Detroit Green Stormwater Infrastructure Workforce Assessment

An examination of the existing and projected market for GSI jobs and potential for economic impact in the Detroit region

DETROIT FUTURE CITY

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This report examines the existing and projected market for jobs related to green stormwater infrastructure in the Detroit region. The report investigates the potential for the jobs identified to be filled by Detroiters, specifically low-income and underserved populations. Recommendations are made to inform public policies, workforce development and training, and business support programs related to green stormwater infrastructure and set forth a strategy for long-term leadership regionally and nationally as a green infrastructure cluster.

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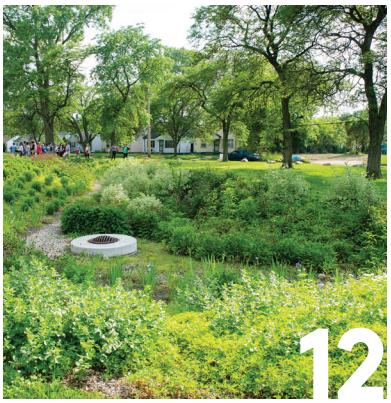
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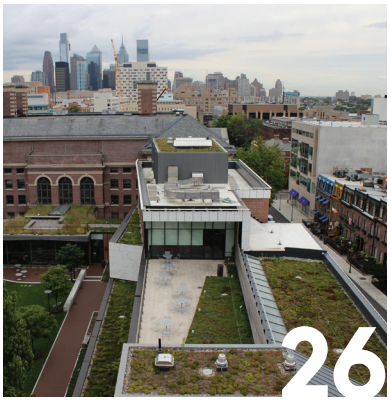
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EXECUTIVE SUMMARY

Over the past decade, green stormwater infrastructure (GSI) has emerged in Detroit as a method to manage stormwater, reutilize land, enhance water and air quality, and add beauty to the landscape. With abundant land available and an imperative to protect the Great Lakes, Detroit is uniquely positioned to incorporate GSI into all neighborhoods, parks, developments and streets. In a city where 33% of its residents live under the federal poverty line,[1] any industry should intentionally be developed to help address that stark statistic.

In recent years, DFC and other local practitioners have experienced first-hand a shortage of contractors in the area with the experience to install and maintain smaller-scale GSI projects. By increasing support to the labor market, GSI installations will continue to increase and the growing demand will be met.

103,000 people in the region currently hold jobs that have tasks that could be transferrable to GSI.

In this report, the job market, policies and programs of Detroit and six other communities are assessed, and recommendations are made around GSI policy, workforce and training programs, and business support for how Detroit can ensure an inclusive workforce to fill this important job sector.

Right-of-Way Bioswale

GSI Best Management Practice

Photo Credit: Vireo

Metro Detroit's Green Stormwater Infrastructure Workforce

Highlights of the findings include:

- 103,000 people in the region currently hold jobs that have tasks that could be transferrable to GSI; 32% of those are in Wayne County.
- Jobs in those occupations grew at a rate of 21% between 2010 and 2017, far outpacing the U.S. economy, which grew at 12%.
- 87% of the jobs are educationally accessible because they require only some college, or an associate's degree or less.
- Most of the jobs are close to a middle-class wage[2] with a national average wage of $43,700 annually.
- 3,000 to 8,000 of the people in those jobs are estimated to be performing GSI work, though only a small percentage of all 103,000 people in those jobs actually perform GSI work.
- Of the workers performing GSI work, only a part of their time is spent on GSI. It is rare for a GSI worker to spend 100% of their time on GSI projects.[3]
- Based on workers' average educational attainment and growth in the market, ten occupations with tasks that could be transferable to GSI were identified as having the strongest potential for Detroiters:
    - First line supervisors of farming, fishing, and forestry workers
    - Construction managers
    - Farmworkers and laborers (crop, nursery, and greenhouse)
    - First line supervisors of construction trades and extraction workers
    - First line supervisors of landscaping, lawn service, and groundskeeping workers
    - Cement masons and concrete finishers
    - Construction laborers
    - Landscaping and groundskeeping workers
    - Roofers
    - Pesticide handlers, sprayers, and applicators (vegetation)

- Jobs that are growing and pay a middle-class wage above $46,000 annually include:
    - First line supervisors of construction trades and extraction workers
    - First line supervisors of landscaping, lawn service, and groundskeeping workers
    - Construction managers
    - Cement masons

Though jobs related to GSI work are growing and becoming more accessible, they are not necessarily located in the city of Detroit or Wayne County. Instead, they are concentrated in the inner-ring suburbs, including Ann Arbor.

