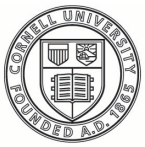

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Building the Blue Economy: Opportunities for Community-Based Organizations in Stormwater Management

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Abstract

The United States has a serious problem with combined sewer overflows. In responding to this environmental and public health menace, many regions are using innovative “green infrastructure” or “blue economy” approaches in addition to traditional “gray infrastructure” such as pipes and reservoirs. These new methods offer many environmental benefits and cost efficiencies and can be a potent source of jobs – including entry level jobs.

This report outlines ways for community-based organizations to seize these opportunities, both by advocating for green infrastructure and by developing social enterprises that do stormwater management work at a neighborhood level. It is designed for non-profit groups, policy makers, and funders interested in the intersection of sustainability, neighborhood redevelopment, and job creation and the possibility of a triple win in all three areas.

BUILDING THE BLUE ECONOMY

Opportunities for Community-Based Organizations in Stormwater Management

A Report from **PUSH Buffalo** and **The Partnership for the Public Good**

By Sam Magavern, Tina Meyers, Jen Kaminsky, and Sarah Maurer

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Executive Summary

The United States has a serious problem with combined sewer overflows. In responding to this environmental and public health menace, many regions are using innovative "green infrastructure" or "blue economy" approaches in addition to traditional "gray infrastructure" such as pipes and reservoirs. These new methods offer many environmental benefits and cost efficiencies and can be a potent source of jobs – including entry level jobs.

This report outlines ways for community-based organizations to seize these opportunities, both by advocating for green infrastructure and by developing social enterprises that do stormwater management work at a neighborhood level. It is designed for non-profit groups, policy makers, and funders interested in the intersection of sustainability, neighborhood redevelopment, and job creation and the possibility of a triple win in all three areas.

Introduction: Raw Sewage in our Water

Many people are surprised – and disgusted – to learn that their city discharges large amounts of raw sewage into local lakes and rivers whenever it rains more than a trace amount. But that is exactly what happens in many cities; in Buffalo, for example, it happens over 50 times each year. In fact, sewer overflows contaminate the nation's waters with some 860 billion gallons of sewage per year – enough to cover the state of Pennsylvania with an inch of sewage.[i] The U.S. Environmental Protection Agency (EPA) has estimated that up to 3.5 million people get sick every year from swimming in waters contaminated by sewer overflows.[ii]

Older cities such as Buffalo tend to have combined sewer systems, in which the sanitary sewage flows into the same pipes as the stormwater that enters from streets, parking lots, and the gutters and downspouts of buildings. The pipes and tunnels lead to sewage treatment plants. On dry days, all of the sanitary sewage can be treated at the plants. On wet days, however, the combination of the sanitary sewage and stormwater is too much for the treatment plant to handle, and so the combined sewage is discharged directly into local rivers and lakes through combined sewer outflows. In Buffalo, for example, the sewage plant can fully treat up to 300 million gallons per day (MGD) and partially treat up to 600 MGD. That works fine on dry days, with an average sanitary sewage flow of 150 MGD. But

an inch of rain or melting snow produces an additional 590.5 MGD, resulting in massive sewage discharges.[iii]

Rain garden on Rhode Island Street, Buffalo, New York

Solving the problem of sewer overflows is one of the great environmental challenges of our era. In the nation, 772 municipalities containing some 40 million people have combined sewer systems, and they discharge raw sewage about 43,000 times per year.[iv] The sewer discharges are illegal under the federal Clean Water Act and many state laws, and the EPA and state environmental departments have been steadily moving to bring sewer authorities around the nation into compliance. Sewer authorities can address the problem in three main ways. First, they can separate out the sewer systems. The main drawback of this approach is that it allows the stormwater to enter waterways untreated, and stormwater picks up many pollutants as it flows through fields, lawns, streets, and highways. Second, they can build large reservoirs to hold the combined sewage in reserve until the sewage treatment plant can process it. This approach is very expensive, and it does not address the damage that stormwater does before entering sewage systems through erosion, flooding, and surface water contamination.

The third solution is green infrastructure, which keeps stormwater out of the sewer system in the first place through techniques such as rain gardens, permeable pavement, rain barrels, green roofs, bioswales, and increased plantings. Used correctly, green infrastructure can save taxpayer money and yet create more jobs than traditional "gray" infrastructure techniques. New York City estimates that its green infrastructure plan will reduce sewer overflows by 2 billion gallons over 20 years while costing $1.5 billion less than a purely "grey infrastructure" strategy.[v] Philadelphia estimates that its investment of $1.6 billion in improving its water quality will lead to 15,266 direct green collar jobs.[vi] Green infrastructure can also offer a panoply of co-benefits to the environment and the community – improving air quality, beautifying neighborhoods, reducing hot summer temperatures, conserving water, and more.

The rapid emergence of green infrastructure as a preferred solution to sewer overflow offers a window of opportunity to community development corporations, job training programs,

and other non-profit groups working to better their communities. For many place-based organizations working in neighborhoods where employment and capital are scarce and environmental hazards are plentiful, the ideal initiative is a social enterprise that employs local residents to make their communities healthier and more prosperous. Green infrastructure offers one of the most promising arenas to achieve this kind of double victory. This report, using Buffalo as its primary case study, explores some of the challenges and winning strategies involved in advocating for and implementing green infrastructure solutions at a neighborhood level.

POLICY ADVOCACY

Bringing green infrastructure to your city and neighborhood probably will require determined, well-informed policy advocacy. In other words, it is unlikely that neighborhood-based green infrastructure projects and jobs will simply appear through the normal course of business. Here are some possible elements of an advocacy campaign:

Clean Water Plans

Find out what stage your local sewer authority is at in its clean water planning. First, determine whether the authority is negotiating with the EPA and/or a state agency about coming into compliance with the Clean Water Act – about one fifth of localities with combined sewer systems still lack enforceable clean water plans.[vii] If so, you can push for green infrastructure to be a major part of the solution – as reflected in the funding plans. For a local sewer authority, large-scale gray infrastructure solutions will often seem more comfortable, familiar, reliable, and predictable. But you can come armed with examples from cities such as Philadelphia and New York of green infrastructure as the most cost effective solution. In part, this will require simply sharing information about best practices and new techniques. But in large part, this advocacy requires you to reframe the cost-benefit analysis to be more complete: to include all the environmental harms that grey infrastructure does not address and all the co-benefits of using green infrastructure. Many tools for this more complete cost-benefit analysis already exist, including case studies from other cities and the "Green Values Calculator,"[viii] With these tools, you will be able to show – for example – that planting trees and gardens to help control stormwater will produce many quantifiable benefits that pipes and reservoirs will not.[ix] In Buffalo, Buffalo Niagara Riverkeeper was able to play a key role in the negotiations over the Buffalo Sewer Authority's clean water plan and to persuade the Authority to embrace green alternatives – including a series of pilot projects that will measure precisely how much stormwater is being diverted.

High Road Standards and Community Benefits

In advocating for water infrastructure, advocates should consider policies governing who does the public sector installation and maintenance work. A locality might simply bid out work to the lowest bidder with landscaping experience, without consideration of whether the bidder has green infrastructure training and experience or whether it pays its workers a living wage. Thus, you may want to advocate that a certain level of expertise be required and that an RFP process that includes social goals be used, rather than simply awarding work to the lowest bidder. Portland's Verde Landscape Program, a social enterprise, has found it hard to compete with private contractors unless the project requires goals such as workforce training and diversity, or specialized knowledge of native plants and green infrastructure.

PUSH Blue crew working on green infrastructure in Buffalo's west side

More broadly, if a region is making a large investment in infrastructure, the public money should be spent in ways that maximize the benefits to the community, rather than simply increasing the profit margins of a few favored developers and contractors. In other words, the projects should be "high road" rather than "low road." As Green for All summarizes the relevant high road standards, they include paying living wages, hiring workers from disadvantaged communities, providing quality, affordable health insurance, employer funded retirement plans, paid sick leave, and, of course, complying with tax and labor laws.[x] One way to achieve the high road is to reach a community benefits agreement with the agency in charge.[xi] Another way is to seek legislation or policies that incorporate the high road standards.[xii] Some good examples can be found in green energy work done in New York, Milwaukee, and Portland. For example, Portland's Clean Energy Works project includes a Community Workforce Agreement with provisions such as:

- **Local Hire.** 80% of workers must be local.
- **Family Supporting Jobs.** Workers must earn at least 180% of minimum wage.
- **Diverse Workforce.** Disadvantaged workers such as people of color, women, and low income city residents must perform at least 30% of the trades and technical project hours
- **Diverse Businesses.** Minority and women owned businesses must account for at least 20% of the dollars in the project.

