and other nutrients; it also mentioned the potential to utilize material from the Cuyahoga River shipping canal as a source of phosphorus. Second, the plan suggested the possibility of utilizing indicator landscapes that use "indicator plants" that grow in specific environments and could demonstrate what contaminants and soil fertility may exist on a site. Third, it suggested the potential for successional landscapes, which would utilize interim

plantings that require less nutrients, such as grasses and prairie plants, to add organic material into the soil and reduce soil compaction. In time, larger plants and trees could be established at the sites. Fourth, it recommended a landscape that could establish spontaneously. And fifth, it suggested the guerrilla 'landscape', a strategy to distribute ecologically beneficial plantings through do-it-yourself kits and associated programs such as pop-up events, seed postcards, and improvised planters.[34]

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New Orleans, LA

Introduction

The Pontilly Stormwater Hazard Mitigation Project (the Pontilly Project) and the Greater New Orleans Water Management Strategy (the Water Management Strategy) provide complementary planning models of greening vacant lots to mitigate flooding. Through the Pontilly Project, the New Orleans Redevelopment Authority (NORA) seeks to implement a neighborhood-scale storm water management plan in the Pontilly neighborhood. This project seeks to reduce future Federal Emergency Management Agency (FEMA) flood insurance claims by implementing green infrastructure to retain storm water, which overwhelms the city's water management system. Using the approach of "Retain, Detain, Drain" the plan proposes to "manage each drop of water where it falls"[1] in an effort to keep up-stream storm water from overwhelming down-stream systems. Meanwhile, the Water Management Strategy is identifying green infrastructure that can mitigate flooding throughout St. Bernard Parish and the East Bank of Jefferson and Orleans Parishes. The Pontilly Project has not yet been implemented and the Water Management Strategy is scheduled for completion in early 2013. Nonetheless, the engineering, design and land use strategies of these two plans could inform other cities' efforts to manage storm water on vacant lots.

Background: Storm water management

Similar to combined sewer systems, both the volume and rate of storm water flow overwhelm New Orleans' drainage system. The city's system of catch basins, pipes and pumps removes water at a rate of one inch per hour for the first hour of a rain event, and one half inch per hour thereafter. The majority of the small scale infrastructure is below ground (pipes 36" and smaller), while the large scale infrastructure (pipes 36" and larger) includes large pipes and box culverts below ground and open-air canals.[2] A ten-year storm, at its peak, can produce three inches of rain per hour. Two-year and five-year storms cause flooding in many neighborhoods, especially when the rate of rainfall exceeds one to two inches.[3,4] Comprised of twenty-two pumping stations, more than 90 miles of open canals, and more than 90 miles of subsurface canals, the flow rate of the city's drainage system is greater than that of the Ohio River.[5] Even if the capacity of the drainage system's pipes, pumps and canals were doubled – a costly endeavor – drainage challenges would persist.[6] A green infrastructure approach may offer a more cost-effective solution.

Throughout the 20th century, New Orleans used powerful Wood Screw Pump technology to remove groundwater and pave over large areas of wetlands to facilitate development. Presently, not only do vast areas of impervious paving limit the infiltration of water into the ground, but the drainage and sewer systems actively pump groundwater due to inflow and infiltration (I/I). Aging sewage infrastructure allows the entry of groundwater (infiltration) and storm water (inflow), increasing the likelihood of flooding.[7] Groundwater pumping has resulted in subsidence by drying out subsurface soils and causing soil oxidation, resulting in the uneven sinking of the ground – at a rate of over one inch per year in some places. Subsidence not only damages roads, utilities, and buildings, but also increases the need for higher, increasingly expensive levee systems around the city; parts of the city have subsided more than eight feet since 1900.[8] While flooding due to Hurricane Katrina (Katrina) resulted predominantly from the breaching of levees and floodwalls protecting New Orleans,[9] the change in surface elevations of many parts of the city over the

past century, caused in great part by subsidence, may have exacerbated its impact. Significant investments have improved the city's levee system (including $14.5 billion in Federal investment) to fortress New Orleans from 100-year storm events.[10] NORA and the Water Management Strategy design team propose to infiltrate water, which could potentially reduce the rate of subsidence in Pontilly and throughout New Orleans.

Vacant Lot Management

New Orleans' population has been declining for several decades, indicating that repurposing many vacant lots as green space may make sense. The population of New Orleans had declined from approximately 628,000 in 1960[11] to 455,000 in July, 2005[12] (a 27% decrease). Moreover, the number of vacant lots and abandoned buildings in New Orleans has dramatically increased since Katrina, which occurred in August, 2005. By 2010, the city's official population was 343,829,[13] and at least 47,738 vacant lots existed in New Orleans (a conservative estimate of underutilized property, considering this figure does not account for lots with abandoned or uninhabitable buildings).[14,15]

The post-Katrina Road Home-Homeowner Assistance Program (the "Road Home Program") has transferred to parishes – the legal equivalent of counties in Louisiana – surplus vacant land that they are responsible for maintaining. Nearly $9 billion in funding, from the U.S. Department of Housing and Urban Development, was provided to New Orleans home owners for post-disaster reconstruction. The funding was intended to cover the gap between what FEMA would pay to homeowners impacted by Katrina and the cost required to re-build their residences.[16] Through this program, home owners were provided the option of re-building their homes or selling their property to the State of Louisiana. The State of Louisiana created the Louisiana Land Trust (LLT) to hold the more than 11,000 properties it acquired through the Road Home program.[17] Maintenance cost the state $76 million, prompting it to sell land to developers as a source of revenue and to transfer undeveloped land to local parishes beginning in 2012.[18] The disposition of Road Home properties was conducted in coordination with the local parishes.[19]

In the case of Orleans Parish, where 5,000 properties were sold to the state through the Road Home program, NORA managed the disposition programs in concert with LLT until June 2012 when the remaining 3,100 properties were transferred from the state to NORA.[20] NORA now holds the titles, maintains the properties, and disposes of them directly to individuals and developers for re-use and redevelopment. NORA has an incentive to dispose the properties due to the $400 annual maintenance cost per property – an overall cost of approximately $1.2 million per year.[21]

The Pontilly Project

Background

The Pontilly Project provides a strategic framework for greening vacant lots on a community scale. NORA is currently positioned as a leader to implement this large-scale green infrastructure pilot project through its partnership with the Pontchartrain Park and Gentilly Woods neighborhoods, collectively referred to as "Pontilly."[22] Katrina flooded Pontchartrain Park, with waters as high as fourteen feet. In Gentilly Woods, areas at lower elevations were equally as flooded, while areas at higher elevations experienced flood water three to four feet deep.[23] Pontchartrain Park (a historically professional, middle-class African American neighborhood) and Gentilly Woods (a neighborhood that has been African American since the 1980's) seek to improve their post-Katrina communities through the Pontilly Disaster Collaborative and the Pontchartrain Park Community Development Corporation. In response to NORA's initial plan to purchase and sell Road Home lots in their neighborhoods, former Pontilly residents and existing community members have organized to advance the needs of the Pontilly community.[24]

In 2008, the City of New Orleans was awarded $15 million in disaster mitigation funding through FEMA's Hazard Mitigation Grant Program, with the premise that green infrastructure could cost-effectively reduce post-disaster FEMA insurance claims. $1.5 million is dedicated to the planning and an additional $13.5 million to the implementation of pilot projects throughout Pontilly.[25,26] The final award of the $13.5 million is contingent on the design phase meeting the FEMA requirements for a benefit cost analysis. Nearly half of the 2,100 lots in Pontilly remain vacant after Katrina, and approximately 300 properties were owned by NORA; 130 have been sold to developers for construction of new homes, leaving around 175 lots total in inventory. (NORA holds 63 vacant lots in Pontchartrain Park and 108 vacant lots in Gentilly Woods). The greening of vacant lots holds an important role in this plan while NORA facilitates housing development in the area.[27]

Model & Design Features

The project lead and engineering firm, CDM Smith, modeled the hydrology (the flow of water) and hydraulics (the flow of water through engineered systems) of green infrastructure interventions, to understand their potential impact on mitigating floods during 10-year storm events. Specifically, the team modeled the potential impact of storm water lots and storm water parks, porous parking & alleys, street basins, bioswales, infiltration columns, and widening the Dwyer Canal (to increase in-line storage capacity). Storm water lots are single vacant residential lots that could be used to manage storm water. Storm water parks are aggregated vacant lots serving storm water management and community recreation purposes. Both storm water lots and storm water parks could be converted to wetlands, which would have wet soils and support native wetland plantings, and dry ponds, designed to infiltrate and drain more rapidly. Both wetlands and dry ponds would be designed to drain within 48 hours to prevent standing water.[28]

Scenario Planning

The Pontilly Project developed three alternative scenarios (minimum, medium and maximum) for implementing storm water management on neighborhood streets and vacant lots, using the following criteria for each scenario:

- Hydrologic and hydraulic impacts: greening sites at a higher elevation reduces the rate of flow down the system, where the storm water overwhelms the system;
- NORA-owned sites;
- Sites that are not highly developable;

Table 1

BMP Strategy	Min Alternative	Mid Alternative All of Min Alternative plus:	Max Alternative All of Mid Alternatives plus:
Storm water lots	• Selected existing vacant lots not owned by NORA. • Located at key points for storm water management.	Selected existing vacant lots not owned by NORA located at key points for storm water management.	Additional selected lots not owned by NORA located at key points for storm water management.
Storm water parks	Robert E. Lee corridor right-of-way including Morrison play spot.	Lots aggregated into larger land area for substantial detention and neighborhood open space.	Additional storm water parks.

Source: p. 14, New Orleans Redevelopment Authority.

- Opportunities for open space and connections to improve quality of live and neighborhood livability;
- Promotion of pedestrian activity.[29]

The study's findings with respect to vacant lots are summarized in Table 1.

Of the three scenarios, repurposing existing, publicly owned vacant lots as green space was the least expensive intervention. Although the three scenarios specified exact numbers of vacant lots to green, the analysis remains conceptual. Site selection and potential ownership still need to be determined. Details of the three scenarios are as follows:

Minimum alternative:
The min. alternative modeled the greening with a focus on avoiding the acquisition of non-NORA properties while maximizing storm water capture on a per-site basis. This alternative suggested only greening vacant lots owned by NORA. A storm water park was only recommended for a large area of city-owned lots with the highest storm water management potential. This alternative's estimated cost is $7.2 million ($7.60 / Cu-ft of reduced peak stage flooding).[30]

Mid alternative:
The mid alternative has slightly broader goals: to increase storm water management functions, develop connections across green spaces, and create open spaces. This scenario would require the acquisition of privately owned vacant lots. This alternative's estimated cost is $13.5 million ($9.20/Cu-ft), not including the acquisition of 107 privately owned lots. This alternative also recommended additional greening measures and widening the Dwyer canal.[31]

Maximum alternative
The max alternative would further increase the volume of storm water captured while creating additional benefits. For this scenario, the City would acquire and convert vacant homes into storm water lots and storm water parks. By doing so, the City would increase the size of existing vacant lots, reduce the need to pipe water between sites, and increase open space benefits. This alternative also suggested converting vacant lots along the canal to store and infiltrate storm water while controlling erosion. The estimated cost is $15.8 million ($8.00/cu-ft), not including the acquisition cost of 133 privately owned lots, including 11 with residential structures.[32]

Neighborhood Livability Analysis

Recognizing green infrastructure as an opportunity to revitalize Pontilly, the design team conducted a Neighborhood Livability Analysis. This assessment considered the neighborhood's walkability, access to public transportation, connection to other green spaces, and comfort to pedestrians, in relation with storm water flow. Because FEMA does not fund quality of life improvements, these recommendations were not directly linked to the storm water model and were developed beyond the study's scope of work. Nonetheless, the notion of developing analyses that link livability with storm water planning may help to inform additional storm water management in New Orleans, such as those developed through the regional Storm Water Strategy, which seek to generate multiple green infrastructure benefits.[33] The design team suggested that green infrastructure could improve the Pontilly neighborhood in three ways:

1. Utilize alleys that reduce the walking distance to public transportation – particularly for the elderly and disabled. Green vacant lots along alleys would create connections through longer blocks along the way to public transportation; extending curbs and creating modestly raised crosswalks would slow storm water and traffic flows. While excavating and grading the streets, installing pervious paving on top of course aggregate / French drains would facilitate the detention and flow of storm water from one block to another, and mitigate flooding challenges.[34]
2. Coordinate the greening and aggregation of corner storm water lots with street improvements. Corner lots can capture more storm water because water can inflow from multiple streets; corner lots also can serve as visually appealing entry points into neighborhoods. Bioswales bumped out into the street also could reduce traffic flow.[35]
3. Develop a network of aggregated storm water lots along the Dwyer canal, including grading toward the canal, and linkages throughout the neighborhood.[36]

View of Corner Street Basins and Storm water Lots at Mirabeau
Image printed with permission and courtesy of NORA.

The rendering below illustrates the use of corner lots as a strategy to manage storm water runoff from multiple streets. Additional goals of the design include creating a visual and physical entryway into a street or neighborhood and aggregating multiple adjacent lots along a street to create connections throughout a block and a neighborhood. The image below represents the Max Alternative Plan; tan-colored buildings are potential development projects.