The Future of Metro Detroit's Green Stormwater Infrastructure Workforce

Projections of public and private investment in green stormwater infrastructure were modeled using four scenarios: "declining investment," baseline" investment," "modest investment" and "significant investment." The first two scenarios are conservative to accommodate the fact that no indications have been given by the City for large investments in GSI beyond 2029. The significant growth scenario considers a much larger investment in GSI by the Detroit Water and Sewerage Department (DWSD), at $13.7 million per year in the long term. The GSI investment projections were then translated into the number of estimated workforce hours required to implement those projects, measured in full-time equivalents (FTEs).

Based on four investment scenarios to model job demand, the results suggest that GSI investment in the City of Detroit would lead to:

- 90 FTEs in 2029 decreasing to 50 FTEs in 2039 at the baseline investment rate.
- 245 FTEs in 2029 increasing to 250 FTEs at the modest investment rate.
- 250 FTEs increasing to 460 FTEs in 2039 at the significant investment rate.

Note: One FTE is the equivalent of one person working on GSI projects 100% of the time. FTEs are a valuable metric for understanding the potential impact of GSI investment, but in reality, it is more likely that many workers spend a fraction of their respective workloads on GSI,

rather than a single worker spending their entire workload on GSI. From FTE estimates alone, it is difficult to extrapolate the range of workers that could be working on GSI projects as a portion of their workload.

At the current expected levels of investment, GSI will not necessarily create new jobs, given that an estimated 3,000 to 8,000 workers are already currently performing GSI work in the region. In order for GSI to drive job growth, there will need to be a large increase in public and private investment, shown by the "significant investment" scenario. The jobs range increases almost nine times from the baseline investment of "status quo spending" to "significant investment." This is due mostly to the "significant investment" scenario projecting that DWSD will spend half of the amount that Philadelphia spends on GSI per capita after 2029. However, the projected jobs will still require specialized training and will not necessarily go to Detroiters without intentional strategies to develop the existing workforce.

It is important to understand that it is rare for a person's job to be focused solely on Green Stormwater Infrastructure. *The Jobs for the Future* report found that for most of these occupations, only 5-15% of the employee's time was spent working on projects related to green infrastructure. It is more accurate to describe GSI work as specialized "functions" or "tasks" of an occupation.

In order to create more job growth in the GSI sector and ensure those jobs are accessible to Detroiters, the following are needed:

- Policy and funding improvements
- Specialized GSI training
- GSI workforce development
- GSI Detroit-based business support

Learnings From Peer Communities

Trends, policies, and programs for GSI-related occupations in six peer communities were explored, including: Kansas City, Missouri; Milwaukee; Philadelphia; Portland, Oregon; Washington, D.C., and Washtenaw County. Each city has unique policies, funding, training, and workforce development programs that offer insights into best practices and lessons learned from around the country. These programs showcase how cities operationalize their public GSI commitment, encourage private GSI investment, and employ unique programs and policies to scale up GSI.