Municipal Codes, Plans, Specifications

A formal clean water plan is not the only opportunity to advocate for green infrastructure. Much of the success of green infrastructure in a city will depend on its approach to land use, building codes, and public works. For example, some cities have **"Complete Streets"** ordinances which require that, whenever the city builds a new street or renovates an old one, it is designed not just for vehicles but also for pedestrians, bicycles, and the environment – which can include stormwater management tools like planting more trees and vegetation by the streets and diverting water from gutters into bioswales and rain gardens.

After a city passes a Complete Streets ordinance, advocacy, education, and relationship building may still be necessary to make sure that it is implemented fully. In Buffalo, the non-profit group GOBike Buffalo not only persuaded the city to pass a Complete Streets law, but worked diligently to help public works personnel become familiar and comfortable with green streets strategies, showing them successful projects from other cities; if not for this effort, the ordinance may have remained a dead letter. Meanwhile, Buffalo Niagara Riverkeeper advocated successfully with the city and sewer authority to create a pilot project on a number of streets employing different strategies such as permeable paving and bioswales.

Another key issue is how the local building code handles **downspouts**. Does it require that they be connected to the sewer system, does it allow for disconnects, or does it even incentivize or require disconnects? In Buffalo, the code required connected downspouts until Buffalo Niagara Riverkeeper advocated for an amendment to allow for disconnects. Toronto began a mandatory downspout disconnection program in 2011.[xiii] In Portland, the City began an active downspout disconnection program in 1993, using door-to-door canvassing and financial incentives. By 2011, over 56,000 downspouts had been disconnected, removing more than 1.3 billion gallons of stormwater from the sewers per year.[xiv]

What does the code require for **large new projects**? Ideally, the state or municipality should require that development manage a certain amount of rainfall on site, rather than sending it into the sewers. Pittsburgh requires that new developments and redevelopments larger than 10,000 square feet manage the first inch of rainfall on-site with green infrastructure. Similar laws exist in Philadelphia, South Carolina, New Jersey, New Hampshire, West Virginia, and Tennessee.[xv] What does the code require for parking lots and other large impervious surfaces? No parking lot should be built or renovated without including green infrastructure, which will make it much more attractive as well as much more environmentally friendly.

Advocates should examine **zoning codes and land use policies** to make sure that they are friendly toward rain gardens, community gardens, pocket parks, urban farms, and other uses that are likely to employ or harmonize with green infrastructure projects. In cities such as Buffalo, where demolitions of vacant buildings are very common, community groups should also pay attention to the laws and specifications regarding demolition – to see, for example, what type of backfilling is allowed and whether the demolition contractor is required to re-seed the lot. Ideally, each vacant lot would be cleaned, graded, and planted so as to capture stormwater instead of letting it escape to the streets. In reality, however, vacant lots are often left with rubble and clay forming a largely impervious surface that does not absorb rain and snow.

Fees, Incentives, and Funding

Some green infrastructure work will be done by sewer authorities and other government actors or commissioned by them as they implement their clean water plans and policies. Advocacy by community groups will help determine how much of that work gets done and who does it. Equally important will be the work done by private businesses and residents in response to the regulations and the incentive structure that localities create. The more that public policy incentivizes green infrastructure work, the more projects and jobs there will be for community groups to compete for.

Ideally, to create the proper incentives, a locality should have a separate stormwater utility fee based on the amount of stormwater sewage a property generates. In most localities, businesses and residents do not pay a fee that reflects usage; rather, their sewer bill is based on their water consumption or property tax bill. Thus, they lack a financial incentive to use green infrastructure instead of directing stormwater into the sewage system. To redress this problem, many regions now bill separately for stormwater sewer service, based on the amount of impervious surface at a property. Customers who reduce impervious surface or institute other green measures can reduce their fees. Disparate cities such as Kansas City, Nashville, Philadelphia, Portland, Seattle, and Washington D.C. have taken this

approach.[xvi] Once this fee structure is in place, it also becomes possible to develop innovative financing mechanisms, similar to those used in the green energy field, in which future savings on utility fees are used to finance the upfront investments needed to install green infrastructure. None of this works, of course, unless the fee and the discounts are large enough to reflect true social/environmental costs and hence actually motivate green projects.

Even without a separate stormwater fee, there are still many incentives and programs a city can develop to encourage green infrastructure. Some cities, such as Chicago, reduce permitting fees or fast-track the permitting process for developments that include green features. Many cities offer grants or loans for green infrastructure projects; even the relatively small and fiscally challenged city of Syracuse offers a $3 million Green Improvement Fund for stormwater projects as part of its negotiated clean water plan.[xvii] New York offers property tax abatements of $4.50 per square foot, up to $100,000, for properties with roofs at least 50% green and with maintenance plans.[xviii] Many cities also offer free or discounted rain barrels and/or native plants for green projects.

Advocates may ask their municipality to float bonds and/or raise utility fees to finance green infrastructure work. In some cases, this may require a referendum; for example, in 2004 Los Angeles voters approved bonding of up to $500 million for water quality, flood protection, water conservation, and habitat preservation.[xix] Because interest rates are at historic lows, now is a good time for municipalities to bond for public works. On the other hand, bonding and increased fees put the burden on all taxpayers, regardless of their contribution to stormwater problems, so they are neither as equitable nor as effective as separate stormwater fees and credits.

DEVELOPING A PROGRAM

Once advocacy has helped to create a market for green infrastructure, the next step is to develop a program or social enterprise to seize the new opportunities to construct and maintain the projects. And, in doing so, community groups and non-profits have a number of potential focal points.

Community Education and Labor Market Intermediaries

One of the cornerstones of green infrastructure is educating the community about it.[xx] In Portland, the downspout disconnection program included door to door canvassing. In

PUSH Blue team works on plantings for a rain garden

Howard County's READY program, summer workers do not just install rain gardens, they also make community presentations about them. Community education can help build the market for green infrastructure services in two ways: first, by educating the public on the environmental harms of sewer overflows and the proper ways to reduce them; and, second, by showing residents, businesses, and institutions how good stormwater management can save them money over the long term with flood and erosion control, reduced water bills, and reduced sewer bills.

Community groups may win contracts from cities or authorities to provide workshops, manuals, classes, and one-on-one guidance. Some groups create demonstration projects so that residents can see green infrastructure in action. Cincinnati's Project Groundwork includes a Green Learning Station where people learn about rain barrels, pervious pavers, rain gardens, bioswales, green roofs, compost, natural insect and weed control, and the benefits of locally grown food.

In some situations, the most effective education may include one-on-one and small group methods. In Chicago, the Center for Neighborhood Technology has piloted a "Wetrofits" program in which it acts as a "labor market intermediary." CNT provides free home visits and assessments to owners experiencing flooding, identifies solutions, and then helps find an appropriate contractor and oversees the work. In Buffalo, PUSH has successfully used a similar model for its green energy work. PUSH has used "house parties" and similar methods to spread the word through trusted neighbors, as well as using door knocking, paid media, free media, and communications from elected officials.

Large Projects

A prime market for green infrastructure will be large scale projects at universities, hospitals, public schools, religious institutions, affordable and public housing developments, and other developments. In addition to featuring multiple buildings and green spaces, these

larger developments tend to have large parking lots – a very ripe field for green infrastructure. Of particular interest will be projects with large public or non-profit components, where the work may already be subject to prevailing wage requirements, local hire requirements, and mission-driven criteria that could give social enterprises an edge over for-profit contractors, or at least help to level the playing field. One strategy, employed by Verde in Portland, is to get certified as a Section 3 business that employs local, low-income residents; this designation offers an advantage in bidding for any work funded by the federal department of Housing and Urban Development (HUD).

Houses and Small Businesses

Work at the residential and small business scale may include installing and maintaining rain gardens and rain barrels and disconnecting downspouts. In general, the market of private residences and small businesses will be hard to crack, given the competition from private landscapers who often pay minimum wages and no benefits to their workers. However, community development corporations that develop affordable housing may be able to add a green infrastructure division that begins by working on the CDC's own projects, branches out to serve other CDCs and affordable housing developers and institutions, and eventually gains enough strength to compete in the private market.