Ownership, maintenance & next steps

The long-term ownership and maintenance of the greened vacant lots is to be determined. To acquire the remaining $13.5 million of the FEMA grant, NORA needs to develop a plan for the long-term ownership and maintenance of the sites.[37]

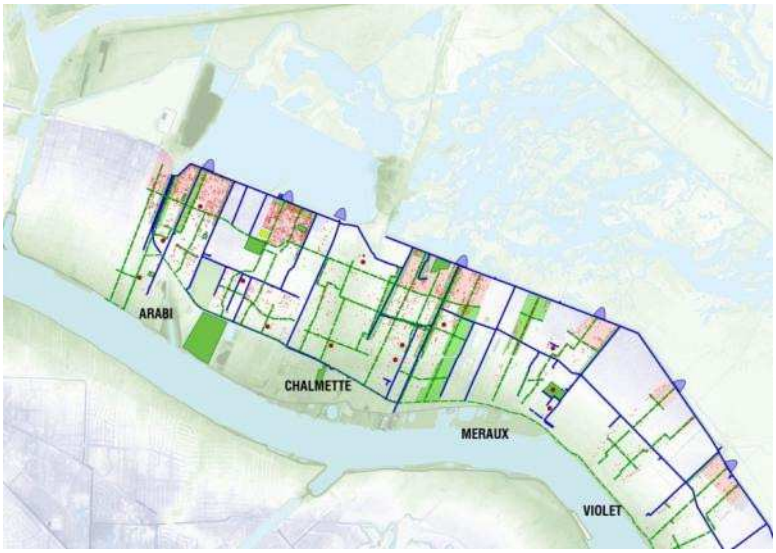
The Greater New Orleans Water Management Strategy

Though separate initiatives, the neighborhood- scale Pontilly Project and the Water Management Strategy could potentially complement one another. The Pontilly Project is seeking to overcome

implementation challenges (particularly to identify maintenance funding). Meanwhile, the Water Management Strategy seeks to put forth a vision for a more sustainable and resilient region as the starting point for more projects like the Pontilly Project. The Strategy is supported in part by a $2.5 million grant from the Louisiana Office of Community Development and the U.S. Department of Housing and Urban Development, and is administered by Greater New Orleans, Inc. (the economic alliance for Southeast Louisiana). A joint American and Dutch design and engineering team led by Waggoner & Ball Architects initiated an 18-month planning process in 2011 to assess the potential for green infrastructure to reduce flooding and subsidence, improve quality of life, and enhance economic vitality throughout Greater New Orleans.[38]

The design team's analysis includes the following five components:

1. Developing an analytic framework for metrics to compare green infrastructure with conventional infrastructure in the context of the New Orleans region's water management system.
2. Creating and overlaying topography, soils, and drainage maps of the city to consider the most effective drainage and subsidence prevention strategies.
3. Quantifying the costs of street and home repair due to subsidence, versus the costs and benefits of green infrastructure. Their assessment is considering three scales: the region, the hydrological basin, and the neighborhood. The research team is identifying how to better manage drainage system operations and maintenance among multiple agencies.[39,40]
4. Identifying opportunities for collaboration between parishes.
5. Developing more detailed district plans, and identifying financing and implementation strategies for different types of green infrastructure storm water management projects.[41]



Greened vacant lots and neighborhood connections, St. Bernard Parish. Image printed with permission from Waggonner & Ball Architects.

For example, the image to the left illustrates how the greening of vacant lots and streets could create connections across neighborhoods and along the canal. The green depicts greened vacant lots and open spaces, as well as greened streets. The blue lines depict the existing canal network in St. Bernard Parish, part of the overall project area for the Water Management Strategy.

While the Water Management Strategy will not be finished until early 2013, by advancing the use of storm water as a resource rather than as a burden, it holds the potential to bring about a paradigm shift in water management throughout Greater New Orleans.

Endnotes

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Chapter 3: Planning & Implementation Strategies

Chapter Overview

Chapter 3 synthesizes key findings from Chapter 2 case studies. This chapter summarizes what programs, policies and practices resulted in greened vacant lots, and what practices failed to overcome barriers to vacant lot transfer, management, and preservation. Patterns across cases provide evidence that some practices may encourage the greening of vacant lots in multiple contexts. On the other hand, we identified a broad range of strategies that were highly contextualized; no single set of strategies, from planning through preservation, proved preferential in all circumstances. Thus, we present the following findings as a "portfolio of opportunities" that should be adapted to particular contexts.

The key findings are organized by the following 12 sections:

I. Program Goals
II. Planning and Analysis
III. Administration
IV. Site Use and Design
V. Site Aggregation
VI. Transfer Mechanisms
VII. Ownership Models
VIII. Maintenance Models
IX. Financing
X. Brownfields as Regional GI
XI. Economic Development Framework
XII. Conclusion & Further Research

I. Program Goals

1. Seven of 10 cases incorporated vacant lots as part of a storm water management strategy.

Cities are greening vacant lots to advance three storm water goals: improving the safety of waterways for fishing and swimming; protecting drinking water supplies; and mitigating the hazardous impacts of flooding. In many instances, water agencies seek to advance storm water regulatory requirements by greening vacant lots within a broader green infrastructure plan.

- Milwaukee, WI avoided relying on its combined sewer system by managing on-site all storm water runoff from the Menominee Valley Industrial Center (MVIC), a redeveloped brownfield. This site uses a vegetated "treatment train" to capture and filter storm water runoff from industrial sites, while mitigating flooding through a floodable waterfront park.
- Cleveland, OH and Detroit, MI are integrating plans to green vacant lots into Consent Orders, which require green infrastructure solutions.
- New York City's Staten Island Bluebelt complies with the MS4 requirements for managing storm water. Baltimore's Watershed 263 pilot program received MS4 credit for some of its projects.
- In Florida, the City of Tallahassee and Leon County collaborated to develop the Capital Cascade Trail, which mitigates flooding regionally while improving the quality of storm water runoff that replenishes the state's aquifer.
- The New Orleans Redevelopment Authority has developed a plan to manage storm water on vacant lots using green infrastructure to cost-effectively reduce the amount of future FEMA insurance claims.

2. In five cases, storm water agencies held a key role in advancing green infrastructure on vacant lots.

In some cases water agencies took lead roles while in other cases they were secondary partners. In all successful cases, water agencies sustained key long-term partnerships with other agencies and NGOs. The two programs led by water agencies that demonstrated strong outcomes were Milwaukee's MVIC project and NYC's Staten Island Bluebelt.

- The Milwaukee Metropolitan Sewerage District and Milwaukee Department of Public Works collaborated with the Redevelopment Authority of the City of Milwaukee and non-profit partners to support the design, implementation and maintenance of large-scale, site-specific green infrastructure.
- The New York City Department of Environmental Protection (DEP) was the lead agency for the Bluebelt program. The DEP dedicated an office to support the acquisition, reclamation and maintenance of hundreds of properties. Though the DEP was the lead, it partnered successfully with other agencies where necessary to facilitate the acquisition of properties.
- Baltimore's Department of Public Works (DPW) was the lead agency whiles seeking to green vacant lots through the Watershed 263 program.

  Challenges arose because of lack of support from other agencies and the pilot project status (reducing the DPW's long-term commitment to owning or maintaining sites).

- The Southeast Michigan Council of Governments, a metropolitan planning organization, is providing technical assistance to the Detroit Water and Sewerage Department (DWSD). The DWSD plans to implement green infrastructure on vacant lots as part of its green infrastructure CSO program. The DWSD is forming strategic partnerships with other agencies and non-profit organizations.
- The Northeast Ohio Regional Sewer District is actively identifying vacant lots to green for its CSO program, and is conducting outreach to community organizations and the Cleveland Botanic Garden as part of this effort.

II. Planning & analysis

We investigated the role of planning and analysis in the successful greening of vacant lots on a large-scale. We found three key elements as described below.

1. Effective programs linked regional, neighborhood and site-specific planning.

Effective programs developed plans at the regional scale, addressing policy barriers among public agencies and gaining feedback and buy-in from NGOs, elected officials and businesses. Regional and neighborhood planning at the citywide or sewer shed scale was typically led by parks departments, water departments, and redevelopment authorities. Public agencies used regional planning to develop policy mechanisms that can facilitate the greening of vacant lots on a large-scale, while identifying vacant lots that are not planned for development. Early collaboration provided lead agencies the opportunity to address storm water and brownfield regulations, reducing project costs and administrative challenges. NGOs were valuable stakeholders early in the process, as many had sought to overcome institutional barriers through their own projects.

2. Partnerships with communities facilitated neighborhood level planning.

Final land-use decision making requires the input and buy-in of local stakeholders, including residents, CDCs, neighborhood associations, businesses, and

elected officials. Local planning efforts at the neighborhood scale help to identify and prioritize sites for greening. Not only may potential conflicts over the use of vacant lots be prevented or resolved, but community members may take a vested interest in the well-being of these sites and commit to long-term stewardship. Community stakeholders frequently have a strong understanding of vacant lots in their neighborhoods and may proactively identify sites for greening.

From an administrative perspective, we identified three neighborhood-scale planning models. The first model is direct engagement with community groups (Seattle & Chicago). The second model is engagement through an intermediary organization that interacts with community groups (Chicago). The third model is a public-private partnership (Milwaukee).

- The City of Seattle implemented neighborhood planning by engaging community organizations directly in the planning process. The City completed 38 neighborhood plans as a result. In Chicago, public agencies led the planning of large sites, working with local communities to plan the greening of vacant lots.
- For smaller sites in Chicago, a non-profit intermediary emerged as a viable model. Openlands, a non-profit environmental organization, worked with local community leaders, including neighborhood associations, block associations, businesses, and elected officials to develop neighborhood-scale and site-by-site greening plans. Though not affiliated or directly coordinated with the efforts of city agencies, Openlands' neighborhood planning program advanced citywide greening goals.
- In Milwaukee, a public-private partnership facilitated the conversion of the Menomonee Valley Shops brownfield site into the Menomonee Valley Industrial Center. In this instance, the Redevelopment Authority of the City of Milwaukee (RACM), the lead public agency, worked closely with other public agencies. Meanwhile, the Menomonee Valley Partners, Inc. and the Sixteenth Street Community Health Center coordinated closely with non-profit organizations and businesses to develop a shared vision for the site. At times, the work of RACM and the partner non-profit organizations overlapped. By closely coordinated efforts, the impacts of all organizations were amplified.

3. Spatial analysis, in tandem with local stakeholder collaboration and site visits, can facilitate site selection.

Spatial analysis can help planners understand the potential extent to which vacant lots could be greened. Geographic Information System (GIS) analyses have been conducted on the regional, watershed and sub-watershed scales to identify the potential to green vacant lots. Several programs have modeled potential hydrological impacts of green storm water interventions, including vacant lots, to identify areas with the greatest potential to manage storm water. Spatial analysis may also assist analysts to identify potential areas where sites could be aggregated. The use of spatial analysis is still in development for many programs, which are conducting site suitability analyses.

Common area-wide criteria include:

- Watersheds or subwatersheds (Baltimore's Watershed 263 program; Cleveland; Detroit; New Orleans; NYC Staten Island Bluebelt);
- Areas prone to flooding (Tallahassee/Leon County);
- Neighborhood stabilization areas; areas with transitional housing markets (The Greening of Detroit; Cleveland; Genesee County);
- Neighborhood economic characterization and prevalence of vacant lots (Detroit Works);
- Areas that could connect neighborhoods, including block-by-block and neighborhood-by-neighborhood assessments (New Orleans; Tallahassee/Leon County; Baltimore; Cleveland);
- Distance from accessible open space (Chicago).

Common site-specific criteria include:

- Publicly / land bank-owned vacant lots (Chicago; Genesee County; Cleveland; Detroit; New Orleans);
- Vacant lots that could inflow storm water from streets – particularly street corner sites (Detroit; New Orleans);
- Properties near storm water inlets or waterbodies (Tallahassee/Leon County; Cleveland; New Orleans);
- Publically owned properties eligible for demolition (Baltimore's Growing Green Initiative; Chicago's CitySpace plan);
- Tax delinquent properties with or without structures entering the foreclosure process (Chicago, Genesee County);
- Unoccupied privately owned, tax-current vacant lots (NYC Staten Island Bluebelt; Tallahassee/Leon County).

Follow-up site visits and coordination with local stakeholders are necessary to understand whether a vacant lot could be greened to achieve storm water management and community goals. Site visits may provide information about formal and informal uses of the site, confirm occupancy status, and help to assess the site's potential for storm water management, such as the lot's surface condition. Other considerations, such as proximity to power and sewer lines, whether the basement of a former building was excavated, and soil qualities (including contamination levels), also need to be assessed.

III. Administration

We analyzed how public agencies and non-profit organizations institutionalized programs that seek to green vacant lots. We found that effective programs frequently had a narrow focus, emphasizing a particular aspect of greening vacant lots.

1. Public agencies and nonprofit organizations expanded or developed specialized programs to green vacant lots.

Greening vacant lots frequently did not fit into existing programs of public agencies or non-profits, but in many instances they developed new, targeted programs. These organizations realized that greening vacant lots would support their mission; in each instance, significant financial resources supported new programs or activities.

- New York City public agencies and nonprofits developed specialized programs. The Department of Environmental Protection created an office to manage the Staten Island Bluebelt program, which has acquired more than 14,000 acres since the program's inception in 1989. This office has spent more than $72 million in the last 10 years on acquisition alone.
- The New York Restoration Project (NYRP) developed a land trust as part of its overall greening efforts once it acquired 52 community gardens. The NYRP acquired these sites with $1.2 million of funding from the Midler family foundation, and Bette Midler's personal funds; it has since developed a $2.5 million endowment from private donations for capital improvements and maintenance.
- Many additional organizations around the country have expanded their programs. The Greening of Detroit, a citywide non-profit organization, is greening vacant lots for the Detroit Water and Sewerage Department. The Seattle Department of Parks & Recreation has substantially expanded the scope of its work through projects funded by special tax levies.

2. The development of new special purpose organizations or agencies filled gaps in the process of greening or preserving vacant lots.

Greening vacant lots does not necessarily fit within the purview or jurisdiction of existing organizations, even if financial resources were to become available. Moreover, many initiatives that seek to green vacant

lots are incorporating multiple goals that require working across agencies and district lines, posing coordination challenges to existing agencies. The following organizational innovations have successfully supported the planning, acquisition, management, preservation, and maintenance of vacant lots. Each organization partnered closely with both city agencies and community or business stakeholders.

- *Planning*: In Milwaukee, the Menomonee Valley Partnership, Inc. was founded to support the implementation of a regional land-use plan, which included the reuse and greening of strategic vacant sites. The MVP coordinated a broad set of NGOs, businesses, and public sector agencies for the redevelopment of the Menomonee Valley Shops site, greatly enhancing the capacity of the Redevelopment Authority of the City of Milwaukee.
- *Acquisition, planning and short-term greening*: the Genesee County Land Bank Authority (GCLB) was created in 2002 to acquire foreclosed properties, to temporarily hold these properties, and to sell or redevelop properties where possible. The GCLB, supported by a series of state laws, has overcome numerous barriers to acquire foreclosed privately owned properties, particularly through the Sheriff's sale. As a consequence, it has achieved tremendous scale in acquiring and repurposing vacant lots. The GCLB has tailored its short-term greening programs in coordination with its Citizens' Advisory Committee to allow community site managers or stakeholders to acquire green spaces.
- *Project management*: The City of Tallahassee and Leon County created Blueprint 2000, an intergovernmental special purpose agency, to support the project management and implementation of Blueprint 2000 projects. Blueprint 2000 supports the design, acquisition, finance, and construction management of greened vacant lots through the Capital Cascade Greenway. This agency was created because Blueprint 2000's numerous green infrastructure and transportation projects would present challenges to existing agencies, as projects crossed agency and jurisdiction lines. Moreover, program developers believed a single purpose organization could be more efficient at delivering projects than an existing government agency with a broader set of responsibilities.
- *Temporary ownership and technical assistance*: The GreenThumb program in New York City was created to provide technical and material assistance. It currently services 600 community gardens under its registration, and facilitates license agreements with community gardeners.
- *Preservation*: Local land trusts have developed in numerous cities, with support from partner agencies or organizations, to support small community managed open spaces. For example, in New York City, the Trust for Public Land incubated the development of three local land trusts: the Manhattan Land Trust, the Bronx Land Trust and the Brooklyn Queens Land Trust.
- *Maintenance*: In Milwaukee, RACM will initiate a special purpose property owners' association among businesses in the Menomonee Valley Industrial Center to support the maintenance of a centralized green "storm water train" that treats 100% of storm water runoff.