Some examples of unique program and policy models employed by peer communities include:

- **Increased investment:** Philadelphia has committed to spend $1.67 billion on GSI between 2009 and 2034.[4] As of 2016, it was estimated that the GSI industry has resulted in more than $60 million in annual economic impact.[5]

- **Greened Acre Retrofit Program, Philadelphia:** Grant funding up to $90,000 per managed impervious acre for multi-property programs. As of mid-2018, Philadelphia has more than 1,100 greened acres.[6]
- **Stormwater retention credits trading, Washington, D.C.:** This program enables property owners to sell their stormwater credits achieved by installing GSI to noncompliant properties.
- **National Green Infrastructure Certification Program:** This national program provides specialized GSI training to professionalize the industry.
- **Fresh Coast Guardians, Milwaukee:** This resource center is run by the Sewer District, providing technical assistance for design, installation, maintenance, and workforce training for GSI.
- **10,000 Rain Gardens, Kansas City:** This educational outreach campaign promotes rain garden installations across the city.
- **Workforce landscaping companies:** Blue Skies Landscaping in Milwaukee and Verde Landscape in Portland offer on-the-job training and workforce development for GSI.
- **Sustainable Business Network of Greater Philadelphia:** Brings together GSI-related businesses to learn from one another and hosts the Excellence in GSI Awards.

The projected jobs will still require specialized training and will not necessarily go to Detroiters without intentional strategies to develop the existing workforce.

Strategies For Maximizing Detroit's Green Stormwater Infrastructure Workforce

Nine specific strategies were identified in four areas to increase GSI installations, strengthen Detroit's GSI workforce, and support Detroit businesses.

Policy & Funding Improvements

1. Increase technical assistance to property owners implementing GSI.
2. Provide 100% reimbursement of up to $100,000 for the DWSD Capital Partnership Program.
3. Increase annual public investment on GSI.

4. Encourage more Detroit-based jobs and businesses with stronger local hiring and procurement requirements.

Specialized GSI Training

5. Professionalize the regional GSI field through education and certification.

GSI Workforce Development for Detroit

6. Layer GSI training onto existing workforce development programs.
7. Offer Detroit GSI apprenticeship programs.
8. Teach GSI skills to specialty trades workers.

GSI Detroit-based business support

9. Create a GSI small-business network.

Conclusion

Though GSI-related jobs have grown over the last decade, current predicted levels of spending show that the jobs required to meet the demand for GSI in the region can largely be filled by the existing workforce. However, due to experience in Detroit's GSI industry, we know that the existing workforce requires specialized GSI training to strengthen skills and meet the growing demand. If Detroit were to significantly increase its public spending on GSI, there would be more significant job creation in GSI-related occupations.

GSI remains a leading way to sustainably protect water resources and water quality, so it is likely that Federal and State governments will continue to require GSI as part of the solution to stormwater management. Therefore, it is possible that Detroit and other cities may experience much larger investments in GSI in the future, resulting in the need for a larger workforce. However, even with the existing demand, there is a need to train workers in GSI-specific skills and provide on-ramps for Detroit's workforce to enter the field. This will require investment in more intentional training, workforce development and business support.

INTRODUCTION

Over the past decade green stormwater infrastructure (GSI) has emerged as a way to manage stormwater that also produces co-benefits of reutilizing vacant land, enhancing water and air quality, and beautifying neighborhoods. The shift from gray to green infrastructure is also due in part to the federal mandate to address combined sewer overflows using GSI as part of the solution.

Millions of dollars are invested in GSI each year by public and private sectors in the Detroit region, and this trend is expected to increase. These projects need to be designed, installed, and maintained by highly competent professionals. Though this industry is in its infancy in Detroit, it is more developed in cities like Philadelphia, Portland, OR, and Washington, DC. These cities can offer lessons from which Detroit can learn.

Six peer communities were analyzed as comparable in size and demographics, but also representing different environmental, economic and political histories, and stages of GSI development, in order to learn from other GSI markets. The peer communities include Kansas City, MO; Milwaukee; Philadelphia; Portland, OR; Washington, DC, and Washtenaw County, MI. Detroit's GSI job market, policies and programs were analyzed to identify areas for improvement to elevate Detroit to a national GSI leader and provide greater economic impact for the region.

The job market, policies and programs of Detroit and these six other communities were assessed and recommendations made on how Detroit can ensure an inclusive workforce to fill this important job sector.

This report is designed to analyze:

- Local and national trends in GSI workforce.
- Existing and projected markets for GSI-related jobs in Detroit.
- Likelihood for those jobs to be filled by Detroiters, specifically low-income and underserved populations.