One approach to the residential market is to target a specific neighborhood – a key to success in Minneapolis' Metro Blooms project, which involved 230 community members in the installation of 125 rain gardens.[xxi] A tight geographic focus can have many benefits. It can help marketing by creating a neighborhood "buzz" and by making it easy for residents to see their neighbors pursuing green solutions. It heightens the ability to measure and prove results in reducing overflows. Especially when paired with targeted investment in housing rehabilitation and infrastructure, focusing work can help a neighborhood revitalize itself and reduce a downward spiral of disinvestment and replace it with a virtuous cycle of reinvestment and rising property values. In Buffalo, PUSH's Green Development Zone is succeeding in doing exactly that.

Green Roofs

Green roofs include a vegetative layer in a specially designed soil on top of a drainage layer. The New York City Green Infrastructure plan notes, green roofs can reduce the run-off from buildings by 54% and also absorb air and noise pollution, insulate buildings from heat and cold, and increase quality of life. Some social enterprises include green roof construction and maintenance in their programs. PUSH Blue, for example, plans to install two green

roofs in its target neighborhood. DC Greenworks has green roofs as a major focus, having installed some 70 green roofs thus far.

Vacant Lots and Trees

Cities that have experienced sharp population declines tend to have large numbers of vacant lots – often owned by the city itself, due to tax foreclosure. Buffalo, for example, contains over 10,000 vacant lots, of which almost half are owned by the city. Greening, improving, and maintaining these lots is one of the lowest cost improvements a city can make, and it can be a source of entry-level jobs. In Buffalo, much of the city's vacant lot maintenance is contracted out to the Center for Employment Opportunities, which works with people returning from incarceration.

The Pennsylvania Horticultural Society's LandCare program has renovated thousands of properties in the last decade: removing debris, importing topsoil as necessary, planting grass and trees, installing simple wooden railings, and performing bi-weekly maintenance during summer months. PHS estimates its costs at roughly $1,250 to clean and green a property and $150 per year to maintain it.

De-paving a vacant lot to implement a rain garden

Even the most basic clean and green lot improves rainwater retention by planting grass and trees. Making the lot slightly concave, so that water flows into the lot instead of out onto the street, can further decrease runoff. Additional planting, grading, and other techniques can be added in key locations, and, in the case of vacant lots next to buildings, the downspouts of the buildings can be routed into the green lot instead of into the sewer system. PUSH has used this technique on some of the vacant lots it owns, persuading the neighboring property owners to disconnect their downspouts.

Many cities are moving aggressively to plant more trees to soak up air pollution, reduce the urban heat island effect, and beautify neighborhoods – as well as to soak up stormwater and remove pollutants from it. A mature deciduous tree intercepts 500 to 700 gallons of water per year, and mature evergreens intercept more than 4,000 gallons.[xxii] Community groups may be able to win contracts with cities to plant some of the trees being added to

boulevards and public spaces. In Portland, Verde successfully advocated for the city to incorporate high road requirements in its bidding out of tree planting work.

Social enterprises can also target green infrastructure jobs farther up the supply chain – not just in installation and maintenance. The Pennsylvania Horticultural Society has created a Roots to Reentry program in which prison inmates grow seedlings in a prison greenhouse and garden, while receiving 14 weeks of training in landscaping work.

JOB AND CAREER LATTICES

Green infrastructure offers distinctive opportunities and challenges for workforce development. Advocacy for green infrastructure can lead to the creation of more public sector jobs in two ways: first, by persuading the public to fund more infrastructure work, by demonstrating its value to public health and the environment; and, second, by shifting spending from grey infrastructure, which is more capital intensive, to green infrastructure, which is more labor intensive. Public sector jobs, even in landscaping, will tend to pay decent wages and benefits.

For non-profits seeking to create jobs and job training programs, green infrastructure is appealing because many of the jobs do not require advanced education or training. That advantage is linked to several challenges, however: competition from low-road employers and difficulty in moving to a private employer and up a career ladder into better paying jobs. Nationally, landscape workers, greenhouse workers, and pipelayers all earn an average of under $9 per hour.[xxiii] Another problem is that the work is fairly seasonal, particularly in northern parts of the country. On the other hand, landscaping is a growth field, with projected growth in many of the related jobs expected to top 20% through 2020.[xxiv]

Thus, green infrastructure lends itself fairly easily to short term jobs matched with training programs aimed at hard to employ populations such as ex-offenders or persons with very little job experience. The READY program in Howard County employed 31 youth for eight weeks, working in five to seven member crews, to build 31 rain gardens.[xxv] The Onondaga Earth Corps uses a conservation corps model, recruiting both youth and young adult crew

members from underserved neighborhoods. Each year, OEC hires seven adult crew members to work spring through fall at prevailing wage, and provides green infrastructure training, but also "wrap around" training in topics such as financial literacy, nutrition and wellness, and workplace professionalism.[xxvi] To help build career ladders, some programs have forged links with local community colleges or universities; for example, North Carolina State University's Best Management Practice program has a specialty in green infrastructure.

GETTING FUNDED

In the long term, funding for green infrastructure work will greatly depend on success in advocacy and public education – persuading local governments to prioritize clean water and to invest in green infrastructure over gray infrastructure, and getting a stormwater utility fee passed or creating other financial incentives for green solutions.

But even in an expanding market for green infrastructure work, social enterprises will still face stiff competition from private contractors, who may not offer decent wages and benefits, much less include career development, wrap around services, and the hiring of disadvantaged workers in their business plans. More revenue may be needed than private sector contracts can provide, although non-profits and faith groups can provide a good stream of clients, as Onondaga Earth Corps and Verde Landscaping have found. In addition to foundation and other private sources of funding, following are some potential funding streams to start a green infrastructure project and/or augment its program income.

Municipal or Sewer Authority Funding

In some cases, the entity trying to reduce its sewer overflows may contract with a social enterprise or make it a grant to do green infrastructure work. In Howard County's READY program, for example, the government funds the non-profit partner, who then provides free installation of rain gardens at non-profit and government owned locations.

EPA Funds

The EPA distributes federal funds to states for clean water revolving funds. Unfortunately, after receiving a one-time boost from the American Recovery and Reinvestment Act in 2009, the Clean Water SRF was cut deeply in 2011.[xxvii] The EPA also funds projects through its Community Action for a Renewed Environment (CARE), Section 319 funds, and Targeted Watersheds Grants.

In New York State, for example, the state's Environmental Facilities Corporation administers the Clean Water SRF and can also issue special obligation revenue bonds under its Industrial

Finance Program. In 2009, the EFC used ARRA money to start a Green Innovation Grant Program, which has since funded 121 projects with $92 million in grants.

Community Development Block Grants (CDBG)

The Community Development Block Grant (CDBG) program is a federal anti-poverty program run by the Department of Housing and Urban Development (HUD). It is designed to create sustainable communities by providing funds to improve the housing and shelter, living environment, and economic opportunities of people with low and moderate incomes.

CDBG funds are distributed by formula to 1,177 separate towns, cities and counties. Funds may be used for the prevention or elimination of slums or blight, or other community development activities that address an urgent threat to health or safety. At least 70% of the CDBG funds received by a jurisdiction must be spent to benefit people with low or moderate incomes. Buffalo, for example, receives roughly $14 million per year in CDBG funds, some of which it spends on its own activities, and some of which it distributes to local non-profits as sub-grantees. A green infrastructure program that improved low and moderate income neighborhoods would make a good use of CDBG funds, particularly if it employed local residents.

CONCLUSION: FORGING NEW PARTNERSHIPS

As can be seen from the discussion above and from the case studies that follow, pursuing green infrastructure work offers exciting possibilities for community based organizations, but it requires of them a diverse set of skills and, just as importantly, a diverse set of partners: typically in government, philanthropy, environmental advocacy, education, and workforce development. In Buffalo, for example, it was the environmental advocacy of Buffalo Niagara Riverkeeper and its allies that opened the door for green infrastructure; and Riverkeeper could not have succeeded without the strong relationships it built inside and outside of government. Once that door was opened, a grassroots, neighborhood based group, PUSH, was able to create opportunities for place-based social enterprise. But to do so, PUSH needed an extensive web of relationships itself – with neighborhood residents, funders, national allies, technical experts, and many more. The success of PUSH's efforts, like many others around the country, will depend in great measure on the strength of the partnerships it has forged.