3. Successful programs developed and sustained partnerships among specialized agencies and organizations.

As the needs of greening vacant lots are diverse and specialized programs can be effective, strategic partnerships are critical. Partnerships emerged among organizations that plan, design, acquire, own, and maintain vacant lots.

- The New York Restoration Project partners with the NYC Housing Authority, the Trust for Public Land and the NYC Department of Parks & Recreation for maintenance and programming in community gardens and neighborhood parks.
- Even though the NYC Staten Island Bluebelt is distinctly a program of one city agency (the Department of Environmental Protection, or

DEP), partnership with other public agencies was critical during acquisition. The DEP worked with the Parks Department as well as the NYS Departments of Environmental Conservation and Transportation in developing agreements for the use of the properties. The DEP also coordinated with the City's legal department and the Department of Citywide Administration Services in acquisition of private properties.

- Blueprint 2000 works closely with public agency staff through a Technical Advisory Committee, the general public through an active Citizens Advisory Committee, and project-specific community partners.
- Chicago has sustained partnerships for the past fifteen years among the Chicago Park District, the City of Chicago, the Forest Preserve District of Cook County, and NeighborSpace, a non-profit land trust they jointly fund.
- The Genesee County Land Bank has sustained a Citizens Advisory Committee since it was founded, providing critical feedback and direction to the organization's programs.

IV. Site use & design

We analyzed what kinds of planned uses help to ensure the successful development, political support and maintenance of projects. Uses are typically determined before the transfer or acquisition process. Uses can generally be broken down into two categories: smaller sites, frequently community gardens that tend to be on the size of one to four vacant lots that once held residential buildings, and larger sites that provide for recreational, ecological and/or agricultural functions.

1. Successful programs advance multiple goals.

Agencies around the country seeking to advance storm water regulatory requirements are determining the extent to which they will design greened vacant lots for public use versus specifically for storm water management. Three challenges exist to designing and programming green infrastructure on vacant lots to provide public access and storm water management. First, from a financial perspective, public agencies may be limited in their use of funds to meeting infrastructure-specific goals; additional recreation-specific goals may require an additional source of funding or relaxed rules pertaining to the use of funds. Second, projects advancing multiple goals may require greater collaboration with multiple agencies and NGO stakeholders – which may increase the time required to develop and implement a project. And third, lead agencies may not have a mission or history of creating open space while advancing regulatory goals. Nonetheless, all nascent programs we studied are seeking to advance both community and storm water goals through some aspect of their programs.

- The New Orleans Redevelopment Authority seeks to implement green infrastructure according to FEMA cost-benefit analysis guidelines, which do not include recreational uses. Nonetheless, an innovative neighborhood livability analysis identified opportunities to incorporate quality of life goals into green storm water infrastructure projects on vacant lots.
- SEMCOG, a metropolitan planning organization coordinating the development of the Detroit Water and Sewerage Department's CSO green infrastructure plan, is incorporating community feedback into the site selection process to ensure the greened vacant lots improve community well-being.
- The Northeast Ohio Regional Sewer District plans manage 2.1 million gallons of storm water runoff from Cleveland the Urban Agriculture Innovation Zone, receiving Consent Order credit by avoiding runoff into the regional CSO system. The Urban Agriculture Innovation Zone is an area that is programmed to provide business development and education opportunities to Cleveland residents.

2. Successful green infrastructure projects seek to improve quality of life by incorporating multiple public uses.

Projects that clearly improve quality of life are likely to be funded, acquired, conserved, and maintained.

- A 30-acre green infrastructure storm water train manages and treats storm water runoff from businesses in Milwaukee's Menomonee Valley Industrial Center. The storm water train is integrated with a floodable park. Additional uses include: playing fields; a canoe launch; gathering spaces; a stretch of the Hank Aaron Trail; and a pedestrian bridge to a park on the opposite side of the Menomonee River.
- In Tallahassee, the Capital Cascade Trail provides a model of managing storm water throughout a region while creating open space and connecting communities. The storm water system across three separate areas of the Capital Cascade Trail is connected to mitigate flooding throughout the region. Pedestrian and bicycle paths along the segments encourage active recreation.
- The NYC Staten Island Bluebelt integrates storm water BMPs into existing natural areas, thereby reducing flooding. The program expands existing natural areas, restores degraded wetlands, and provides recreational opportunities. Although not all Bluebelt areas are accessible to the public, the Bluebelt as a system maintains the "rural" character of Staten Island.

3. Successful open space programs create active and passive uses that improve quality of life.

Our cases illustrated that the benefits of green infrastructure extend well beyond the ecological services, such as storm water management, air quality, urban heat island mitigation, and biodiversity. Successful programs also enhanced community well-being and quality of life. Successful parks programs commonly raised revenues to increase the amount of green space, with the public understanding that quality of life would be improved through the creation of publically accessible green spaces that allow for passive and active uses.

- In Seattle, a comprehensive plan provided a guideline for what sites should be prioritized to become parkland. Specific uses were determined through neighborhood planning involving the members of the community before the City's green space tax levy was proposed.
- The Chicago CitySpace plan provides a framework for the Chicago Park District (CPD) to acquire green space in priority areas. The CPD raises revenues primarily through a dedicated property tax and tax increment financing – both sources that impact property owners and require a high level of public buy-in.

4. A narrow focus on storm water-specific designs can present unforeseen challenges

Baltimore's Watershed 263 project provides a cautionary lesson of how green storm water infrastructure projects may not succeed without designing for the use by local residents. Though the project focused on the public right-of-way, its lessons may apply to greening vacant lots. Tall native plantings selected by designers were cut down as an act of good citizenry out of concern for safety by local residents, who preferred clear sightlines and wanted to avoid hiding places for pests or drug trafficking. Moreover, street tree wells did not account for the accumulation of trash; Parks & People ultimately retrofitted them to reduce maintenance needs.

V. Site Aggregation

Site aggregation provides the opportunity to create greater storm water management and open space benefits. By aggregating sites, larger areas of storm water runoff can be stored and treated, economies of

scale can be achieved for installation and maintenance, and a more diverse set of uses can be achieved. Numerous barriers, however, exist to aggregating sites. Gaining site control is the greatest challenge programs faced – even in cities such as Detroit and Cleveland that have extremely high vacancy rates where they seek to aggregate sites. Acquiring properties held by numerous owners is usually necessary to aggregate sites. Organizational capacity to manage the planning, implementation, and long-term ownership also proved to be challenges. Given the substantial benefits of site aggregation, however, most programs we analyzed seek to aggregate sites.

Four key aspects of successful programs are as follows:

1. A single lead agency sustains long-term planning and implementation capacity

A single organization needs to support and maintain planning efforts to see through the acquisition of multiple vacant lots. Blueprint 2000 in Tallahassee and Leon County coordinates and executes the acquisition of numerous vacant lots for the Capital Cascade Trail. Similarly, the NYC Department of Environmental Protection and the Genesee County Land Bank have sustained initiatives for more than a decade to aggregate vacant lots, resulting in large-scale green space. Though these organizations worked in partnership with others, they took ultimate responsibility over planning and implementation efforts.

2. Successful programs use multiple acquisition strategies

Several lead agencies needed to purchase sites from property owners as well as acquire foreclosed properties. In two strong- market cities – New York City and Tallahassee (Segment 3) – eminent domain, or the threat of eminent domain, was used. (In the case of New York City, the properties were all structureless). Intergovernmental transfers are the easiest transactions, but infrequently are they alone sufficient to aggregate vacant lots.

3. Interim ownership can support aggregation

The interim ownership of land by a 3rd party organization assisted public agencies to permanently acquire vacant land in several instances.

- Blueprint 2000 and Openlands both own land on an interim basis. Blueprint 2000 acquires land and transfers it to the City of Tallahassee once constructed is completed, while Openlands acquires certain sites temporarily until local governments, including the City of Chicago, can pay for the properties.
- Land banks, such as those in Genesee County and Cleveland, can acquire property on behalf of other organizations, and may have their own inventory of undevelopable land. The Genesee County Land Bank provides one year and two to five year leases to local residents. For leases from two to five years, the land bank provides lessees the option to purchase.

4. Greenways could help agencies to systematically aggregate many smaller sites to manage storm water

Thought-leading cities are developing plans to connect communities by implementing small-site storm water infrastructure networks. The Greater New Orleans Water Management Strategy and the Pontilly Project Livability Analysis provide design examples.

VI. Transfer Mechanisms

In this section, we examine what types of transfer mechanisms were most effective and prevalent among cases. We consider temporary-to-permanent, side lot, public-to-public, and private-to-public transfer programs.

1. Temporary-to-permanent green spaces

Temporary community management of open spaces can often lead to permanent ownership and stewardship. For smaller sites, many cities permit the temporary use of vacant lots as green space,

mostly as community gardens. Cities also facilitate the transfer of title from short-term to permanent status, given they are well-maintained, have leadership and community support. Typically, these sites originate on a short-term basis, with legal agreements providing access for one to five years. In many programs, hundreds of participants manage open space each year through temporary programs. Short-term agreements exist in the event that development interests arise for the site, or if community leadership cannot be sustained to maintain the site. Once vacant lots are actively used as community gardens for several years, they frequently become a preferred long-term use. Development of the sites for other uses may become politically challenging. This process also enables neighborhood residents to take the lead on identifying sites they would like to green.

- The Genesee County Land Bank maintains three complementary programs that can result in the long-term ownership of sites by local residents: a free seasonal program to applicants who commit to short-term greening; a one-dollar annual lease for applicants who commit to greening or gardening a site for two to five years; and a vacant land lease with option to purchase, which provides applicants who lease for two to five years the option to purchase the property during the lease's term. The vacant land lease with option to purchase is intended for open space managers considering permanent care of land.
- Chicago's Green Corps program helped community gardening groups secure a five-year hold on publicly owned properties by facilitating the receipt of a letter of support from local aldermen. Some of these sites already had shorter-term temporary agreements with the city, while others were actively seeking permanent status with NeighborSpace, a land trust.
- The Baltimore City's Adopt-a-Lot program, administered through the City's Housing and Community Development department (HCD), provides a one-year license to new applicants who utilize vacant lots for greening purposes. The HCD pre-selects eligible sites and utilizes a streamlined application process to encourage participation. After one year of successful stewardship, the HCD allows participants to apply for a five-year license. With Baltimore Green Space (BGS), a land trust, the City developed criteria to transfer community managed open spaces to BGS for permanent protection.
- New York City's community gardens program illustrates that community gardens may be perceived as critical community assets meriting preservation, even when development opportunities exist. When the City of New York sought to sell off publicly owned land that had been used as community gardens for many years, protests followed. More than 100 community gardens were purchased by local land trusts to prevent these sites from being used for affordable housing; the City of New York also owns several hundred community gardens, which are legally protected from development through a Memorandum of Agreement with the New York State Attorney General.

2. Side lot transfer programs

Selling side lots to adjacent homeowners holds the potential to create permanent open spaces. Some cities sell publicly owned side lots to interested landowners, putting these sites back on the tax rolls. These sites are commonly used as green or open space. For example, The Genesee County Land Bank transferred 770 vacant lots by selling them to local residents for one dollar plus a nominal processing fee ($39 in 2012). Many of these sites are used as adjacent gardens or lawns. Although this program does not incorporate restrictions or incentives for maintaining the land as green space, this transfer process could be tailored to advance storm water goals.

3. Public-to-public transfer

Some cities have acquired vacant lots from state agencies through title transfers or memoranda of understanding. A major benefit of transfer from one public agency to another is that financial costs tend to be waived and agreements are relatively easy to

develop, compared to the acquisition of private property. Although transfer of title or land-use rights does not cost local governments, the new landowners are responsible for maintenance and assume liability. The transfer of sites frequently advances the mission or economic interest of state agencies. For example, the City of Tallahassee acquired two adjacent, abandoned brownfield properties for its Capital Cascade Park to facilitate clean-up, advancing state brownfield cleanup goals. In New York City, the Department of Environmental Protection acquired rights to between 50 and 100 acres for the Staten Island Bluebelt from the NYC Department of Parks & Recreation and the NYS Departments of Environmental Conservation and Transportation, in the form of memoranda of understanding, which are in effect in perpetuity. The construction of the Staten Island Bluebelt advances both city and state goals, as it manages storm water as required under the State Pollution Discharge Elimination System (SPDES) and preserves and restores ecologically valuable areas such as wetlands.

4. Private to public transfer

Although the transfer of publically owned vacant land is the least expensive and easiest type of transaction, a significant proportion of vacant land is privately owned, particularly in postindustrial cities. Three main strategies emerge to acquire privately owned vacant land: foreclosure, direct acquisition, and condemnation.

Foreclosure & the Sheriff's Sale

Acquisition of foreclosed properties can be the least expensive process for acquiring privately owned vacant land. Three programs provide model processes: the Genesee County Land Bank, the Cleveland Land Bank, and the Chicago Tax Reactivation Program. Each of these programs facilitates the acquisition of thousands of properties each year through Sherriff's sale-related processes.

In the three successful models, the purchasing agency develops a list of properties from the slate of tax delinquent properties eligible for the Sherriff's sale. Chicago's Department of Community Development includes properties requested by the Chicago Park District and NeighborSpace, so long as they commit to maintaining or supporting vacant lots to be greened. The Cleveland Land Bank focuses on acquiring properties within Cleveland's 15 target areas through its HUD Neighborhood Stabilization Plan, which is the target area for the city's Community Development Block Grant funds. The Genesee County Land Bank stands out by submitting a bundled list of sites to acquire, which includes highly developable properties as well as properties with little to no development potential. By diversifying the portfolio, this land bank is able to generate revenue through development and finance the demolition of abandoned buildings.

Each purchasing agency then submits a list of properties it would like to acquire to the County treasurer. While the Cleveland Land Bank and Genesee County Land Bank may directly place a bid on properties, the Chicago Department of Community Development must first have the City Council passed a local ordinance in support of the bids, followed by the Cook County Board of Commissioners passing an ordinance in support. In all cases, upon acquisition the tax liens on the properties are waived and the titles are cleared.