Lastly, recommendations are made on policies, funding, workforce programs, and business support related to green stormwater infrastructure.

GREEN VERSUS GREY INFRASTRUCTURE:

Green stormwater infrastructure (GSI) is defined in this report as practices designed to mimic nature and capture rainwater where it falls.

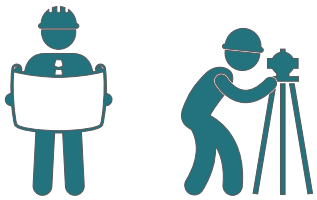
"GSI has proven superior to traditional gray infrastructure solutions in generating more accessible on-ramps for individuals to find employment... Green infrastructure projects are typically smaller in size and the bidding process is less capital intensive." [7]

Assessment Of The Detroit Region GSI Workforce

This report focuses on "GSI-related occupations" or occupations with tasks transferable to GSI work, including the design, installation, maintenance and inspection of green stormwater infrastructure practices. For example, roofers could be trained to install green roofs and pesticide handlers could be trained to maintain plant-based GSI practices. Forty occupations were identified in three categories, which are identified with examples of GSI-related occupations below:

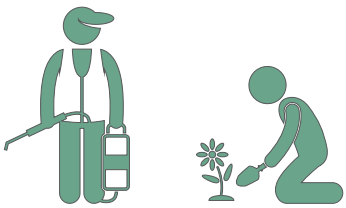
White collar occupations

- Examples: construction managers, architects, surveyors, environmental engineers, foresters, and hydrologists.



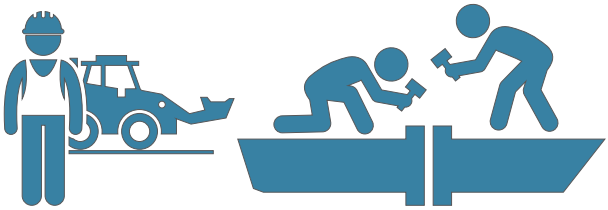
Landscaping occupations

- Examples: first-line supervisors, landscapers, groundskeepers, pesticide handlers, and tree trimmers.

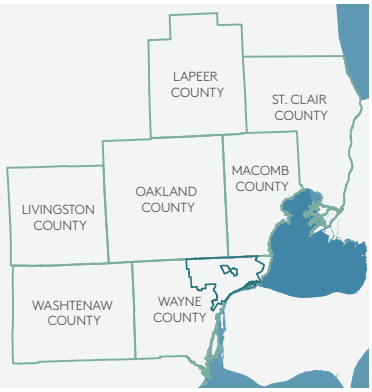


Construction occupations

- Examples: first-line supervisors, masons, laborers, pipelayers, roofers, excavators, water plant operators, and tractor operators.



CURRENT DETROIT GSI WORKFORCE



In this report, the Detroit region is defined as this seven county area, unless otherwise noted.