IN DEPTH CASE STUDY: PUSH BLUE

Buffalo, like many older industrial cities, has a significant problem with combined sewer overflows. On Buffalo's West Side, sewage overflows into the Black Rock Canal and Scajaquada Creek, both part of the Niagara River Watershed, where many neighborhood residents swim and fish. The overflows, added to the legacy contamination from the area's industries, have made the Niagara River an Area of Concern for the International Joint Commission that governs the Great Lakes.

Health impacts range from gastrointestinal illness to rashes after water exposure. The region's public beaches automatically close whenever more than a half inch of rain falls, due to contamination from sewer outfalls, but many residents venture into the water outside of beach areas. In the City of Buffalo, where there are no public bathing beaches, young people frequently swim in unauthorized spaces, such as the Black Rock Canal at the foot of West Ferry Street – very near the outflow of the Albany Street CSO.

Other residents face even worse health impacts from eating fish out of the Niagara River – the third most popular freshwater fishery in the US. Fish consumption is a source of sustenance for many of the refugees and people with low incomes in the neighborhood. For residents of the West Side, addressing environmental issues such as combined sewer overflows is a matter of survival.

PUSH's Green Development Zone

The Green Development Zone (GDZ) includes innovative green technology demonstrations, green affordable housing construction, community-based renewable energy projects, housing weatherization, green jobs training and urban agriculture. It has demonstrated success as a strategy for expanding employment in a range of green jobs sectors while producing high-quality affordable housing; reducing housing vacancy; weatherizing homes; transforming vacant land and improving public infrastructure.

In March of 2012, the Environmental Protection Agency (EPA) notified the Buffalo Sewer Authority that it had violated its environmental permit issued by the New York State Department of Environmental Conservation (DEC) by not submitting a plan to address the 52 CSO's going into the Niagara River and its tributaries. Buffalo's 2004 Long Term Control Plan, the most recent version, incorporated many "grey infrastructure" strategies, such as separating pipes and increasing the size of pipes and treatment capacity. Both the EPA and

DEC encouraged the Buffalo Sewer Authority to incorporate various green infrastructure projects into their mitigation strategies. Buffalo Niagara Riverkeeper estimates that an aggressive green infrastructure program could reduce stormwater flow into the system by up to 45% during 95% of the region's water events. Such a reduction could bring the total flow down from 740 million gallons to 450 million, ensuring that the flow into the system would receive at least some level of treatment.

The PUSH Blue project involves a variety of storm water management interventions throughout PUSH's twenty-five block Green Development Zone on Buffalo's West Side. The project will include rain gardens and bioswales, downspout disconnects, stormwater harvesting for two large community gardens, passive irrigation for urban agriculture sites, permeable pavers, living walls, and green roofs on 25 PUSH-owned sites, as well as a rain barrel program for local property owners. The 25 projects will be done over the course of two years.

Practical steps to building a community-based Green Infrastructure (GI) team

- Hire locally and train crew in best practices of GI
- Secure capital equipment such as dump truck, wheel barrel, latter and hand tools
- Build partnerships with an engineer, plumber, city plumbing department, vacant land owners, public funder
- Gain access to vacant land (either through agreements or ownership)
- Perform assessment on planned GI site
- Install GI
- Create signage for installation to promote community awareness
- Maintain GI - mulch and water

PUSH has acquired 50 parcels of property in its Green Development Zone, ranging from vacant lots to vacant multi-unit structures. The majority of PUSH Blue project will be on these sites. Already, PUSH has developed rain gardens on some of its lots and has incorporated stormwater retention strategies, such as dry wells and downspout disconnections, on the housing it has developed. PUSH will also work with property owners of adjacent structures on downspout disconnections and will provide free rain barrels to aid in downspout disconnects for 200 houses throughout the neighborhood.

For the residents of those homes, PUSH Blue's work can have some added benefits. The downspout disconnection ensures that water is properly moved away from a house during a rain event. Many houses in Buffalo currently have wet basements due to cracked, broken, or

poorly planned sewer connections. Safely bringing that water away ensures that foundations are not undermined by stormwater. Homeowners also have a vacant lot next to their house beautified, which creates a more livable space for them as well as potentially increasing their property values. (Research in Philadelphia has shown marked increases in property values due to the cleaning and greening of nearby vacant lots.[xxviii]

PUSH Blue's Green Infrastructure Team on site

PUSH Blue is using these stormwater intervention initiatives not only to improve stormwater management, but also to create new job opportunities for neighborhood residents – a crucial step, given that, in the census tract that encompasses the majority of the Green Development Zone, the unemployment rate is nearly 20%, and the median household income is $16,000 per year, with 28% earning less than $10,000 per year.[xxix]

PUSH currently employs a landscape crew to develop and maintain its various properties. PUSH Blue's team includes two workers from the existing landscape crew, plus four new hires. To recruit the new hires, PUSH held a green jobs fair, did door knocking throughout the entire green development zone, and flyered businesses, as well as doing traditional job posting.

All employees have received OSHA training and have visited green infrastructure installations around the city, but most of the training is on the job. Many of the skills gained are basic landscaping/hardscaping skills with some adaptations focused on stormwater capture and infiltration. The crew has learned to use a laser level, proper excavating techniques, safe excavator operation, safe trucking and dump-trailer operation, gutter installation and repair, fence building, paver installation, light construction, horticulture with a focus on organic techniques and use of native species. The crew staff also receives opportunities for community building and leadership development.

Steps in a Typical PUSH Blue Project

- Engineering of project
- Get neighbor sign-off to disconnect downspouts
- Have plumber sign-off on project and submit to city
- Contact *Dig Safe* to locate any underground utilities on site
- Modify design based on findings if necessary
- Mark out excavation
- Excavate to required depth
- Truck excavated fill off-site
- Rough up bottom of excavation for better water infiltration
- Dig trenches for pipe to convey rainwater from downspout to rain garden
- Have engineer and city plumbing inspector out to verify proper size of excavation
- Back-fill with large aggregate topped with pea gravel (per engineer's specs)
- Lay pipe from downspouts to rain garden and install fittings
- Have city plumbing inspector out to inspect plumbing,
- Backfill with bio-retention soil mix and rake out to appropriate elevations
- Plant with native species adapted to inundation and drought
- Mulch, edge and water garden

PUSH Blue will also incorporate a strong community engagement piece to the work so as to fully involve the community, including educational signage at various sites, workshops around CSO's and the impact of this green infrastructure, volunteer opportunities, a project website, tours of the sites, and job training. Such a combination builds a constituency for the continuation of this work, educates local stakeholders about its importance, and creates models that can be replicated in other neighborhoods throughout the region.

Most of PUSH's installations are on the scale of a single vacant city lot. Construction and planting typically takes between 3 and 10 days. But every green infrastructure site is different. The advantage of having a crew that understands the concepts behind the work is that they can deal with all of the variables that arise in appropriate ways. To build a rain garden, PUSH uses native plants adapted to the region and to the unique growing conditions of rain gardens. PUSH uses large and small aggregate stone in the base of rain gardens for water holding capacity, and a free-draining soil mix with a high percentage of compost for the upper planting layer. A typical PUSH rain garden will capture over 14,000 gallons of stormwater annually.

The gardens are designed to beautify the neighborhood as well as capture stormwater, so maintenance is similar to other forms of landscaping: major clean-

up and mulching spring and fall with light weeding throughout the growing season. The cost of the rain gardens ranges from $1000 to $5000, depending on the size of the lot, the depth of excavation and backfill required, and the condition of the lot when the project starts (for example, how much debris does it contain). Local residents will be involved in the design process for some of the gardens.

"The PUSH Blue work transforms an ugly vacant lot into a beautiful garden. It signals to others that someone cares about the lot, reducing dumping, crime, and vandalism. It also gives neighbors an opportunity for safe passive and active recreational space."

-Jenifer Kaminsky, PUSH

The community's response to PUSH Blue has been enthusiastic. As PUSH's Jenifer Kaminsky says, "Once we begin to explain the issue, people want to address it. They don't want their kids swimming in dirty water, eating toxic fish, or smelling bad smells. People also really love gardens on their street." PUSH's work in cleaning and beautifying vacant lots also has a ripple effect, as residents become more inspired to clean up and garden other lots, and less prone to dump into vacant lots. PUSH workers have noticed far fewer sofas and other trash being dumped since they began their efforts.