Acquisition of tax-current properties

Many cities seek to directly purchase properties from voluntary landowners. Three conditions need to be met for such acquisitions to take place: first, the landowner must be accessible; second, the land owner must be willing to sell; and third, the public agency and the land owner must agree on a price.

We found these three conditions are not easy to meet. Many landowners are not accessible, even if they are up-to-date with their property taxes. Many property owners are not interested in selling their lands. The accessibility of land owners and their willingness to sell present challenges to many cities seeking to aggregate land to manage storm water – even in cities such as Detroit and Cleveland where a much higher proportion of land is vacant than in other cities. Also, public agencies need to be willing to fairly compensate the landowners. This tends to

present less of a challenge to public agencies, which are prepared to negotiate in good faith.

Despite challenges, most cities seek to directly acquire private properties to strategically aggregate sites or gain access to high-priority stand-alone properties. Effective programs had the capacity to identify private landowners and directly negotiate with them. Blueprint 2000, for example, is purchasing privately owned properties in Tallahassee, in tandem with other acquisition strategies, to construct detention ponds and public parks. The City of Chicago is purchasing and aggregating vacant properties over multiple years to create larger green spaces, including wetlands. In addition to the City of Chicago's direct acquisitions, the nonprofit Openlands provides temporary ownership of land until the City can afford the cost of acquisition, at which point Openlands transfers the land to the City for the cost of the property and program administration. One important lesson from Blueprint 2000 and the City of Chicago is that acquiring high-priority sites is a long-term proposition, requiring the institutional capacity to track and acquire sites over many years.

Cities still in the planning and early implementation stages intend to acquire private property to manage storm water. The Northeast Ohio Regional Sewer District in Cleveland and the Detroit Water and Sewerage Department seek to acquire properties to aggregate green storm water infrastructure sites. Water agencies also plan to purchase strategically located sites such as those adjacent to major transportation corridors. The New Orleans Redevelopment Authority's "Pontilly Project" flood mitigation plan also identified purchasing privately owned properties as a potential acquisition strategy.

Condemnation

Though eminent domain is frequently a method of last resort, theNYC Staten Island Bluebelt has successfully acquired around 90% of its properties through condemnation. Two key lessons emerge from the Bluebelt program: first, using condemnation on unoccupied vacant lots without development potential can be politically acceptable, particularly with a popular future use in place. Second, delegating both condemnations and acquisitions to partner agencies enabled the DEP to focus its efforts on planning. The City's Legal Department managed condemnations and legal transactions. Private property acquisitions are negotiated through the NYC Department of Citywide Administrative Services.

Transfer of private properties for demolition

Many abandoned properties will become vacant lots when vacant structures are demolished. The main constraint to demolishing nuisance buildings is funding availability. As demolishing abandoned buildings is expensive, several cities seek to prioritize the demolition of abandoned buildings based on greening criteria.

Efforts are taking place in Chicago, Detroit and Baltimore to create open space through the demolition process. The City of Chicago, through its Tax Reactivation Program, routinely acquired and demolished abandoned buildings to create green space. The Detroit Water and Sewerage Department paid $1 million to demolish 140 privately owned abandoned buildings, which it is in the process of acquiring to implement green infrastructure. Baltimore City, meanwhile, has developed the Growing Green Initiative, an interdepartmental efforts including the City's Public Works, Housing and Community Development, Planning, and Transportation departments. The Baltimore City Public Schools and non-profit greening organizations also are part of the Growing Green Initiative. This initiative is identifying properties that need to be demolished and do not have short-term redevelopment potential, suggesting any of six greening typologies for these sites, including green storm water infrastructure.

Easements

Easement was the least popular method of transfer, and was not a scalable mechanism for preserving land in any instance. Easements were unpopular for three reasons. First, many cities – particularly post-industrial cities – have numerous low-value properties that could be readily acquired for less than

the financial and transaction costs of an easement. Second, numerous cities noted that acquisition provides greater certainty of preservation over time than an easement, as changes in ownership may result in a loss of commitment to preservation. And third, other cities noted that zoning restrictions may be a more efficient and effective tool. In fact, several cities that considered easements in the planning stages used other strategies to ensure preservation when implementing their projects. For example:

- Chicago shifted its city policies from using easements to zoning, encouraging the use of waterfront property for storm water management and public access.
- The City of Tallahassee and Leon County initially considered using easements to create green space for Segment One of the Capital Cascade Trail, but instead they utilized creative design features within the public right-of-way.

VII. Ownership Models

We found that site ownership presents a challenge across many programs seeking to green vacant lots to manage storm water. Maintenance costs and liability were the two greatest concerns of public agencies seeking to green vacant lots for storm water management.

However, we found that public agencies are the most common land owners of greened vacant lots. Large green spaces – those above around 1.5 acres – were nearly always owned by public agencies. Smaller green spaces were owned by both public agencies and land trusts. Privately owned side lots may present another opportunity to advance storm water goals.

1. Public ownership of large sites

We consistently found that large sites were owned by local public agencies. Although in some instances covenants were placed on these properties, these were generally with respect to storm water specific uses or related to funding received from environmental protection grant programs. Several examples include:

- In Tallahassee, brownfields that were owned by the State of Florida were transferred to the City of Tallahassee for its Capital Cascade Park project.
- In New York City, the Bluebelt is owned by the NYC Department of Environmental Protection.
- In Chicago, large sites (2 acres and larger) are owned by the Chicago Park District.
- In Milwaukee, a deed restriction was placed on part of the Menomonee Valley Industrial Center's green space due to funding provided from state and federal grant programs.

2. Smaller site ownership by both public agencies and land trusts

Land trusts, which are nonprofit organizations, own vacant lots and provide liability insurance. Land trusts are a particularly attractive opportunity for cities not wanting to take on liability of smaller green spaces. Many land trusts also provide technical assistance and leadership development for community managed open spaces. Land trusts frequently work in partnership with city agencies for policymaking or implementation.

- In Chicago, three public agencies, the Chicago Park District, the City of Chicago, and the Forest Preserve District of Cook County provide financial support and board leadership for the NeighborSpace land trust.
- The Baltimore Green Space (BGS) land trust has taken an active policymaking role by partnering with the city's Office of Sustainability to re-design the process of transferring and preserving vacant lots to green space. BGS also owns sites and provides liability insurance.

Public agencies are also capable of delivering similar programs, though they need to be highly specialized. For example, NYC's GreenThumb program provides technical and material assistance to garden groups, and administers license agreements.

VIII. Maintenance Models

The adage, "begin with the end in mind," holds true with greening vacant lots. Project planning, site selection and design, ownership, and finance all impact maintenance. Although effective maintenance programs leverage volunteers, they also utilize a professional staff to ensure maintenance occurs when necessary or when specialized skills are required. The Greening of Detroit, a nonprofit organization that implements greening projects citywide, initially developed agreements with neighborhood volunteers, who committed to maintaining vegetation. Challenges quickly arose, however, as some volunteers were not interested in conducting maintenance when it was most necessary, such as during heat waves; other volunteers moved away or passed away, leaving a maintenance void.

Including maintenance in the design of the green space is also critical in ensuring a successful maintenance program. For the NYC Staten Island Bluebelt, maintenance workers were involved in the design phase for the Best Management Practices to be installed. This process ensured that the BMPs can be properly maintained.

We identified four maintenance models worthy of consideration by agencies seeking to develop maintenance programs.

1. Publicly managed public space

Several cities utilize public agency staff to maintain greened vacant lots. The Capital Cascade Trail in the City of Tallahassee and Leon County will be maintained by multiple city and county agencies. A funding mechanism has yet to be developed for maintenance, however, even though several large projects are scheduled for completion in 2013. In New York City, the Staten Island Bluebelt had a maintenance crew of seven staff, though unfilled vacancies have resulted in the loss of three positions. The Bluebelt has a budget of $700,000 through DEP's budget, raised through ratepayer fees. For green infrastructure in the public right-of-way, the DEP has developed an MOU with the city's Parks Department; such an agreement could be adapted by other cities to care for vacant lots.

2. Privately managed public space

The Redevelopment Authority of the City of Milwaukee (RACM), the City of Milwaukee Department of Public Works (DPW), and the Menomonee Valley Industrial Center (MVIC) businesses have agreed to develop a privately managed public space arrangement. RACM negotiated an agreement with the DPW that provides an easement to MVIC businesses for above ground storm water infrastructure, allowing them to receive a 60% stormwater credit against the DPW storm water fee – the maximum allowable credit. The DPW will credit the maximum value because an adjacent storm water train will manage and treat 100% of the storm water runoff from MVIC properties. In exchange, MVIC businesses commit to funding the maintenance of the storm water train. When fully occupied, businesses in the 13 parcels will contribute approximately $50,000 annually – about the amount of funding the businesses will save through their storm water fees –toward a maintenance fund. The fund will be administered through a property owners' association. RACM commits to conducting or subcontracting the maintenance, using funds provided by the property owners' association. This arrangement provides a source of revenue for maintenance through the stormwater fee. Whereas RACM may not receive

storm water credits, a private property owners' association may receive these credits according to the City's storm water regulations.

3. Community managed open space

Third, community managed open spaces tend to be volunteer run while receiving assistance from land trusts or other greening organizations. Outside organizations support volunteers through capacity building, liability insurance, access to low-cost materials, and facilitating the process of acquiring short-term or permanent property rights. See the description of land trusts under "ownership models" for more information. This option may make sense for cities seeking to avoid ownership or liability over smaller sites.

4. Youth summer employment maintenance programs

Finally, several programs incorporate youth development into green space maintenance. Youth employment programs may more easily attract corporate and foundation funding than similar programs for adults. State-based summer youth employment programs may provide an additional source of funding. The seasonal nature of the work, which extends through the summer months, is consistent with youth availability.

- The Genesee County Land Bank's Clean and Green program provides stipends to groups that maintain vacant lots, including mowing and trash pickup, every three weeks. The land bank prioritizes applications from community organizations that incorporate youth training and demonstrate direct ties to a local community.
- The Greening of Detroit runs a similar Clean and Green program, whereby it conducts a neighborhood wide assessment of vacant lots and greens those that are of greatest priority. Around half of lots become greened and all are cleaned while additional vegetation, such as street trees, is planted throughout the target neighborhood.
- The Greening of Detroit also runs the Green Corps program, which maintains 20,000 to 30,000 trees five times per summer each year. About 200 youth participate in the program, conducting tree pruning, picking up trash, and performing additional maintenance tasks. Though not focused specifically on vacant lots, this program provides another youth-based summer employment model.
- Cleveland's model focuses on maintaining green storm water infrastructure that advances its CSO Consent Order. The Northeast Ohio Regional Sewer District (NEORSD) may develop a partnership with the Cleveland Botanic Garden (CBG) to provide youth employment and training. The NEORSD would benefit because the CBG has expertise in green infrastructure, while providing the added benefit of employing youth. That NEORSD will support green infrastructure maintenance through ratepayer funds.

IX. Financing

We identified a variety of financing mechanisms for greening vacant lots, including foundation grants, government grants, special levies, utility fees, and tax increment financing.

1. Planning

Foundation grants were the most common sources of funding for planning initiatives. Local foundations in particular played a strong role in supporting the planning efforts of public agencies and NGOs. For example: the Chicago Community Trust provided financial support for planning processes resulting in the CitySpace plan; the Cleveland Foundation supports planning to determine how the Northeast Ohio Regional Sewer District, Land studio, and community stakeholders could develop green leave-behinds along the path of gray infrastructure improvements; and local foundations support the

Genesee County Land Bank's community planning initiatives. Public grants support planning in New Orleans (HUD) and Detroit (state of Michigan Section 205(j) program, an EPA program).

2. Acquisition & Construction

Storm water agencies funded the acquisition and construction of green infrastructure on vacant lots primarily through ratepayer fees. Parks or recreational programs received most of their acquisition and construction funding through specialized tax levies. Place-based financing such as tax increment financing provided another significant source of funding for open space programs. Other funding mechanisms, such as government grants and loans, provided supplementary funding.

Utility fees

Greening programs through public water agencies were funded through ratepayer fees:

- The New York City Department of Environmental Protection spent $72 million on acquisition between 2002 and 2011, supported by ratepayer funds. The DEP spent $50 million on Bluebelt construction, and an additional $300 million on sewer capital projects including storm and sanitary sewering.
- The Detroit Water and Sewerage Department spent $1 million to demolish 140 abandoned houses along major roads, part of the city's $50 million commitment to green infrastructure through its CSO Consent Order.
- The Northeast Ohio Regional Sewer District, through its Consent Order, will spend at least $42 million in ratepayer funds to reduce CSOs. This Cleveland-based green infrastructure investment will include land acquisition, construction and maintenance costs.

Tax levies

- The City of Seattle passed two green space levies: one in 2000 and a renewal in 2008 in the form of lifting the lid on property taxes. The 2000 levy raised nearly $200 million over eight years for acquisition, development (construction), programming, and maintenance. The second levy is approved for $145 million over six years for acquisition and development without maintenance or programming.
- The Chicago Park District (CPD) receives a dedicated share of property taxes. The CPD typically issues around $30-$40 million in general obligation bonds each year for land acquisition and capital improvements.
- The City of Tallahassee and Leon County's Blueprint 2000 organization raised $198 million through a 1% local sales tax dedicated to local infrastructure projects. The majority of Blueprint 2000's funding for its $80M Capital Cascade Trail was raised from the 1% sales tax. Funding also was raised from HUD's Community Development Block Grant program, state grant programs, and private donations. Storm water infrastructure was financed predominately through the 1% sales tax.

Place-based financing

We identified two sources of revenue in areas with active development: tax increment financing and an open space impact fee. Below are three examples.

- To finance construction, the Redevelopment Authority of the City of Milwaukee created a tax increment district (TID) for the Menomonee Valley Industrial Center to be repaid through future tax revenues from businesses. The TID provided the majority of funding ($16 million) for the project, including the storm water train. An additional $14 million were raised from twenty local, state and federal grants, as well as private donations. The large range of partners collaborating on this project helped to attract funding. The Milwaukee Metropolitan Sewerage District, the Wisconsin Department of Natural Resources, and the EPA provided several hundred thousand dollars of grants for green infrastructure.
- The Chicago Park District raised $55 million through TIF financing from 2006 through 2010, and expects to raise $142 million through 2016.
- The Chicago Open Space Impact Fee (OSIF) program has raised $53 million for the Department of City Development to support

neighborhood green spaces since 1998. The OSIF program requires residential developers to pay a per-unit fee for new dwelling units as part of the building permit process.