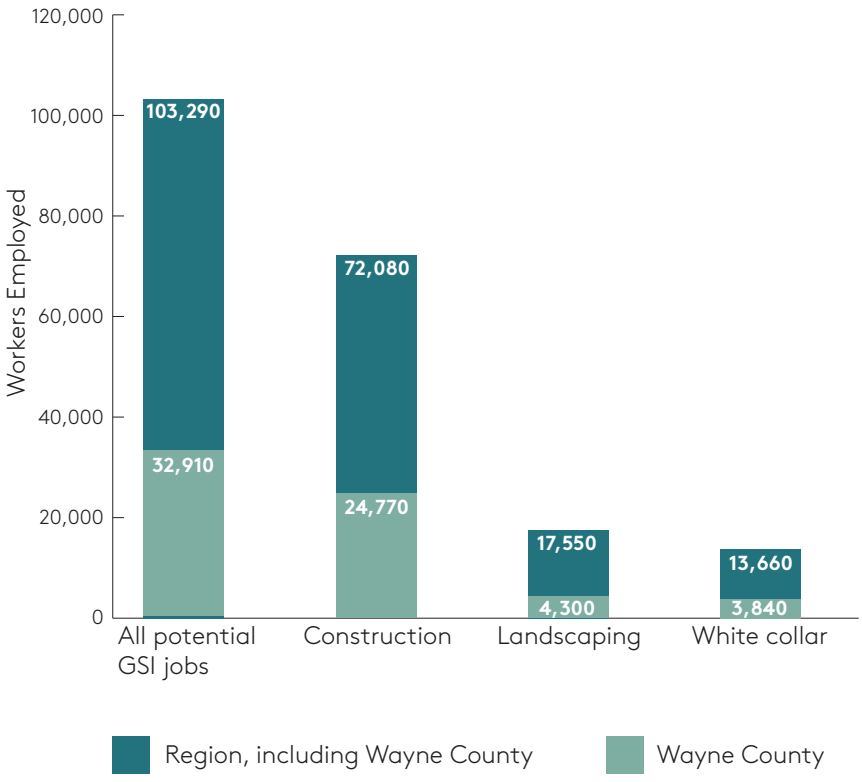
In the Detroit Metropolitan Area of Wayne, Oakland, Macomb, St. Clair, Lapeer, and Livingston counties, as well as in Washtenaw County, there are more than 103,000 jobs in GSI-related occupations as noted in Figure 1. Of those, 32% are in Wayne County, and the majority of the jobs are in construction.

These jobs grew at a rate of 21% in the region during 2010-17, far outpacing the national average, which grew at 12%. However, much of this growth was fueled by the recovery of the construction industry and not necessarily due to GSI directly, shown in Figure 2.

Of those holding a job in the GSI-related occupations, a percentage of them performs GSI work. For example, of the 110 pipelayers in the Detroit region, it is estimated that only 6 to 11 of them work on GSI projects. Figure 3 shows the number of jobs that likely do GSI work based on this percentage. The region has an estimated 3,000 to 8,000 workers performing GSI work.

2017 Workers employed in GSI-related occupations

FIGURE 1



Source: U.S. Bureau of Labor Statistics Occupational Employment Statistics and O*NET, 2017

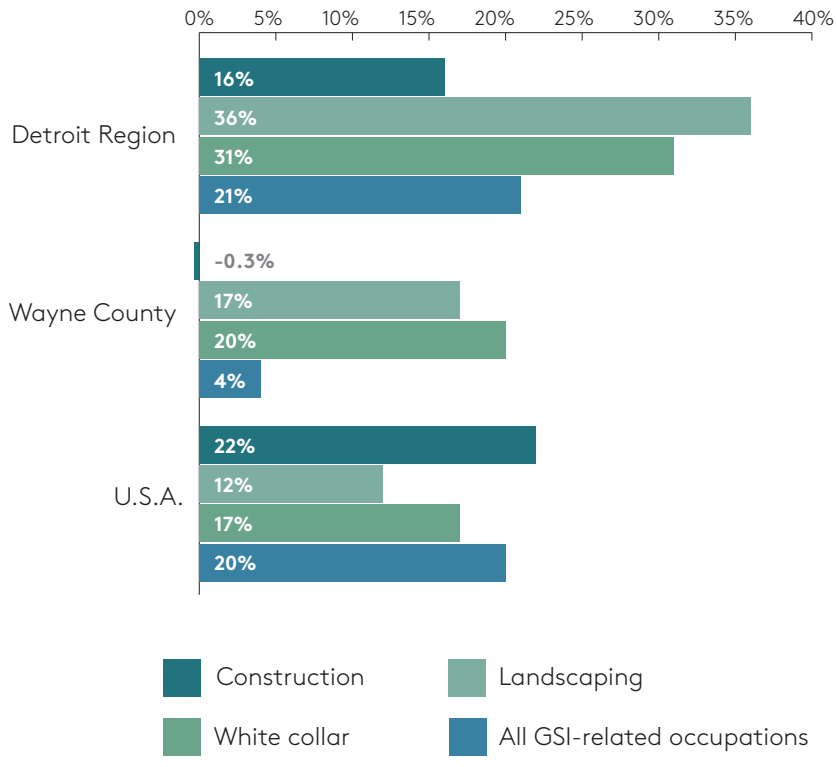
87% of jobs in GSI-related fields are accessible to those with less than a bachelor's degree.