SELECTED PUSH PROJECTS

129 Chenango: Permeable Parking and Rain Garden

This is a vacant lot between two homes, a typical situation for the west side of Buffalo. PUSH Blue added a rain-garden which captures all run-off from the roofs facing the lot on both sides and a 3-car permeable parking pad at the front of the lot for the neighboring residents. Any rain that falls on the parking pad infiltrates into the ground below instead of running off into the storm sewer.

NetZero House at 10 Winter St.: Drywell and Rain Garden

There are two forms of stormwater capture at this location. Most of the downspouts are directed to a drywell in the vacant lot next door. A drywell is an underground pit of large stone. The large voids between stones provide space for stormwater to collect while it slowly seeps further into the ground. PUSH also installed a small rain garden near the front entrance to the house to capture rainwater and provide visual interest.

566/568 W. Utica: Rain Garden with Downspouts

This is a vacant lot between two homes. In this instance PUSH kept the footprint of the garden fairly small to allow most of the site to remain as a play-space for neighborhood children. As in this case, the capacity of rain gardens can be increased by making a deeper excavation when space is at a premium.

Interview with a PUSH Blue Worker: Bob Cook

Bob Cook is a longtime resident of Buffalo's West Side who first got involved with PUSH as a member, concerned about the vacant housing in the neighborhood and the four fires that had erupted in abandoned buildings within a block of his home. Today he is a staff member working on PUSH Blue.

What are some of the best aspects of your job?

The kind of results we get in the neighborhood – like community gardens that everyone shares and that create good, nutritious food for people; talking with people in the neighborhood on a regular basis; and being involved in transforming lives.

What are your career goals? How does this job fit into them?

This is the best job I've ever had. I have a boss who works with me, not over me, which is quite inspiring. Right now I'm taking care of green spaces - making sure lawns are mowed in occupied and unoccupied lots, making sure vacant houses are secure. I also operate as one of the community leaders – for example, going to news conferences and saying here's what

PUSH is trying to do. I can speak intelligently about the issues; that's where I see myself going with PUSH. A few people would like to see me move in that direction, because I'm right in there on the frontlines and I do have pretty good working knowledge of our program and what it's trying to accomplish.

What kind of training and career development are you receiving?

We've had training in the actual creation of the rain gardens—the layers, the aggregate, the plants that will grow well in wet situations. This spring we'll learn how to actually create and install a rain barrel and have it work properly for a client. That'll be something that we can do across the city - our goal is to have this program prove to be successful so that we can get funding to continue the program throughout the West Side and across Buffalo.

OSHA safety training: One of the guys in our crew can use excavating equipment; he has trained one other guy to use it safely. OSHA is how to keep an area safe where you're using that equipment; warning signs that you've got a problem spot around where you're digging, etc. It is part of what we needed to learn in order to proceed with this legally, and also important to keep ourselves safe.

I would like to see the whole crew know how to operate the excavating equipment. I've always been a proponent at cross training at aspects of a different job in the event of splitting up crews or qualified people being pulled away, so the job can still continue.

Tell me about the neighborhood and how it has changed in recent years.

We get a lot of praise from people just about green spaces - lots that used to just catch tires, cinder blocks, piles of refuse, litter, garbage. All of these we've been able to transform into kept-up green spaces; there are kids that play in just about all of our green spaces.

We've gotten a lot of comments about the way we've transformed buildings from people who have lived in the neighborhood for a long time and had given up on it, and now think the neighborhood is actually turning around and becoming a better, safer place to live. Even with the gun battles that seem to go on around this area, there's been a recognition that this activity needs to stop. We're having an impact on the people who deal drugs, talking with them saying soon this will not be a viable thing to do; tell them to look for these jobs instead of continuing what they're doing. I've seen a transformation with the way people deal with each other; the attitudes people have towards the neighborhood.

ADDITIONAL CASE STUDIES

Portland: Verde Landscape Program

Verde Landscape is a licensed Landscape Contracting Business housed within the not-for-profit organization Verde in Portland, Oregon. Verde's mission is to serve Portland's communities by building environmental wealth through social enterprise, outreach and advocacy. Verde Landscape is Verde's oldest social enterprise and provides a wide-range of services both directly and through its contractor partners. These services include construction, street-tree planting, habitat restoration, invasive species removal, and stormwater management practice installation and maintenance.

Verde offers stormwater management installation and maintenance services to general contractors, government bodies (such as the City of Portland and local conservation districts), school systems, nonprofits, affordable housing providers, and other commercial property owners. Verde Landscape ensures that community members are involved and engaged in its work and that its projects directly benefit low-income people and people of color.

Verde, Hacienda CDC and partners celebrate a new bioswale

Verde Landscape offers individuals from impacted communities training in green infrastructure installation and maintenance using a traditional workforce development model. Currently, Verde Landscape employs six full-time, all-year crew members who receive 80 hours of paid training each year. Trainings include technical, safety and industrial instruction, as well as English, financial literacy, and computer classes.

Verde Landscape is designed to employ full-time crew members for approximately 3.5 years and then assist with their transition into permanent employment. However, this is not a fixed term; workers can choose to continue working at Verde as crew members or potentially as crew leaders or other advanced positions within the organization. Each crew member has its own individual learning plan and, ultimately, Verde aims to equip workers to succeed as a small business owner, an employee at a for-profit business with opportunities for wage and career growth, or as an experienced crew leader who supervises and trains future landscape crew members.

Verde also employs at least five or six seasonal crew members, as well as several shorter-term workers from within local neighborhoods where projects take place.

Verde relies on its extensive community contacts, including those within local neighborhoods, other nonprofits and the City of Portland, to assist with recruiting new crew members, obtaining new projects, providing training to current crew members, as well as identifying potential permanent employment opportunities for crew members. The City of Portland's "Grey to Green" program that promotes green infrastructure installation is also extremely helpful to Verde's success.

Verde Landscape originally utilized grants to fund its training programs and crew members also received training from City workers. Now the program has grown into a fully functioning contracting business, funding itself almost exclusively by competing for project bids.

Verde Landscape crew works on controlling invasive plants

Because of its investment in social change and creating quality, sustainable jobs, Verde often finds it hard to compete with the low prices of private contractors. However, Verde is often successful when a project requires attainment of social goals such as workforce training or diversity, or specialized knowledge of native plants and green infrastructure techniques.

In order to create a sustainable program that is competitive with private contractors, Tony DeFalco, Living Cully Coordinator at Verde, recommends that groups incorporate an advocacy component into their program that creates opportunities for an effective social enterprise. For example, if a local government decides to increase its tree planting or stormwater management installation, it is imperative that groups demand specific requirements that allow for women and minority-owned businesses to access such opportunities.

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Howard County, MD: Restoring the Environment and Developing Youth (READY) PROGRAM

Restoring the Environment and Developing Youth (READY) is a program funded by Howard County in Maryland and administered by the Alliance for the Chesapeake Bay with support from People Acting Together in Howard (PATH). PATH engages local congregation and community leaders on issues affecting their lives, including environmental stewardship and increasing local jobs.

READY works with Howard County government to employ young adults (age 16-26) in building and maintaining rain gardens throughout the county. This in turn helps the County achieve its employment goals and the green infrastructure requirements under its stormwater permit. READY recruits participants through networks of congregations, high schools and local universities, targeting qualified young adults in both high school and college.

During the program's first phase, in the summer of 2012, READY employed 31 young adults who designed and installed 31 rain gardens and other conservation landscaping. During the 8-week, full-time program, READY students received training on general workplace and technical skills, as well as weekly environmental education days and field trips. They then concluded the summer by hearing talks given by local and regional professionals and government officials on environmental and green economy topics.

During 2013, READY leadership expanded the program to form a more generalized conservation corps aimed at addressing green infrastructure needs such as installation, operation and maintenance, community education, auditing of green infrastructure, and cultivating plants for the projects.

READY participants need only be Howard County residents, but, according to Don Tsusaki, Project Manager at the Alliance, moving forward they are looking to more intentionally target recruitment in some of the county's underserved neighborhoods. Past participants

have largely been centered around the PATH congregations, which naturally did include some underserved communities.