While the above three financing mechanisms raise revenue for areas where property values are anticipated to increase, the Genesee County Land Bank utilizes a countywide TIF scheme to cross-subsidize development of low value properties. This funding mechanism was made possible by an expansion of the Michigan state brownfield law, defining abandoned, tax delinquent and land bank owned properties as brownfields. This expanded definition allowed land banks to take out bonds through the state brownfield program for the redevelopment of blighted properties. Such a strategy may be relevant for cities wishing to fund the greening or demolition of sites in CSO areas, which frequently are in low-income areas that have weak real estate markets. The Genesee County Land Bank is predominately paying back thirteen million dollars in TIF bonds from revenues generated by a small number of high-value redevelopment projects with high returns on investment. The land bank also has demolished 400 projects and rehabilitated 3,800 projects for sale, returning properties to the tax roll.

Other funding mechanisms and sources include:

- State and federal grant programs frequently provide funding for specific infrastructure and environmental improvement projects. These public grant programs tend to be for specific types of environmental improvements and brownfield cleanup.
- The nonprofit Openlands provides gap ownership of properties for public agencies in Northeast Illinois. Openlands manages an internal revolving loan fund facilitating the acquisition of multiple projects. This program helps public agencies receive grant funding for projects while ensuring ownership in the interim, and facilitates the aggregation of sites when public agencies may need time to raise revenue to acquire properties.
- The substantial philanthropic contribution for acquisition of community gardens, as seen in New York City, is exceptional; we did not find any other uses of philanthropy for acquisition. Given the high profile nature of the New York City community gardens battle, and the exceptional interest of one philanthropist (Bette Midler), philanthropy may not be a replicable model to reliably acquire vacant land at scale.

3. Maintenance

For storm water management, most cities are still developing mechanisms to finance long-term maintenance. In several cases, ratepayer funds may support maintenance where cities seek to advance storm water regulatory goals. For example, the Northeast Ohio Regional Sewer District (NEORSD) estimates it will spend approximately 10% of construction costs on maintenance. For every $1 million in capital investments, the NEORSD will spend $100,000 each year for maintenance. In Seattle, under the Pro Parks Levy 2000, maintenance, stewardship and programming had an allocation of more than $60 million, with maintenance of newly acquired parks estimated to more than $6 million. Clearly, funding needs for maintenance are substantial.

- In Milwaukee, an easement agreement enables private businesses to receive a storm water rebate from the City of Milwaukee Department of Public Works, contingent on the businesses' commitment to funding maintenance. This agreement is expected to result in a financial "net zero" for businesses, whereby their financial commitment will be approximately equal to the value of their storm water rebates.
- For projects that do not advance storm water management, or where local public agencies will not make financial commitments to maintenance, youth programs may be a viable alternative. The Greening of Detroit's $1 million youth-based Green Corps program has successfully raised funding from public, foundation, and corporate sources in recent years.

- Seattle's Pro Parks 2000 Levy included maintenance for both existing and new parkland, avoiding the increased maintenance burden on the Seattle Department of Parks & Recreation (DPR) as new parks are developed with the Levy funds. Unfortunately the 2008 Levy eliminated maintenance and the Seattle DPR is now struggling to fund maintenance.

X. Brownfields as regional green infrastructure

Many brownfields in urban areas are larger sites that are not readily developable, making them prime candidates for green infrastructure. Although additional barriers exist to utilizing brownfields as green infrastructure sites, the redevelopment of the Milwaukee's Menomonee Valley Shops site and Tallahassee's Capital Cascade Trail illustrate how contaminated sites can be designed, cleaned up, and managed to meet regional green infrastructure and public open space goals. In each case, storm water agencies were partners whose investments were greatly leveraged by incorporating storm water into broader open space projects. Milwaukee's 30-acre storm water treatment train manages 100% of storm water from a 63-acre manufacturing center while providing public recreational space. Similarly, the 24-acre floodable Capital Cascade Park, one segment of a greenway, is designed to store and treat runoff from a 693 acre drainage area.

Key aspects common to these two projects include:

- Early collaboration with regulators to ensure the project's design and clean-up can meet brownfield regulations.
- Early input from storm water management regulators to identify how these sites should advance regulatory requirements.
- Early feedback from citizen stakeholders interested in the use of the sites for recreation.
- The development of creative designs that facilitate the use of each brownfield as a regional storm water management facility.
- Project management of brownfield remediation and construction from public agencies that are not responsible for storm water management, but have a vested interest in the environmental performance of the site.
- Moderate financial investment from public agencies seeking to advance stormwater goals. The Milwaukee Metropolitan Sewerage District, the Wisconsin Department of Natural Resources and the EPA invested several hundred thousand dollars toward the $2 million storm water treatment train. In Tallahassee, the EPA provided a grant of approximately $500,000 toward an alum treatment system to improve storm water runoff quality at Capital Cascade Park. (The entire park's construction cost, however, was $25 million).

For former residential sites, low level of contamination (such as lead) may be present and should be addressed during site selection and preparation according to state regulations.

We also found in Michigan the creative use of brownfield funding for urban redevelopment and demolition projects, which could be adapted to support open space and storm water management goals. See section IX of this chapter under *Place-based financing* and the Genesee County case in Chapter 2 for more information.

XI. Economic development framework

We also analyzed cases based on their economic development benefits and challenges. We found that greening vacant lots supports economic development in three ways: providing direct

employment, supporting neighborhood stabilization, and advancing the needs of businesses.

1. Direct employment

Most employment programs we identified employed youth. "Green Corps" programs, such as those in Detroit and Genesee County that conduct landscaping maintenance, were common. Chicago's Green Corps program trained adults, particularly those with barriers to employment, in horticulture. As horticulture laborer jobs in the temperate zone are seasonal, these jobs may not be viable long-term careers, but instead could serve as stepping stones to greater educational and employment opportunities. Sustaining sufficient funding levels to provide workforce development is a challenge in all cases; the Greening of Detroit's strategy of fund raising from state, foundation, and corporate sources for a youth-based employment program has been successful in the long-term.

2. Neighborhood Stabilization

Many programs are greening vacant lots as a neighborhood stabilization strategy, targeting neighborhoods with transitional housing markets. The Genesee County Land Bank implements a Clean and Green program that greens vacant lots in transitional neighborhoods; planning efforts in Cleveland seek to prioritize green infrastructure in NSP2 target areas; and the New Orleans Redevelopment Authority has developed a neighborhood-scale green infrastructure plan they are coordinating with housing development efforts. Although these programs have been funded predominately through Federal grant programs, given the potential increase in tax revenues through stabilizing housing markets, local financing strategies such as tax increment financing or general obligation bonds could be considered.

3. Business needs

Businesses are increasingly concerned about the potential impact of flooding on their properties, as well as the need to meet regulatory requirements. Businesses also frequently seek opportunities to market themselves as environmental stewards. In Milwaukee, the Menomonee Valley Industrial Center's centralized storm water design provides businesses with off-site green infrastructure that enables them to meet on-site storm water requirements. (This was developed through an easement agreement; see the maintenance section of this chapter for more details). Green infrastructure at the site also is designed to manage a 100-year storm, reducing flooding concerns for businesses. The MVIC is a high-profile project that has provided space for local businesses to grow and international companies to locate.

We also identified the following workforce challenges with respect to advancing storm water management goals:

1) **There is a lack of standardization and accreditation of green infrastructure maintenance.** In other words, the standardization and accreditation of green infrastructure maintenance skills would support high-quality job performance. For example, Chicago's Green Corps program provided specialized training in horticulture for its workforce, but no certification exists for many of these skills. Although the Green Corps program maintained strong relationships with contractors, facilitating job placement, there is a need for standardizing employer-recognized skills.
2) **Low bid procurement practices may increase project costs.** In Baltimore, the low-bid contractor used too much concrete, increasing project cost by 50% and reducing infiltration. Procurement of contractors should consider both quality and cost. Training needs to be provided for contractors to understand how to implement green infrastructure on vacant lots, as well as in the public right-of-way. Contractor training, as well as certification, may also provide an opportunity to recruit historically under-represented businesses.
3) **Water agencies typically do not have expertise in green infrastructure maintenance.** Up-skilling and/or strategic partnerships with horticulture experts need to take place. For example, the NEORSD is considering a partnership with the Cleveland

Botanic Garden, which has expertise in horticulture and a youth-based Green Corps that could conduct maintenance.

4) **Designers need to be trained to work with low-income communities and communities of color to select appropriate plants, given neighborhood context.** Unintended consequences may follow without working with communities. For example, in Baltimore, designers selected tall native plantings, but residents cut them down because they were perceived as safety hazards.

XII. Conclusion and further research

Vacant lots clearly hold potential to improve the environmental and economic well-being of cities. The previous sections in Chapter 3 demonstrated how cities can meet water quality regulations and provide recreational open space by greening vacant lots. We articulated a range of effective planning and implementation strategies and analyzed initiatives of though- leading cities, which are in the early planning and implementation stages. Further research, however, would advance efforts of cities seeking to green vacant lots. Additional research on planning processes, program administration, vacant lot transfer, site aggregation, and ownership could support these greening efforts. The two most important research gaps, however, are maintenance and workforce development.

Maintenance

Green infrastructure maintenance models for urban areas need to be developed to advance storm water regulations. The following areas should be prioritized for further research:

1. Financing

Although significant investments are taking place nationwide to construct green infrastructure, the financing of maintenance remains a gap for many cities. Whereas parks department frequently seek to 'do more with less', the mandate to maintain vegetation as infrastructure to meet regulatory requirements necessitates a different mentality. Reliable short –and long-term funding strategies need to be developed and implemented.

2. Public administration

Site selection, design, procurement, and ownership of green spaces significantly impact their performance. Effective models need to be developed, implemented and refined across all these aspects.

3. Public-private partnerships

Partnerships between city agencies and communities are critical to the effective maintenance of green infrastructure. Models need to be developed specifically for maintaining green open spaces in low-income urban areas, where green infrastructure is frequently implemented to manage storm water.

Workforce Development

We also identified important gaps with respect to workforce standards and career paths.

1. Workforce standards

- Workforce standards need to be created to ensure the consistent performance of green infrastructure. One major gap is the lack of a certification for professionals with less than 5 years of professional experience. (Professionals with at least five years of experience may apply to receive a horticulture license in several cities).
- For contractors, greening vacant lots presents a particular set of challenges given their unique conditions. Best practices for greening vacant

lots to manage storm water should be developed and integrated into training and certification programs.

2. Workforce and career paths

- As the green infrastructure field grows, jobs may be created. Many green infrastructure jobs are seasonal or target youth populations. Further research should identify the career paths of green infrastructure professionals, estimate the number of jobs that may be created, and recommend policies and practices to assist green infrastructure professionals in developing their careers.

Chapter 4: Opportunities for Philadelphia

Chapter 4 identifies opportunities for the Philadelphia Water Department (PWD) to green vacant lots to advance its *Green City, Clean Water* storm water management goal. Chapter 4 builds from the overview of vacant land planning efforts in Philadelphia described in Chapter 1.

National Lessons

Our national assessment in Chapter 3 identified the following practices that should inform the PWD's efforts. Effective programs conduct inter-related regional, neighborhood and site- specific planning. By coordination among other agencies, programs successfully identify which publically owned sites could be converted to green space in the short- and long-term. By initiating new specialized programs or expanding existing ones, public agencies and non-profits support the greening of vacant lots. Frequently, "intermediary" organizations that work among both community organizations and city agencies support the planning, acquisition, ownership or maintenance of greening vacant lots. While intermediary organizations take many forms, we identified several examples of land banks that partner with both public agencies and communities. Partnerships with community organizations and stakeholders greatly facilitate neighborhood level planning. Spatial analysis, site visits and collaboration with local stakeholders help programs to identify suitable vacant lots.

Site aggregation provides the greatest opportunity to achieve scale. To aggregate sites, a single lead agency sustains long-term planning and implementation capacity. While effective programs work in partnership with other agencies and organizations, a point person is necessary to ensure acquisitions are coordinated. Multiple acquisition strategies help programs to achieve scale. These strategies include acquiring foreclosed properties (vacant lots and abandoned buildings), purchasing tax-current properties, forming inter-agency MOUs, and, particularly in strong market cities, using condemnation. Easements did not provide a scalable model in any case we examined.

Green space and green infrastructure programs are successful when the sites were designed for public access. Effective green infrastructure programs support active and passive recreation, including greenways and trails, fishing, and public education. Large-scale greenways can incorporate storm water infrastructure. Brownfields can serve as regional green infrastructure and public open space. Planning models also exist for developing a network of greened vacant lots on smaller sites.

In terms of ownership, public agencies nearly always own larger green spaces (approximately 2 acres and greater), while public agencies and land trusts own smaller green spaces. Parks departments frequently are the designated public agency for owning green spaces. Land trusts provide leadership support and liability insurance to stewards of community managed open spaces in several cities nationwide.

We identified four maintenance models: publically managed open spaces, privately managed open spaces, community managed open spaces, and youth-based maintenance programs. Factoring in maintenance throughout the greening process (from site selection onward) supports successful long-term maintenance and community stewardship.

Water agencies actively supported the greening of vacant lots. Their specific roles varied by case, however. Some water agencies coordinate site selection, finance acquisition, and support maintenance, while others take on more limited roles such as providing modest grants and technical

support to other agencies. Developing partnerships among key public agencies and NGOs based on the strengths of each organization was critical in each case.

Given the variety of water department roles, the PWD needs to create a plan based on a patchwork of policies and programs across all cases, rather than using a single case as a guide. This chapter recommends how the PWD could apply lessons from this study's ten cases to its particular context.

First, however, we review existing assets for and challenges of greening vacant lots in Philadelphia.

Philadelphia Overview

Assets

The PWD should build from Philadelphia's strengths to develop a vacant lots strategy. We identified the following assets from which the PWD should build:

- The City's standing interagency vacant lands team provides an opportunity to work among agencies during the site selection process.
- A recent City disposition policy offers the short term reuse of vacant lots.
- The City recently consolidated its inventory of publically-owned vacant land.
- The PWD maintains ongoing partnerships with neighborhood organizations in each CSO area.
- Other community groups throughout Philadelphia would like to repurpose vacant lots for public benefit.
- A Philadelphia Land Bank is likely to emerge in the next 9 to 12 months.
- The Neighborhood Garden Association, a land trust that could support smaller sites, is being rekindled through the Pennsylvania Horticulture Society.
- The PA Horticulture Society's Clean and Green program greens and maintains vacant lots through a City-funded contract with the Philadelphia Licenses & Inspections department.
- Philadelphia-specific research quantifies the benefits of greening of vacant lots in terms of increased property values, reduced crime, and reduced public spending.