Further, only a small percentage of those employees' time is spent working on GSI-related projects. It is more accurate to describe GSI work as specialized "functions" or "tasks" of an occupation.[8] Of the 110 pipelayers in the Detroit region, the 6 to 11 of them working on GSI projects spend only a fraction of their workload on those projects. To relate this more broadly to the region, there are 103,000 workers in GSI-related occupations, and only 3,000 to 8,000 of them perform GSI work; of that range, likely only a small fraction of their job is spent on GSI projects. The national average is 3% to 8% of GSI workers' time is spent on GSI projects.

Jobs in GSI-related occupations are only 5% of the region's total jobs, however, 87% of those jobs are considered highly accessible because they require only some college, or an associate's degree or less. Detroit Future City defines a middle-class household as one having an income between 80% and 200% of the national median household income, or between $46,100 and $115,300.[9] So, these GSI-related jobs are on average close to middle-class jobs with a national average wage of $43,700 annually.

GSI-related occupations job growth, 2010-17

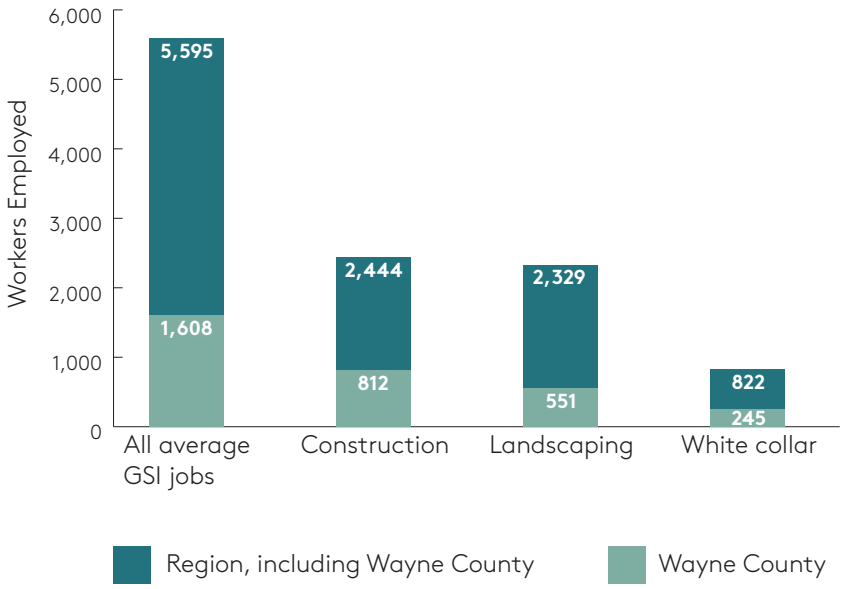
FIGURE 2



Source: Mass Economics analysis of OES data, 2017

2017 workers employed estimated to be performing GSI work

FIGURE 3

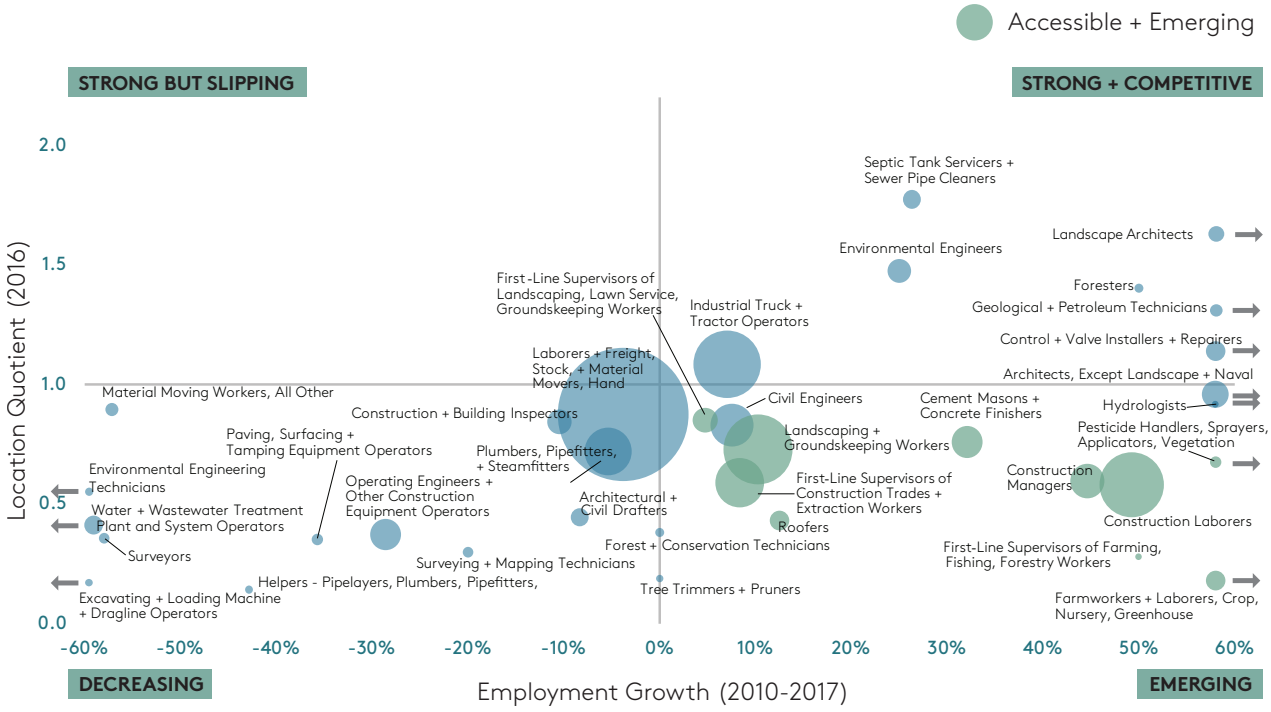


Source: Mass Economics, analysis of OES data, 2017