Mr. Tsusaki likes the idea of permanent, sustainable, adult jobs for a program like this. Each summer with the new crop of trainees, he says they have to start at ground zero with the training, including job skills, team-building, leadership, first aid and safety, and technical training (i.e. using a shovel, etc.). Although the educational benefits for the students make it worth it, the crew often is not completely trained until the summer is halfway over. He feels it would be more efficient and effective to utilize a full-year permanent crew who can build on prior skills. Tasks such as site design, project planning, and inspections, maintenance, repairs, monitoring and assessment of existing practices provide plenty of work to be done all throughout the year. Also there is extensive need for a labor force to remove invasive plants to ensure the effective functioning of practices.

Mr. Tsusaki is also interested in the idea of building greenhouses to generate native plants for use in the projects. As the demand increases for green infrastructure throughout the region, there will need to be an increase in native plant production to keep up. He feels that incorporating plant generation into the program will help save money and provide job skills training at the same time.

READY students install and maintain rain gardens on institutional properties such as schools, congregational grounds, and large properties held by nonprofits, at no cost to the property owner. The program is funded entirely by Howard County. READY only asks that the property owner agree to maintain the rain garden each year and provides them with instructions on how to do so. This arrangement makes it easy for READY to find available sites for installation.

According to Mr. Tsusaki, they are currently exploring the possibility of working on small commercial properties and potential funding sources to make that happen. The State of Maryland recently imposed a stormwater utility or fee for all property owners, including a robust credit system administered by each county. This credit system provides strong

incentives for property owners to work with READY. They are still working out the logistics of how the credit system will apply and who will bear the costs of green practice installation on private properties.

The Chesapeake Bay Total Maximum Daily Load (TMDL) is another regulatory mechanism that provides incentives for green infrastructure installation and maintenance by READY. The TMDL requires all counties to make certain stormwater pollution reductions. Howard County therefore has an incentive to support installation and maintenance of extensive green infrastructure to ensure its compliance with regulatory requirements.

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Syracuse/ Onondaga County: Onondaga Earth Corps Program

The mission of Onondaga Earth Corps (OEC) in Syracuse, New York is to empower youth to actively create positive change for their communities and the environment. OEC provides training to crew members for future careers and jobs in the environmental fields. Both youth (ages 15-18) and adult (ages 19-25) crew members participate in urban forestry projects, stormwater management projects, private property management and community environmental education and outreach. Stormwater management projects include the installation and maintenance of green infrastructure (i.e. rain barrels, rain gardens, and green roof demonstrations) in conjunction with Onondaga County's Save the Rain program.

Save the Rain is a County-wide program developed in response to a Consent Order requiring the County to abate its sewage overflows into Onondaga Lake. Through Save the Rain, the County offers two funding sources to encourage installation of green infrastructure practices. One, the Green Improvement Fund (GIF), is targeted towards private property owners (businesses, nonprofits, and commercial properties) and the other towards suburban municipalities within Onondaga's sewershed.

Utilizing Save the Rain's GIF, OEC was able to incorporate stormwater management into its workforce development program. OEC crew members not only install and maintain green infrastructure practices, but also do community outreach regarding the Save the Rain program and the importance of these practices. OEC also works with outside contractors on larger installation projects that require equipment and expertise outside the program's capabilities.

Within the conservation corps model, OEC utilizes community contacts in underserved neighborhoods on the south and west sides of Syracuse for recruiting its crew members. Every year, OEC hires about 7 adult crew members to work for the growing and maintenance season (i.e. spring through fall). OEC pays prevailing wages and provides extensive green infrastructure and "wrap around" training to crew members. Wrap around training topics include financial literacy, nutrition and wellness, and workplace professionalism. OEC aims to equip crew members with the skills and community contacts necessary to move on to permanent employment or higher education after the program's completion.

Currently, the OEC adult program is funded almost exclusively through fee-for-service contracts, including with local nonprofits, churches, schools, and Onondaga County's Save the Rain program. According to Greg Michel, Director of OEC, it is important for groups to diversify their funding sources for these types of programs. Although OEC is very grateful for its relationship with Save the Rain, they are constantly seeking new contracts and other sources of income so they are not overly dependent on one funding source.

The ongoing operation and maintenance needs of the extensive green infrastructure practices installed through Save the Rain also provide an ongoing income source for OEC. OEC anticipates its continued involvement with maintenance services in the future, both through providing these services directly as well as training other neighborhood groups to do so.

Mr. Michel also recommends that local groups utilize strong community partnerships in order to help sustain their program. OEC relies on extensive partnerships including contacts at the Cornell Cooperative Extension for landscape design and plant selection, local community groups for recruiting crew members and obtaining new contracts, and other local partners to provide crew members with outside training.

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SUNY College of Environmental Science & Forestry (ESF)
Green Train Landscaping & Urban Ecology (GLUE) Program

The Green Train Landscaping and Urban Ecology (GLUE) workforce training program at the State University of New York (SUNY) College of Environmental Science & Forestry (ESF) sought to prepare citizens in Syracuse, New York with the knowledge, skills, and attitudes necessary for employment in the emerging field of green infrastructure. Through this program, ESF partnered with regional organizations, such as the Northside Urban Partnership, the Near Westside Initiative, and the Centerstate Corporation for Economic Opportunity, to train unemployed and underemployed local residents in the green industries field while supporting the Syracuse area in its infrastructure overhaul. Specifically, ESF trained citizens in developing and implementing practices such as rain gardens, permeable pavers and urban forests, and in vacant lot transformation.

Through the 10-week GLUE program, trainees learned the fundamentals of stormwater management and both installation and maintenance of stormwater practices through classroom training, field trips and hands-on work. Some trainees were also educated in English as a Second Language and supported in obtaining their GEDs, as well as trained in basic construction work. Students also participated in two-week externships with local nurseries, landscape contractors and other green infrastructure companies exposing them to the green work force in Syracuse. In addition to the externships, trainees received certifications from ESF and OSHA upon graduation from the program.

The GLUE program ended after two rounds of training and hosting a successful green infrastructure symposium for professionals and students in the field. Trainees included refugees from over eleven countries with levels of expertise ranging from engineering experience in their home

countries to lack of reading and math skills. According to Dr. Chuck Spuches, Associate Provost for Outreach at ESF, a future program might incorporate more basic math and reading training (depending on the existing skill set of trainees) in order to allow for trainees to collect the necessary assessment data from each site.

Dr. Spuches also recommended that "soft skills" be incorporated into any green infrastructure training program such as communication and interpersonal skills, team-building, problem-solving, and punctuality, in order to effectively equip citizens for entering the work force. In the future he would also incorporate a more robust internship program where trainees received actual work experience as opposed to an externship where they observe the work of others.

Lastly, Dr. Spuches recommended government contracts, such as with the Save the Rain program in Onondaga County, as a potential sustainable way to provide permanent, green jobs. The Save the Rain program provides grants and contracts for installation and maintenance of green infrastructure in the Syracuse area. The program was formed in response to Onondaga County's consent judgment regarding its sewage overflows into Onondaga Lake.

Several of the trainees from the first two rounds have obtained jobs, albeit some as seasonal workers and low-level landscape positions. Dr. Spuches feels with the above recommendations in place a future program could result in more successful job placement.

The project was funded in part by the U.S. Forest Service and the NY Department of Environmental Conservation (DEC). ESF is currently coordinating with DEC to determine ways the program can be improved and replicated around the state.

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Chicago Center for Neighborhood Technology (CNT)
"Wetrofits" Stormwater Management PROGRAM

The Center for Neighborhood Technology (CNT) is a nonprofit in Chicago, Illinois whose mission is to promote more livable and sustainable urban communities. CNT's work crosscuts many areas including transportation and community economic development, energy, water, and climate change. As a "think-and-do-tank", CNT researches, invents, and tests urban strategies that use resources more efficiently and more equitably. CNT's stormwater management program partners with elected leaders, advocates, and trade groups to promote retrofitting of neighborhoods with innovative, low-cost green infrastructure practices, including rain gardens, green roofs, bioswales, and permeable pavers. Specifically, their "Wetrofits" program helps property owners in the Chicago area protect their homes from flood damage by providing a one-stop neighborhood wet weather retrofitting service.

CNT's stormwater management program aims to reduce urban flooding, cut stormwater treatment and energy costs, protect water bodies and vital landscape, generate jobs and spur economic revitalization. The Wetrofit program furthers each of these goals by facilitating the retrofitting of commercial, industrial, public and residential buildings and land with green stormwater management practices. Retrofits reduce flooding damage, enhance property values, and generate jobs in the process. Wetrofit also benefits the environment by decreasing the volume of stormwater runoff, and serves as a communications and advocacy platform to provide information and tools to community members and spur similar market-based solutions in other cities.