Challenges

We also identified numerous challenges to acquiring and aggregating vacant lots, which include:

- No comprehensive vacant land inventory exists for Philadelphia. The most recent inventory was conducted in 2000, and is therefore out-of-date. Many data sources on vacant land, such as tax delinquencies and utility nonpayment, do not refer to properties in the same way, thus, they are difficult to consolidate.
- Few large sites are readily available for acquisition. Of the 9,000 properties in the consolidated inventory of three agencies, only 247 are larger than ¼ acre (as of November, 2012). Many of these sites are marked for development.
- While opportunities exist for aggregation, follow-up analysis of existing data, and follow-up site visits, are necessary. Of the 9,000 sites in public ownership, many are smaller adjacent sites that could potentially be aggregated.
- No city agency is tasked with greening vacant lots for permanent public use.
- There is limited brownfield redevelopment capacity, with one coordinator for the City.
- The City has a lengthy and uncertain foreclosure process.

More detailed analysis is necessary to identify feasible vacant lots to green throughout the CSO watersheds. The following recommendations comprise a big-picture strategy for the PWD.

1. Implement a pilot study

In the next 6-12 months, the PWD should pilot a planning process in one neighborhood or CSO area. Planning efforts have helped agencies in Chicago, Seattle and Tallahassee to identify vacant lots to green, address land use conflicts, and overcome institutional barriers. Considering the important role of planning in effective programs, a pilot study would be a logical first step for the PWD.

A pilot study should identify vacant land to convert to green space, develop a process model that could be applied to other CSO areas, and identify institutional barriers that need to be overcome to achieve scale. Once barriers are identified, the PWD and its partners should develop a strategy to overcome them. Local foundations may be well suited to support this planning initiative, as they have supported similar planning efforts in other cities around the country.

A pilot study should be comprised of the following components:

1) **Develop a GIS site suitability analysis to support site identification. Criteria should include:**

a. Ownership status;
b. Tax delinquent vacant lots and abandoned buildings;
c. Storm water management potential;
d. Additional area-wide and site-specific criteria, as appropriate (using other cities' criteria, in Chapter 3 Section II part 3, as a guide).

2) **Coordinate with other public agencies to confirm site availability, particularly to identify sites with low redevelopment potential.**

Effective programs such as the Chicago *CitySpace* plan coordinate across city agencies to confirm site availability. When a lack of coordination existed in Baltimore, scale was not achieved.

3) **Partner with community organizations to identify existing uses and ideal sites to green.**

Community partnership and input should complement the GIS model. In every case where highly urbanized vacant lots were converted to green spaces, high levels of community participation existed. Examples include Chicago's CitySpace plan, Tallahassee's Capital Cascade Trail, Milwaukee's Menomonee Valley Industrial Center, and Seattle's comprehensive citywide open space plans.

The PWD would benefit by developing a shared vision with community stakeholders for the greening of vacant lots. A shared vision could potentially include aggregating adjacent abandoned properties to create larger public parks, or developing a network of smaller sites. Many vacant lots maintained by the Pennsylvania Horticultural Society, including both publically and privately owned properties, are utilized by community members as parks. Site visits should confirm vacancy and assess site conditions.

4) **Identify institutional (i.e. policy and organizational) barriers to implementation, and develop strategies to overcome these barriers.**

Effective programs such as New York City's Staten Island Bluebelt, Milwaukee's Menomonee Valley Industrial Center, and Chicago's CitySpace plan, identified barriers to implementation early on. These barriers were overcome as programs developed, facilitating effective implementation. In each of these cases, highly specialized programs and organizations emerged to overcome institutional barriers. For example, the NYC DEP created a Bluebelt office, and a land trust for community managed open spaces grew from Chicago's CitySpace plan. In contrast, Baltimore's Watershed 263 program did not identify institutional barriers. Just one vacant lot through its pilot program was greened despite comprehensive planning efforts.

5) Identify roles of other key partner agencies.
The PWD should develop partnerships where appropriate with other agencies, such as the Office of Sustainability and the Philadelphia Parks & Recreation (PPR), for the planning, acquisition, ownership, and maintenance of green spaces on vacant lots. The PWD should consider the extent to which it can leverage investments of other agencies with missions of increasing open space. As maintenance is key to the performance of green infrastructure and is a concern for PPR as well, the PWD may consider cost-sharing the maintenance with the PPR for projects that advance storm water management goals. The PPR could potentially become a partner to own sites should the PWD be prepared to support some of the maintenance costs. A pilot process would help to identify potential roles of the PPR and other public agencies.

6) Identify the potential roles of a Philadelphia Land Bank.
Intermediary organizations and initiatives helped to support the planning and implementation of vacant lot programs around the country (see Chapter 3 Section II). Land banks, in both Genesee County and Cleveland, served as important specialized entities. The land banks supported planning to identify, acquire, and temporarily hold vacant lots. The Genesee County Land Bank (GCLB) provided multiple interim greening and ownership programs that could serve as models in Philadelphia. The GCLB also focused on the redevelopment of vacant land; thus, a Philadelphia Land Bank may be an appropriate organization to identify sites for greening in the context of broader development objectives. The pilot study should identify how a Land Bank could support the long-term greening of vacant lots in Philadelphia, based on the strengths of land banks and gaps of other organizations in the city.

2. Dedicate a vacant lots planner (VLP) position within the PWD

We recommend the PWD dedicate a position to the greening of vacant lots. Effective programs always had a single agency coordinating site aggregation. Successful cases maintained the capacity to aggregate sites in the long-term, frequently for a decade or longer. The Staten Island Bluebelt (led by the NYC Department of Environmental Protection) and Tallahassee/Leon County Capital Cascade Trail (coordinated by the Blueprint 2000 agency) are two examples. The VLP could serve as an intermediary position between other public agencies, including the standing interagency committee and community-based organizations. The VLP could coordinate the development and implementation of neighborhood and site-specific plans, as described in the previous section, in both the short- and long-term. The position could work in coordination with the Philadelphia Redevelopment Authority and the (potential) Philadelphia Land Bank to acquire properties. As the NYC DEP benefitted from partnerships with agencies specializing in property transactions, so too could the PWD. This position also could track and coordinate properties through the sheriff's sale, as well as large-scale redevelopment efforts, including brownfields.

3. Integrate active uses into Green Infrastructure projects where feasible.

Designing sites for active use helps to support the planning, funding, and maintenance of green space. The Capital Cascade Trail in Tallahassee and Menomonee Valley Industrial Park in Milwaukee provide two successful models of large-scale green storm water infrastructure that is actively used and has garnered significant public buy-in. Open space programs in Seattle and Chicago also illustrate how ensuring active community use of green space strengthens public support.

Large sites could be developed by acquiring large properties and aggregating smaller properties. For example, Tallahassee's Capital Cascade Trail requires the acquisition of property held by myriad public agencies and private owners. The Genesee County Land Bank supports urban agriculture by leasing contiguous properties in its inventory to farming groups; the Cleveland Land Bank is supporting the development of a similar initiative with the local water district and community partners. As described above, many vacant sites in Philadelphia are already used as *de-facto* park space.

These sites could potentially be acquired and transferred to the PPR.

4. Develop a smaller sites strategy to construct and maintain storm water greenways.

As Tallahassee demonstrated, the greenway may be an effective strategy to manage storm water throughout a region. Although sites in Tallahassee are relatively large, other thought-leading cities, such as New Orleans and Detroit, are developing smaller site greenway strategies to manage storm [1] The PWD could consider how it could work with other greening agencies and organizations to bolster the Neighborhood Garden Association, which could own and support the maintenance of these sites.

A small sites strategy also would be consistent with the PWD's emphasis on greening the public right-of-way. Public engagement processes, site selection, design (including connections across neighborhoods), and maintenance could be coordinated, dramatically reducing the transaction costs of greening many smaller vacant lots.

5. Consider flexible models of ownership & maintenance

The PWD does not need to gain ownership to ensure long-term preservation. Rather, the PWD should consider strategies to partner with the PPR for larger sites and a land trust or PPR for smaller sites. Importantly, both the PPR and land trusts are intended to encourage recreation and active use. The following ownership and maintenance models could be adapted to Philadelphia.

- Consider interim ownership strategies. Some properties may need to be acquired before a firm commitment from a permanent owner is secured. The NYC DEP benefitted by acquiring properties as they became available early on without a comprehensive plan in place. Should strategic sites come up for sheriff's sale, for example, the PWD would benefit by acquiring these sites and arranging with another city agency or non-profit to hold properties until a permanent owner is secured. For example, Blueprint 2000 in Tallahassee, FL owns vacant land until construction of green space is complete, when it is turned over to the City of Tallahassee. Openlands, a non-profit organization, holds small sites until public agencies in Chicago can afford to acquire the lots, at which point they are transferred for the original cost of acquisition and program administration.
- Memoranda of Understanding in effect in perpetuity with another city agency, which would own the land, might be an appropriate instrument for some sites.
- Consider creative financial arrangements. For example, the PWD could adapt the following three maintenance models.

1) The privately funded public maintenance model. The maintenance easement structure from the Menomonee Valley Industrial Center in Milwaukee, which allows businesses to receive credit for off-site storm water infrastructure provided by the City, merits further analysis for the context of Philadelphia, both among businesses and at the block/neighborhood scale.

2) The "incremental" financing model. The Detroit Water and Sewerage Department (DWSD) is considering three different maintenance arrangements. The City of Detroit's General Services Department (GSD) already conducts "window pane" maintenance, mowing around the edges of vacant lots. The first option of the DWSD is to sustain the same level of maintenance by the GSD at no additional cost. Second, should the DWSD desire a higher level of service (such as mowing the full site or including trash pick-up), it could develop an MOU with the GSD for the water. This would be a pragmatic approach given the challenges of aggregating sites, and could even serve as an interim strategy until larger sites are fully agglomerated. A greenway would reduce the transaction costs of maintenance by clustering projects. These plans, developed in partnership with local communities, as seen in Tallahassee and Seattle, could build from the *2005 Urban Voids* international design competition, which developed designs to green vacant lots in Philadelphia to advance environmental goals.

incremental maintenance cost of premium services. And third, the DWSD could hire an outside contractor to conduct maintenance. As the City of Philadelphia already supports the greening and maintenance of vacant lots by contracting the PA Horticulture Society, the PWD should consider the extent to which the City may continue to support basic 'green and clean' services at no additional cost. The PWD could thus fund maintenance costs above and beyond existing services. Similarly, should the PWD green a site on PPR property, the PWD could financially support the maintenance required for the green storm water infrastructure, but not for all park expenses.

3) The neighborhood-scale greening and maintenance model. The PWD also could implement neighborhood-wide greening and maintenance throughout a targeted neighborhood. Similar programs are frequently funded by Federal HUD grants. The Greening of Detroit, a citywide NGO, greens and cares for vacant lots and the public right-of-way through neighborhood-scale programs.

- The PWD should develop guidelines for how designers can create community-compatible designs. In Baltimore, unexpected maintenance challenges arose because the landscaping conflicted with the community needs. Encouraging meetings between designers and community members during the design phase may be one good starting point.
- Involving maintenance crews, when applicable, in the design process would encourage proper maintenance, as it has for the Staten Island Bluebelt.

Endnotes

[1] City Parks Association, Penn Horticultural Society, Penn Environmental Council, & The Reinvestment Fund. (2005). Urban voids – grounds for change: An international design competition. *Philadelphia Land Vision*. Retrieved Fall, 2012, from http://www.vanalen.org/urbanvoids/index.php?option=com_content

Appendix A: List of Interviewees and Reviewers

Explanation of codes: "I" = interviewees. "R" = reviewers. No code = contacted but not interviewed (often these people gave us others to contact)

Baltimore

Last Name	First Name	Title	Organization	Code
Avins	Miriam	Executive Director	Baltimore Green Space	I
Burgess	Kim	Chief, Surface Water Management	Baltimore Public Works	I
Celestin	Rashelle		City of Baltimore, Department of Housing & Community Development	I
Cocke	Abby	Program Manager	City of Baltimore, Office of Sustainability	I
Hager	Guy	Senior Director of Great Parks, Clean Streams & Green Communities	Parks and People Foundation	I, R
Rupp	Valerie	Manager for Community Greening	Parks and People Foundation	I
Stack	William	Deputy Director of Programs	Center for Watershed Protection	I

Chicago

Last Name	First Name	Title	Organization	Code
Biagi	Gia	Director of Strategy & Policy	Office of the Chief Executive Officer, Chicago Park District	I
Brawley	Emmy	Specialist in Land Preservation	Openlands	I
Chueng	Nelson	Coordinating Planner	City of Chicago, Housing and Economic Development Department	I
Daniels	Glenda	Director of Urban Programs	Openlands	I
Dickhut	Kathy	Deputy Commissioner	City of Chicago, Department of Planning and Development	I, R
Gustovson	Megan	Project Coordinator - Open Space Impact Fee Program	City of Chicago, Housing and Economic Development Department	I
Helphand	Ben	Executive Director	NeighborSpace	I, R
Henderson	Henry	Director, Midwest Program	NRDC	I
Hobbs	Karen		NRDC	
Wiedel	Sean	Assistant Commissioner	City of Chicago, Department of Transportation	I

Cleveland

Last Name	First Name	Title	Organization	Code
Alvarado	Christopher	Strong Cities, Strong Communities Fellow	City of Cleveland	I
Auch	Ted	Postdoctoral Fellow	Cleveland Botanical Garden	I
Downing	James		City of Cleveland	I
Lincheck	Dave		West Creek Preservation Committee	I
McCauley	Victoria	Manager for Storm Water Design	Northeast Ohio Regional Sewer District	I, R
Schwarz	Terry	Director	Cleveland Urban Design Collaborative	
Swanberg	Anna	Project Manager	Land Studio	I, R

Detroit

Last Name	First Name	Title	Organization	Code
Atkinson	Ashley	Urban Garden Program Manager	The Greening of Detroit	I
Candela	Eric	Manager for Government Relations & Grants	Greening of Detroit	I
Elbing	Lauri, K	Policy Associate	The Nature Conservancy	
Hay	Dean	Director of Green Infrastructure	Greening of Detroit	I
Kinkaid	Dean		Hamilton Anderson	I
Mangus	Amy		Southeast Michigan Green Infrastructure Task Force, Southeast Michigan Council of Governments	I, R
Salminen	Rebecca	Executive Director	Greening of Detroit	I, R