Three years ago CNT began working on the Wetrofit concept and in 2013 executed the first pilot project as a "labor market intermediary." Through this program, CNT provides free assessments to homeowners experiencing urban flooding. CNT visits the homeowner's property, identifies the issues causing the flooding, and suggests both grey and green solutions for addressing the problem. CNT informs the homeowner of the full lifetime cost of each suggested practice, including maintenance requirements. Through this process, CNT

seeks to make advocates out of the homeowners by educating them on the larger issues causing urban flooding including stormwater runoff and sewage backups.

If the homeowner is interested in moving forward with CNT's retrofit suggestions, CNT will then assist them with identifying and obtaining an appropriate contractor through a formal bid process, and will provide oversight of the contractor's work during the construction phase. CNT does not charge either the homeowner or the contractor for this service.

According to Ryan Wilson, Stormwater Project Manager at CNT, many of the areas they have identified as experiencing high amounts of flooding are underserved neighborhoods on the south side of Chicago. However, the issue exists in higher income areas as well. In the future, CNT hopes to incorporate workforce development into the program through providing much-needed green infrastructure training to local contractors.

Wetrofit is currently a two-year, seasonal program funded by grants from State Farm Insurance and the Surdna Foundation. CNT is actively pursuing additional funding sources to extend the program into the future, including additional grant funding and potential government contracts.

CNT has also gathered an advisory group to guide their stormwater work that includes representatives from environmental organizations (i.e. American Rivers, Natural Resources Defense Council), government agencies (i.e. EPA, HUD), academia, and the private sector.

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Minneapolis Metro Blooms: Neighborhood of Raingardens Program

Metro Blooms is a nonprofit organization in Minneapolis, Minnesota with the mission of promoting and celebrating gardening, beautifying communities and helping heal and protect the environment. Through its Neighborhood of Raingardens program, Metro Blooms provides numerous local raingarden workshops and installs hundreds of raingardens throughout the Twin Cities region.

The Neighborhood of Raingardens program utilizes resources from the public and private sectors to beautify communities, increase the population of native plants, reduce stormwater pollution, meet state and local water quality mandates, and educate the public on the importance of green infrastructure and stormwater management. Neighborhood associations throughout the Twin Cities area contact Metro Blooms if they are interested in a raingarden installation in their neighborhood. The associations then apply to their local watershed districts for cost-share grants to pay for the project's oversight and management. Individual homeowners in the neighborhood each pay a small amount (around $200) for the materials used on their property.

Metro Blooms installs about fifteen to twenty raingardens in each participating neighborhood and works with about five to seven neighborhoods per year. For each raingarden installation and even for maintenance of projects, Metro Blooms applies for and receives its labor force for free from the Minnesota Conservation Corps. The Conservation Corps is an AmeriCorps program that employs young adults between 18 and 25 to work on energy conservation and natural resources management projects throughout Minnesota and Iowa. The Corps is funded by the Minnesota clean water slush fund. Landscape professionals on the Metro Blooms staff (both permanent and seasonal) train the 5-member Corps crews (a different crew for each project) and oversee the projects. According to Laura Hurley, Environmental

Project Manager at Metro Blooms, the free labor they receive from the Conservation Corps is key to keeping their program competitive with the prices of local private contractors.

Property owners sign a contract to maintain the rain gardens for five years and if they fail to do so, Metro Blooms will maintain the garden at the homeowner's expense. Ms. Hurley finds that a small monetary investment made by the homeowner at the installation phase increases the chances that the homeowner will maintain the raingarden going forward. One of Metro Blooms' biggest installations, in the Powderhorn Lake area, was offered entirely for free to the homeowners (relying entirely on state grant funding) and so far has much lower maintenance success than other projects where homeowners paid.

According to Ms. Hurley, they have had a high success rate with most of their installations thus far, a majority of which were in underserved neighborhoods in north and northeast Minneapolis. These projects usually started out with an interested community member who led their neighborhood through the grant application process with their local watershed district and in coordinating with Metro Blooms.

Metro Blooms also does raingarden installations on institutional properties such as those owned by the Minneapolis Public School District. The school district pays entirely for these projects and has even requested that Metro Blooms conduct some of the maintenance of existing stormwater practices on the properties. The City of Minneapolis has a stormwater fee and credit system where institutional properties can save hundreds of thousands of dollars off their fee by installing and maintaining green infrastructure. This provides a huge incentive for these properties to work with Metro Blooms on both installation and maintenance.

The City of Minneapolis also requires offset of stormwater runoff, through installation of green practices, anytime a property owner increases its impervious surfaces. Property owners cannot get cost-share money towards this requirement, so there is an incentive for business owners to install practices with Metro Blooms before they decide to expand their

parking lots, etc. Metro Blooms also offers on-site consultations and raingarden design services for a fee, providing a sustainable income source for the organization. The costs for these services are built into the Neighborhood of Raingardens program (i.e. built into the cost paid for by the neighborhood associations) and the services are also offered to individual residents outside of the program.

Ms. Hurley identified several needs that could be a basis for creating permanent, local jobs, including: installation each summer, ongoing inspection and maintenance of projects, and site planning and design in the off-season. She also felt that a local stormwater fee and credit system provides opportunities for new, green jobs moving forward, including: assisting property owners with stormwater credit applications (which are complex and require knowledge of landscape design) and once practices are installed, providing ongoing maintenance throughout the neighborhoods in order for them to maintain their credits. This maintenance could include street-sweeping, cleaning stormdrains, and inspecting and maintaining the green infrastructure itself.

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Pennsylvania Horticultural Society: LandCare Program

Case Study

The mission of the Pennsylvania Horticultural Society (PHS) is to motivate people to improve their quality of life and create a sense of community through horticulture. The PHS LandCare program works with community groups and City agencies to transform Philadelphia's vacant lands into neighborhood assets. The goal of the program is to address the urban blight, crime, low neighborhood wealth, and threats to health and safety caused by vacancy.

Since 2003, PHS has received a multi-million dollar annual contract from the Philadelphia Office of Housing and Community Development to "clean and green" both public and private vacant lots in key neighborhoods across the city. The LandCare program provides custodial management to over ten million square feet of land, including over 8,000 lots, and provides employment to over 100 Philadelphia residents in the process.

"Cleaning and greening" of vacant lots takes place in the spring and fall, and consists of removing all debris and weedy vegetation, grading, adding compost-enriched topsoil, and planting grasses and trees. PHS contractors also install a signature fence around the perimeter of each finished lot to define the land as a "cared for" property. Once the site is finished, PHS contracts with local landscape contractors to mow and clean the lots regularly during the growing season.

According to Bob Grossmann, Senior Director at PHS, landscape contractors bidding on Clean and Green projects were originally all suburban-based. However, over time the program has created a market for these services within the City allowing for more City-based and minority-owned contractors to participate. Many smaller, local contractors start off bidding on the maintenance contracts and slowly develop the capacity to bid on the larger installation contracts.

LandCare is currently exploring the possibility of installing green stormwater infrastructure on vacant lots, but thus far has not done so. Challenges to incorporating stormwater practices into the program include the City's desire to retain permanent site control of lots containing green infrastructure as well as the increased expense for installing and maintaining these practices at a large scale. Also, local residents express safety concerns related to planting any foliage that blocks visibility on the site.

LandCare also includes a Community LandCare component that works with fourteen local community organizations to clean approximately one to two hundred nuisance lots in each of their neighborhoods. These lots have not received the "clean and green" treatment. Each community group hires and manages crews of three to four residents from its local neighborhood to clean and mow the lots on a monthly basis, from April through October. Community groups maintain over 2,100 properties through this program.

Through Community LandCare, participating organizations recruit, train and manage local resident crews, with oversight by PHS. Organizations pay crew members $22.50 per parcel and train them on safety and maintenance best practices. Crew members tend to be consistent from year to year and usually include residents with marginal work histories.

Contracts with the City of Philadelphia fund the LandCare program in its entirety. According to Mr. Grossmann, this type of funding source is imperative to the sustainability of this program and others like it. Mr. Grossmann explains that the City is willing to work with PHS in this capacity because the City is "taking ownership" for the real costs associated with vacancy. Although the City only owns one quarter of the total vacant lots, it understands that cleaning and greening both public and privately-owned vacant properties saves money in the long run by addressing a multitude of local issues. These issues include a loss of taxpayer base in these neighborhoods, criminal activity, and the health and environmental costs associated with illegal dumping on vacant lots.