Genesee County

Last Name	First Name	Title	Organization	Code
Kelly	Christina		Genesee County Land Bank Authority	I, R
McShane	Paul	CFO	Genesee County Land Bank Authority	
Phaneuf	Heidi	Community Resource Planner/GIS	Genesee County Land Bank Authority	I
Weiland	Doug	Executive Director	Genesee County Land Bank Authority	I

Milwaukee

Last Name	First Name	Title	Organization	Code
Bray	Laura	Executive Director	Menomonee Valley Partners, Inc.	I, R
Burton	Kein	Program Manager	City of Milwaukee, Redevelopment Authority	
Dettmer	Karen	Senior Environmental Project Engineer	City of Milwaukee, Redevelopment Authority	
Fowler	David	Senior Project Manager/Watercourse Maintenance Manager	Milwaukee Metropolitan Sewerage District	I
Kress	Tory	Senior Environmental Project Engineer	Redevelopment Authority of the City of Milwaukee	I
Misky	David		Redevelopment Authority of the City of Milwaukee	I, R
Sands	Karen	Manager of Sustainability	Milwaukee Metropolitan Sewerage District	
Thur	Timothy	Chief Sewer Design Manager	Milwaukee Department of Public Works	I

New Orleans

Last Name	First Name	Title	Organization	Code
Barnes	Robin	Executive Vice President & COO	Greater New Orleans, Inc.	I, R
Chang	Aron	Architectural Designer	Waggonner & Ball Architects	I, R
Melberg	Kirsten		New Orleans Redevelopment Authority	I, R
Diaz	Rami		Waggoner & Ball Architects	I
Peaden	Kate		Waggonner & Ball Architects	I

New York

Last Name	First Name	Title	Organization	
Alderson	Colleen	Director of Parkland	NYC Department of Parks & Recreation	I, R
Frietag	Amy	Executive Director	New York Restoration Project	I
Gumb	Dana	Director, Bluebelt Program	NYC Department of Environmental Protection	I
Librizzi	Lenny	Director of Open Space Greening	GrowNYC	I, R
Lutz	Dave	Executive Director	Neighborhood Open Space Coalition	I, R
Packard	Erica	Executive Director	NYC Land Trust - Manhattan and Bronx	I
Shapiro	Josslyn	Assistant Director	Office of Environmental Remediation	I
Shrieber	Zach		Office of Environmental Remediation	I
Stone	Edie	Executive Director	GreenThumb	I
Stone	Andy	Director of New York's Parks for People Program	Trust for Public Land	I
Weiss	Hershel		Ashokan, Inc.	I

Philadelphia

Last Name	First Name	Title	Organization	Code
Abrams	Glen		City of Philadelphia, PWD	I
Carpenter	John	Deputy Executive Director	Philadelphia Redevelopment Authority	I
Connolly	Paula		City of Philadelphia, PWD	P
Conway	Thomas	Deputy Managing Director	City of Philadelphia, Licenses and Inspections	I
Greenwald	Bridget	Commissioner	City of Philadelphia, Public Property	I
Grossman	Robert	Director of Philadelphia Green Program	Pennsylvania Horticultural Society	I
Noon	Jessica		City of Philadelphia, PWD	P

Seattle

Last Name	First Name	Title	Organization	Code
Banslaben	Joel	Sr. Sustainable Strategies Specialist for Green Building	Seattle Public Utilities	I
Golub	Susan		Seattle Parks and Recreation	I, R
Macdonald	Rich	Program Supervisor	City of Seattle Department of Neighborhoods - P Patch Program	I
Mayhew	Miles	Strategic Advisor	City of Seattle, Seattle Public Utilities	I
Moty	Joyce	President	P-Patch Trust	I
Raymond	Laura	Coordinator for Parks & Green Space Levy	City of Seattle Department of Neighborhoods - P Patch Program	I
Webster	Louis	Real Property Agent	Seattle Dept of Finance and Administrative Services	I

Tallahassee/Leon County

Last Name	First Name	Title	Organization	Code
Hodges	Stephen	Senior Planner	Comprehensive/Environmental Planning Tallahassee - Leon County Planning Department	I,R
Murray	Tony		City of Tallahassee	I
Phillips	Gary	Project Manager	Blueprint 2000	I, R
Snyder	Dave		Blueprint 2000	I,R
Taylor	Koren	Environmental Programs Coordinator	Tallahassee City, Environmental Policy & Energy Resources Department	I, R
Tedder	Wayne	Director of PLACE	Blueprint 2000	I, R

Other

Last Name	First Name	Title	Organization (City)	Code
Barrett O'Neil	Julie	Green Program Director	Buffalo Sewer Authority	I
Delgado	Laura	Acting Senior Research and Development Analyst	City of Boston, Department of Neighborhood Development	
Emeric	Noemi	Coordinator for R9 Brownfields	EPA	
Furio	Brooke	Section Chief	EPA Region 5	I
Graziani	Kim	Vice President of Capacity Building	Center for Community Progress	I
Grosshans	Jon	Community Planner	EPA Region 5	I
Kieber	Rabi	Coordinator for Green Building & Sustainability	EPA Region 2	I
Larson	Jeffrey	Senior Attorney	The Nature Conservancy	I
Lloyd	Dave	National Program Manager for Brownfields	Office of Brownfields and Land Revitalization	I
Love	Susan	Planner, Coastal Programs	Delaware Department of Natural Resources and Environmental Control	I
Park	David	Director of Neighborhoods and Housing	Urban Homestead Authority (Kansas City)	I
Peluso	Chelsea	Neighborhood Initiatives Coordinator	City of Pittsburgh	I
Maltibia	Anita	Executive Director	Green Impact Zone (Kansas City)	I
Niemi	Laura	Program Coordinator	City of Portland, Parks Department	I
Pitruzzello	Vince	Regional Coordinator	Office of Brownfields and Land Revitalization	I
Robinson	Matt	Environmental Scientist	Stormwater Management Division, District Department of Environment (Washington, D.C.)	I
Sage	Samuel	Executive Director	Atlantic State Legal Foundation, Inc.	I
Warren	Abby	Program Manager	City of Portland, Parks Department	I

Appendix B: Additional Cities Considered

We considered programs in the below ten cities, in addition to the programs we selected. Programs from the below cities did not satisfy our selection criteria: scalability, replicability, diversity of green spaces, geographic diversity, diversity of ownership transfer approaches, and diversity of long-term maintenance strategies. In "diversity", we refer to how approaches in the below cities compared to those of programs in cities we selected. Several cities, such as Boston, MA and Washington, D.C. had projects or narrowly focused programs, rather than larger-scale programs that could be adaptable and scalable to other cities. Other cities, such as Portland, OR, prioritize greening other types of open spaces (such as schools or land owned by non-profits) rather than vacant lots. Numerous programs, such as those in Buffalo, NY and Cincinnati, OH, are in the very early planning stages; we chose the three strongest emerging programs that also provided geographic diversity. Syracuse, NY's program is the farthest along of any emerging city we did not select. Syracuse's program has many similarities to the programs we selected in Cleveland, OH and Detroit, MI, but we sought to profile cities such as New Orleans that bring a different planning approach based on other regulatory and geographic contexts.

Boston, MA
Buffalo, NY
Cincinnati, OH
Washington, D.C.
Kansas City, MO
Pittsburgh, PA
Portland, OR
Toledo, OH
Wilmington, DE
Syracuse, NY

Appendix C: Matrices

C.1. Case Summary Matrix

Case	Program (yr. initiated)	Goals	Project lead (key partners)	Regulatory context	Green space uses	Planning strategy	Acquisition & transfer mechanisms	Preservation	Maintenance
Baltimore, MD	Watershed 263 pilot project (2004)	Measurably improve water quality and quality of life in sub-watershed "O" of Watershed 263, one of 335 Baltimore watersheds.	Baltimore Department of Public Works (DPW), Baltimore Ecosystem Study, Parks & People.	Watershed 263 plan sought to advance DPW's MS4 separate sewer system planning efforts.	One vacant lot and five public right-of-way projects in sub-watershed "O" pilot area. (Additional public right-of-way and school sites were greened throughout the entire Watershed 263).	1) Watershed-wide spatial analyses & a follow-up sub-watershed GIS site suitability analysis with site visits. 2) The "Growing Green Initiative", an emerging collaborative among several city agencies and NGOs, seeks to transfer certain publically owned demolition sites to green space, including green infrastructure.	1) Recently, City's Housing and Community Development department, through its Adopt-a-Lot program, pre-determines which publically owned vacant sites may be greened, expediting the transfer process. 1-year and 5-year licenses are available; community gardens existent for 5 years or more may be transferred to a land trust.	Baltimore Green Space (BGS), a land trust founded in 2007, provides ownership and liability services to stewards of community managed open spaces. BGS owned 3 sites as of August, 2012.	Parks and People conducts maintenance when funding is available. Plantings were not designed in the context of the local community, and one of the contractors was not experienced in green infrastructure, increasing project cost and creating unforeseen challenges.
Chicago, IL	Chicago CitySpace plan (1993)	Increase access to open space at neighborhood, citywide, and regional scales, particularly for underserved community districts.	Chicago Dept of Community Development (DCD), Chicago Park District (CPD), Forest Preserve District of Cook County (FPD), Chicago Public Schools, & NeighborSpace, a land trust. (Openlands -- a non-profit, community organizations, and other stakeholders).	Eligibility of Chicago Tax Reactivation Program expanded in 1991 to include parks and open space, enabling City to acquire tax delinquent properties for open space purposes.	1300+ acres of open space created from 1998 to 2012, including community managed open spaces, pocket parks, neighborhood parks, large city parks, greenways, and wetlands.	CitySpace resulted from a multi-year planning process led by the DCD, CPD, FPD & Chicago Public Schools, involving more than 100 NGOs, businesses and public agencies. CitySpace provided a citywide green space plan with strategy for implementation. For implementation. the CPD led the planning of larger sites, while Openlands led the neighborhood-scale planning for smaller sites in several underserved communities.	Appx. 1000 properties at a time were acquired through CTRP for numerous years. Also, the transfer of City- owned vacant lots resulting from demolitions provided land for the CPD and NeighborSpace. Openlands, through its interim ownership program, acquires and temporarily holds sites for public agencies until funds become available.	CPD owns sites 2 acres and larger, generally. NeighborSpace owns community managed open spaces smaller than 2 acres, and provides support to stewards.	The CPD maintains sites 2 acres and larger and some smaller sites, while NeighborSpace supports stewards of community managed open spaces for successful applicants – a total of 81 sites, or 15 acres of property. The Chicago Green Corps provides technical and material support from 1994 through 2012.
Cleveland, OH	Green Infrastructure plan (2010)	Prevent 44M gallons of CSOs by infiltrating or diverting storm water using GI.	Northeast Ohio Regional Sewer District ("NEORSD"). (Land Bank, CDCs, Cleveland Urban Design Collaborative ("CUDC").	In 2010 EPA Consent Decree, NEORSD committed to spending at least $42M on GI to prevent 44 million gallons of CSOs.	Urban agriculture; other uses TBD. Green "leave behinds" plan (not related to GI Consent Order), a partnership between NEORSD, CUDC & the Cleveland Foundation, will identify potential green spaces physically above grey infrastructure deep tunnels.	Preliminary site selection criteria include large parcels of land, areas where gray infrastructure does not eliminate CSOs, and properties that could potentially divert storm water runoff away from the CSOs system. NEORSD is conducting outreach with CDCs for each potential site.	NEORSD plans to acquire strategically located properties.	NEORSD plans to own the properties.	NEORSD may partner with the Cleveland Botanic Garden's youth-based Green Corps program.

Case	Program (yr. initiated)	Goals	Project lead (key partners)	Regulatory context	Green space uses	Planning strategy	Acquisition & transfer mechanisms	Preservation	Maintenance
Detroit, MI	GI plan (2011)	Reduce storm water flow into the combined sewer system using GI.	SEMCOG & the Detroit Water and Sewage Department. (The Greening of Detroit, local, state, and federal public agencies, universities, utilities, and non-profit organizations across seven counties).	Through 2011 EPA CSO Consent Order, the Detroit Water and Sewerage Department (DWSD) committed to spending $50M through 2030 to construct and maintain green infrastructure.	Specific uses TBD. May green vacant land (a) next to major roadways; (b) on a lot-by-lot basis; and (c) on a large scale through site aggregation. DWSD spent $1M to demolish 140 abandoned buildings on privately owned strategic sites.	SEMCOG facilitates collaboration among stakeholders to identify potential sites. After identifying potential greening opportunities, SEMCOG will model scenarios estimating the potential impact of greening vacant land on storm water volume capture and develop a decision matrix based on potential outcomes.	TBD	TBD	In short term: The DWSD, SEMCOG, the Michigan Land Bank & The Greening of Detroit will pilot vacant lot treatments and develop cost-benefit comparisons for installation and maintenance. In long-term, three considerations: 1) The City of Detroit's General Services Department (GSD) could perform "window pane" cutting along the edges of greened sites at no charge to the DWSD. 2) The DWSD could develop an MOU that includes a financial agreement with the GSD for higher levels of maintenance services. 3) The DSWD could develop a maintenance agreement with an outside contractor.
Detroit, MI	The Greening of Detroit (1989)	Increase vegetative cover and improve communities in Detroit.	The Greening of Detroit. (Community organizations & residents, public agencies, university researchers).	None.	Appx. 1400 vacant lots greened and maintained, appx.1400 family, school and community vegetable gardens developed, and 80,000+ trees planted.	For urban reforestation program, utilizes GIS to ensure each planting maximizes ecosystems services, as well as social considerations.	City "dollar lot" program for publically owned properties provides annual gardening permit.	None.	1) Green Corps youth program maintains trees for three years after planting. 2) Professional crew cares for greenway and community parks. 3) Clean and Green program greens, cleans and maintains vacant lots and vegetation in transitional neighborhoods.
Genesee County, MI	Genesee County Land Bank Authority (2002)	Acquire, manage & dispose of foreclosed properties for public benefit, including urban redevelopment and the greening of vacant lots.	Genesee County Land Bank Authority (the "Land Bank"). (Citizens' Advisory Committee; local neighborhood groups including book clubs, greening organizations, and churches).	State-enabling legislation in 2004 permitted land bank authorities. 2002 State legislation permitted the aggregation of many delinquent properties ("bundling) through expedited judicial proceedings. Expansion of state brownfields law defined land bank-owned properties as brownfields.	Community gardens, urban agriculture, side yards. Through Clean & Green program, *Signature Greening* projects demonstrate new greening practices, including low-maintenance plantings and pocket parks.	The Land Bank works with community organizations & residents to identify and prioritize sites to green. The Land Bank also has an application process that ensures active local stakeholders receive land it leases and disposes, reducing speculation.	The Land Bank acquires appx. 700 to 1000 low-value and high-value properties through Sherriff's Sale proceedings each year. The Land Bank provides 1- year leases, and 2-through 5-year leases (including option to purchase) to greening groups. Through its side yard program, the Land Bank sells side lots to local residents for $1.	Lease agreements cannot be revoked during lease term.	The Land Bank maintained over 1300 vacant lots it owned in 2011 through Clean and Green (C&G) program. C&G program provides stipends and support to local neighborhood groups who care for vacant lots. The Land Bank also partners with the Mott Workforce Development Program to maintain its vacant lots and abandoned buildings. The Land Bank partners with City of Flint to maintain more than 20,000 properties it does not own twice annually.