By utilizing a systemic and comprehensive approach to managing vacant land, the LandCare program benefits neighborhoods by improving their appearance, improving health and safety, providing local jobs, raising property values and stimulating new investment. Other organizations can replicate the LandCare model and so far PHS has consulted with representatives from over twenty other cities on how to do so.

Sources:

http://phsonline.org/greening/landcare-program

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Philadelphia: Pennsylvania Horticultural Society
City Harvest & Roots To Re-Entry Programs

The Pennsylvania Horticultural Society (PHS) in Philadelphia offers two vibrant programs that address both sustainability and economic development in underserved neighborhoods. Their City Harvest program taps the skills and energy of urban gardeners to make fresh, nutritious produce more widely available in under-resourced neighborhoods. Their Roots to Re-entry program provides job skills training in urban agriculture and landscaping to inmates and supports their transition from prison back into the community.

Through these programs, PHS has worked with over 600 inmates of the Philadelphia Prison System who grow seedlings at a prison greenhouse, receive training in gardening and basic landscaping as well as general life-skills lessons. The seedlings are then transplanted and grown in community gardens throughout the city as well as in the prison's onsite garden. PHS partners with a food distribution network who then donates the produce to local food cupboards.

PHS's Roots to Re-entry program then maximizes the chance of future employment for the inmates by providing job placement assistance and supportive services to help them transition to life outside the prison system. Selected inmates receive 14 weeks of training, including health and job preparedness workshops at the prison, and food production and landscape management training at the prison greenhouse and garden. Inmates approved for work-release then enter a "hands-on landscaping phase" at multiple locations such as three participating public gardens and arboretums. During this phase, inmates receive intensive job training in landscaping and horticulture with a focus on landscape

management, preparing them for entry-level work with local landscaping and contracting companies.

PHS is currently working to create a network of employers in the landscaping industry to identify job placement opportunities for inmates graduating from the program. The City Harvest and Root to Re-entry programs are currently funded by various corporate and foundational grants.

Sources:

http://phsonline.org/greening/city-harvest

http://phsonline.org/greening/roots-to-re-entry/

Cleveland Botanical Garden: Vacant to Vibrant Program (V2V)

The Applied Research Program of the Cleveland Botanical Garden (CBG) is conducting a multi-city initiative called Vacant to Vibrant (V2V) in Cleveland, Ohio, Buffalo, New York, and Gary, Indiana. Using a sizable grant from the Great Lakes Protection Fund, V2V will convert vacant properties into green infrastructure in order to improve the quality of neighborhoods while creating local jobs and improving the health of the Great Lakes. This program will create a small parcel green infrastructure network in urban neighborhoods with a high concentration of vacant lands and aging sewer infrastructure and will be the first to evaluate the viability of aggregated small parcels as green infrastructure for stormwater management.

In addition to decreasing stormwater pollution, the overall goal of the project is to improve the quality of life in communities by converting vacant lots into functioning green stormwater management facilities, and to provide workforce development and sustainable jobs to local residents in the process. Originally, CBG planned on only hiring and providing training to ten college-aged adults per city on installation, operation, maintenance, and assessment of green infrastructure practices. However, after assessing the needs of local partners, CBG would now like to incorporate permanent adult jobs into the program.

CBG is still in the preliminary planning stages for the project and is working intensively with local partners, including PUSH in Buffalo and the local community development corporation in Cleveland, to make the program a solid base for a sustainable partner-driven program to continue after the grant ends in 2017. CBG plans to move forward with the installation phase in fall, 2014, and is currently exploring sustainable funding sources for continuing the program after the grant's completion.

In the meantime, CBG will be advertising locally in each of the three cities for contractors to perform installation and maintenance throughout the term of the grant. They will target local minority and women-owned businesses for these positions. Once the workforce development piece of the project is off the ground, they are hoping to bring trainees onto the sites to benefit from the knowledge and experience of hired contractors.

According to Sandra Albro, Director of Research, Horticulture and Conservation at CBG, one of the challenges with funding a sustainable program like this is the varying structures of local governments and sewer districts. In Cleveland, for example, the sewer district is regional as opposed to city-based, making it a bit more challenging to utilize government contracts as sustainable funding for the program. Also, the stormwater fee and credit system in Cleveland is currently stuck in litigation so not yet usable for the V2V program.

CBG will also research and measure the effectiveness of the projects in order to provide hard data for use by future projects throughout the country. Specifically, CBG will partner with local academics to evaluate the project's effectiveness for stormwater management, community development, and for creating sustainable jobs for local residents. This data can then be utilized by other programs across the country to replicate the project and ensure effective practices are installed.

V2V is the result of a two-year planning phase, also funded by the Great Lakes Protection Fund, which convened representatives from fourteen different Great Lakes cities to evaluate the effectiveness of green infrastructure for economic, environmental and social improvements. Through this process, CBG spearheaded the Great Lakes Vacant Land and Green Infrastructure Collaborative.

Sources:

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http://www.glpf.org/funded-projects/vacant-vibrant-vacant-land-green-infrastructure

http://greenforall.org/wordpress/wp-content/uploads/2013/04/Staying-Green-and-Growing-Jobs-April-2013.pdf.pdf (p. 19)

Albro, Sandra (Cleveland Botanical Garden). February 12, 2014. Telephone Interview.

End Notes

[i] Green for All, "Water Works" (2011), p. 2.
[ii] Id., p. 9.
[iii] Julie Barrett O'Neill, "Green Infrastructure Solutions to Buffalo's Sewer Overflow Challenge," presentation available at http://bnriverkeeper.org/wp-content/uploads/2011/04/BSAReport_Final_REV_4.11.11_LR_1.pdf
[iv] Garrison, Noah and Karen Hobbs. "Rooftops to Rivers II." National Resources Defense Council (2011), p. 10.
[v] Green For All, "Staying Green and Growing Jobs" (2013), p. 12.
[vi] Green For All, "Using a Jobs Frame to Promote the Use of Green Infrastructure," (presentation to the Urban Water Sustainability Leadership Conference (2012).
[vii] "Rooftops to Rivers II," p. 10.
[viii] Examples include Center for Neighborhood Technology, "The Value of Green Infrastructure: a Guide to Recognizing its Economic, Environmental, and Social Benefits," (2010); and Stratus Consulting, "Triple Bottom Line Assessment of Traditional and Green Infrastructure Options for Controlling CSO Events in Philadelphia's Watersheds" (2009).
[ix] ECONorthwest provides an excellent literature review in "Green Infrastructure Economic Benefits and Financing" available at www.nrdc.org/water/pollution/rooftopsii/files/RooftopstoRivers_appendix.pdf
[x] Green for All, "Water Works" (2011), p. 41.
[xi] For examples and resources regarding community benefits agreements, see Green For All's "High Road Agreements: a Best Practices Brief and the Partnership for Working Families' extensive resources at http://www.forworkingfamilies.org/resources/policy-tools-community-benefits-agreements-and-policies.
[xii] For examples of high road practices, see Oregon's Clean Energy Works, Milwaukee's Wisconsin Energy Conservation Corporation, the San Francisco PUC's Community Benefits Policy, and the Center for Working Family's Green Jobs Green New York contracting and jobs standards.
[xiii] "Rooftops to Rivers II," p. 36.
[xiv] Green for All, "Water Works" (2011), p. 18.
[xv] "Rooftops to Rivers II," p. 32, 36.
[xvi] "Rooftops to Rivers II," p. 37.
[xvii] "Rooftops to Rivers II," p. 36.
[xviii] NYC Green Infrastructure Plan, p. 54.
[xix] "Rooftops to Rivers II," p. 23.
[xx] Nashville, New York, Philadelphia, Portland, Seattle, Syracuse, Toronto, and Washington D.C. all have community education programs on green infrastructure.
[xxi] Metro Blooms, "A Citizen-Based Approach to Stormwater Management" (2012).
[xxii] "Rooftops to Rivers II," p. 14.
[xxiii] Green For All, "Staying Green and Growing Jobs" (2013), p. 6.
[xxiv] Green For All, "Staying Green and Growing Jobs" (2013), p. 10.
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