Case	Program (yr. initiated)	Goals	Project lead (key partners)	Regulatory context	Green space uses	Planning strategy	Acquisition & transfer mechanisms	Preservation	Maintenance
Milwaukee, WI	Menomonee Valley Industrial Center (MVIC) (1998)	Redevelop 133-acre brownfield site for economic development, environmental and community benefit.	The Redevelopment Authority of the City of Milwaukee (RACM), the Menomonee Valley Partnership, Inc. (MVP), the 16th St. Community Health Center. (The Milwaukee Metropolitan Sewerage District ("MMSD"), the Milwaukee Dept of Public Works ("DPW"), other regulators, businesses, community, environmental, and labor organizations.)	The MMSD was not under consent order but wanted to avoid relying on CSO system. The DPW provides up to a 60% storm water fee reduction for on-site management.	A 30-acre storm water treatment train integrated into a 40-acre public park with passive and active recreational uses, including the Hank Aaron State Trail and space for environmental education. A 63-acre industrial center with 8 of 13 parcels occupied provides 1100+ jobs.	Early collaboration between public, non-profit and private stakeholders advanced environmental and economic development principles. Early input from water agencies and an international design competition helped to develop centralized green infrastructure design.	RACM purchased 133-acre site from private owner for $6.8M.	Above ground infrastructure of treatment train is owned by MVIC businesses through an easement agreement w. RACM; below ground infrastructure is owned by the DPW.	Easement agreement provides SW credit rights to MVIC businesses for adjacent SW treatment train. In exchange, businesses agree to fund maintenance of the treatment train (appx. 50,000/yr.) -- a financial "net zero" after receiving the SW credit. RACM remains responsible for conducting or hiring a contractor to conduct maintenance to a specified standard.
New Orleans, LA	Greater New Orleans Water Management Strategy (2012)	Mitigate potential impacts of natural disasters and subsidence by creating green space and encouraging infiltration throughout multiple Parishes.	A joint American and Dutch design and engineering team led by Waggoner & Ball Architects is conducting the analysis. The Greater New Orleans, Inc., the economic alliance for Southeast Louisiana, is administering the analysis.	TBD	TBD -- considering network of smaller greened spaces connecting streets and neighborhoods.	1. Develop regional framework for analyzing green vs. conventional infrastructure; 2) Overlay topography, soil and drainage maps; 3) Quantify costs of street and home repair due to subsidence vs. costs and benefits of GI; 4) Identify opportunities for collaboration among parishes; 5) Develop GI district plans and financing and implementation strategies.	TBD	TBD	TBD
New Orleans, LA	Pontilly Stormwater Hazard Mitigation Project (the "Pontilly Project") (2012)	Mitigate potential impacts of natural disasters and subsidence by creating green space and encouraging infiltration in key areas throughout the Pontilly neighborhood.	New Orleans Redevelopment Authority ("NORA"). (Pontilly Disaster Collaborative and the Pontchartrain Park Community Development Corporation).	TBD	TBD. Modeled uses included storm water lots & parks, which could function as wetlands or dry ponds. Neighborhood Livability Analysis considered networks of small green spaces enhancing quality of life while managing storm water.	Modeled potential impact of green infrastructure interventions on disaster mitigation in Pontilly. The study's three scenarios considered several potential re-uses of vacant lots.	NORA manages and disposes of vacant land received through the LA State Road Home-Homeowner Assistance Program. NORA received appx. 3,100 properties from the State in June 2012; around 175 lots in the Pontilly neighborhood remain in NORA's inventory. Priority privately owned vacant land could potentially be purchased.	TBD	TBD
New York, NY	Community Gardens (1999 & earlier)	Provide permanent space and support to community gardeners.	The New York Restoration Project (NYRP), the Trust for Public Land (TPL), the GreenThumb program of the NYC Parks Dept. ("GreenThumb").	See "protection strategy."	114 community gardens through TPL & NYRP. More than 600 community gardens are registered with GreenThumb (of over 1000 citywide).	None.	NYRP & TPL purchased 114 community gardens in 1999 from City of New York, which threatened to develop the sites as housing. The TPL incubated three local land trusts (Bronx Land Trust, Manhattan Land Trust, & Brooklyn Queens Land Trust) based on community interest.	Land trust ownership ensures permanent preservation. Hundreds of publically owned community gardens in NYC are protected through a Memorandum of Agreement with the NYS Attorney General.	Community gardeners, with support from GreenThumb, NYRP & other greening groups, conduct maintenance.

Case	Program (yr. initiated)	Goals	Project lead (key partners)	Regulatory context	Green space uses	Planning strategy	Acquisition & transfer mechanisms	Preservation	Maintenance
New York, NY	Staten Island Bluebelt (1989)	Manage storm water runoff in separately sewered area.	NYC Dept of Environmental Protection ("DEP"). (NYC Dept of Citywide Administrative Services & Legal Dept)	Meets MS4 requirements.	Appx. 400 acres of wetlands, many with public access.	Cost-benefit analyses indicated the Bluebelt system was more cost effective than a system relying only on grey infrastructure.	90% of sites acquired through eminent domain, totaling appx 325 acres. DEP acquired Between 50 and 100 acres through MOUs with NYS agencies.	DEP owns the Bluebelt properties.	DEP funds and conducts maintenance.
Seattle, WA	Comprehensive Park & Recreation plans (1988)	Increase open space and recreation opportunities citywide.	Seattle Department of Parks & Recreation ("DPR"). (City Council; Pro Parks Citizens' Planning Committee; various citizens' advisory and oversight committees; 38 neighborhood citizen planning groups).	1988 local ordinance required DPR to develop and fund a comprehensive parks & recreation plan. State legislation required local comprehensive planning for green space. Periodic local property tax levies passed as ballot initiatives.	Parks, trails, community gardens, and other green spaces.	Seattle DPR coordinated the parks planning with the citywide comprehensive plan, which included 38 neighborhood-based plans developed by community organizations. Gap analysis reports were prepared to assist the selection of acquisition sites. By working with community organizations, the plans and associated levy proposals garnered broad support.	Sites to acquire were identified in a parks plan and cross referenced with the Gap Analysis reports, which identified areas lacking green and open spaces. Community organizations can nominate sites for acquisition from the 38 neighborhood-based plans.	Sites owned by DPR	Maintenance provided by DPR.
Tallahassee & Leon County, FL	Capital Cascade Trail (1999)	Mitigate flooding, protect drinking water supply, and improve social well-being of city & county.	Blueprint 2000 agency, City of Tallahassee & Leon County agencies. (Citizens' Advisory Committee; Technical Advisory Committee; other City, State & Federal agencies; neighborhood partners for trail segments).	Capital Cascade Park meets State and Federal cleanup requirements. State-mandated Tallahassee-Leon County Comprehensive Plan states that local governments should seek to incorporate floodplains and natural drainage ways into their joint greenway network.	Greenway with pedestrian and bike lanes, public parks, interactive cascade fountain, playground, walking and fitness trails, Korean War Memorial, commemoration to former "Smokey Hollows" community, and other uses.	Citizens' Economic and Environmental Consensus Committee developed proposal with City & County agency staffs for greening sites throughout County. Countywide Greenways Master Plan and City & County brownfield planning supported Capital Cascade Trail plan. Continued partnership with Blueprint 2000 Citizens' Advisory Committee and Technical Advisory Committee, comprised of key agency staff.	Three key transfer components: (1) Transfer of State-owned land to City agencies. (2) Blueprint 2000 purchases vacant and occupied privately owned properties from owners. When necessary, rather than entering eminent domain proceedings, as-of-right rule allows public agencies to offer to 130% of assessed value for property. (3) Blueprint 2000 assembles land and owns through construction. Subsequently, Blueprint 2000 transfers the land to local public agencies.	Local public agencies own green spaces in the long-term.	Multiple City & County agencies will conduct maintenance.

This matrix reflects information provided in this study's 10 cases. Scopes of activities led by agencies may extend beyond what is provided in this matrix or the cases.

Keys
TBD = To be determined
GI = Green infrastructure
CSO = Combined sewer overflow
GIS = Geographic Information Systems

C.2. Financing Matrix

Case	Program	Planning	Acquisition / Construction	Maintenance
Baltimore, MD	Watershed 263 pilot project	N/A	N/A	The Parks & People Foundation uses public & foundation grants when possible.
Chicago, IL	Chicago CitySpace plan	The Chicago Community Trust supported the development of the CitySpace plan.	(1) The Chicago Park District (CPD) receives a dedicated share of property taxes, selling appx. 30M to 40M in bonds for capital projects each year; (2) CPD raised $53M in Tax Increment Financing from 2006 through 2010; (3) The Open Space Impact Fee on new residential units has raised $53M for the Chicago Department of Community Development's greening projects since 1998.	(1) The CPD uses concession revenues & other funding for maintenance; (2) The Chicago Department of Community Development, CPD & Forest Preserve District of Cook County equally provide $100k ($300k total) each year to NeighborSpace, a land trust, through a 22-yr inter-governmental agreement.
Cleveland, OH	GI plan	The Cleveland Foundation supports the planning of the "Leave Behinds" plan to construct green space above grey infrastructure tunnels. (Not related to the NEORSD GI Consent Order commitment).	A minimum of $42M of NEORSD ratepayer funds will support the design, construction & maintenance of GI.	NEORSD ratepayer funds will support maintenance. 10% of capital costs will be committed to annual operations & maintenance.
Detroit, MI	GI plan	Site acquisition, demolition, construction, & maintenance will be allocated from the DWSD's ratepayer-supported $50M GI Consent Order commitment. DWSD spent $1M to demolish 140 abandoned buildings on privately owned stragegic sites.		
Detroit, MI	The Greening of Detroit	N/A	The Greening received four grants through the Great Lakes Restoration Initiative (GLRI), worth a total of $2,093,000, for its New Growth Forest Initiative that seeks to achieve storm water management goals.	$1M in maintenance funding provided by corporations, foundations and the State Youth Employment Program.
Genesee County, MI	Genesee County Land Bank Authority	80% of the Land Bank's $3.6M 2012 budget derived from property sales. Planning and community outreach are funded by the Mott Foundation.	A $10.7M Federal HUD NSP2 grant supports rehabilitation projects. $13M in Tax Increment Financing for commercial redevelopment, housing rehab and demolition projects through the State brownfields program. All land bank-owned properties are defined as brownfields by State law.	The Land Reutilization Fund, supported by fees on foreclosed properties, provided $458k in maintenance funding in 2012. $1.3M in maintenance funding was cut by County Board of Commissioners in 2011.
Milwaukee, WI	Menomonee Valley Industrial Center	N/A	Acquisition: $5.3M provided by the Redevelopment Authority of the City of Milwaukee (RACM) & $1.5M forgivable loan by the Milwaukee Economic Development Corporation. Construction: A $16M Tax Increment District provided the majority of construction funding, including most storm water treatment train costs. The EPA & Wisconsin Dept of Natural Resources each provided appx. 125k in grants toward the construction of the $2M storm water treatment train. RACM raised an additional $14 million from 20 local, state, and federal grants and numerous private donations.	MVIC businesses, who will receive SW credits for the treatment train through an easement agreement, will provide appx. 50k/yr. for the maintenance. This funding is "net zero" for the businesses because it is approximately the value of the SW credits provided through the easement agreement.
New Orleans, LA	Pontilly Storm water Hazard Mitigation Project (the "Pontilly Project")	NORA awarded $15M through FEMA's Hazard Mitigation Program. $1.5M is dedicated to planning.	The remaining $13.5M will be dedicated to implementation, pending the development of long-term ownership and maintenance plans for greened sites.	TBD.
New Orleans, LA	Greater New Orleans Water Management Strategy	A $2.5 million grant from the Louisiana Office of Community Development and the U.S. Department of Housing and Urban Development supports this initiative.	TBD.	TBD.
New York, NY	NYC Community Gardens	None.	The Trust for Public Land & the New York Restoration Project (NYRP) paid $4.2M for 114 community gardens.	NYRP's $2.5M endowment provides appx. 60k to 100k/yr. for maintenance. Federal CDBG & City funding provide appx. 650k to 700k/yr. for the GreenThumb program of the NYC Dept of Parks & Recreation.

Case	Program	Planning	Acquisition / Construction	Maintenance
New York, NY	Staten Island Bluebelt	N/A	The NYC Dept of Environmental Protection spent $72M on acquisition (purchasing properties via eminent domain) between FY 2002 & FY 2011, using ratepayer funds.	$700k in annual maintenance, using DEP ratepayer funds.
Seattle, WA	Comprehensive Park & Recreation plans	N/A	The 2000 Pro Parks Levy (a property tax levy) provided $198.2M for more than 100 development and acquisition projects, recreation programs, and maintenance. The Seattle Dept of Parks & Rec. leveraged $21M from City, County and State grants and private donations. The 2008 Parks Levy only allocated funds for capital projects.	The 2000 Pro Parks Levy included $60M for stewardship, maintenance & programming. The 2008 Parks Levy did not allocate funds for operations or maintenance. A $14M reallocation of this fund for major maintenance projects, from the "inflation adjustment" category, occurred in 2011.
Tallahassee & Leon County, FL	Capital Cascade Trail	A 1% "extra penny" sales tax provided the Blueprint 2000 agency with $198M from 2004 through 2011 for the project management, acquisition and construction of numerous environmental and transportation projects. Blueprint sold $145M in bonds during this timeframe. The Capital Cascade Trail will cost $80M to construct, with the vast majority of funding from the 1% sales tax. Some Federal and State grants, and private donations, are supporting the trail's development.		TBD. For Capital Cascade Park, one segment of the trail, events may provide one source of maintenance funding.

Key
N/A = Not available
TBD = To be determined
GI = Green infrastructure