The occupations with the strongest potential for Detroiters are those considered accessible and emerging. These are jobs experiencing employment growth; in demand in the region; and that require some college, or an associate's degree or less. Figure 4 highlights (in green) the ten most accessible and emerging occupations. Emerging jobs are defined by those with positive employment growth and a location quotient (LQ) less than one. Location quotient is a statistic measuring a geography's specialization (e.g. Wayne County) relative to a larger geography (e.g. United States.)[10] The occupations with an LQ less than one can be seen as a weakness or gap in the industry. Emerging jobs will fall in this quadrant of occupations that are growing and which have a gap in the number of jobs expected to be in Wayne County.

Wayne County GSI occupation growth and concentration

FIGURE 4



Source: Mass Economics, analysis of OES data, 2017

The accessible and emerging occupations that are growing and also pay a middle-class wage above $46,000 annually include first-line supervisors of both landscaping and construction, construction managers, and cement masons.

OCCUPATION	Wayne County Location Quotient	Regional Location Quotient	2017 Regional Employment	Range of Regional Jobs Performing GSI Work	Regional Average Wage	Regional Employment Growth (2010-2017)	Wayne County Employment Growth (2010-2017)	Wayne County Educational Attainment of Some College or Below
First-Line Supervisors of Farming, Fishing, and Forestry Workers	0.3	0.2	70	4-7	$45,701	-13%	50%	86%
Construction Managers	0.6	0.5	2,170	11-109	$100,053	-1%	45%	65%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	0.2	0.2	670	67-101	$23,558	5%	271%	94%
First-Line Supervisors of Construction Trades and Extraction Workers	0.6	0.6	5,160	26-258	$71,539	9%	8%	89%
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	0.9	0.9	1,310	131-197	$53,955	27%	5%	80%
Cement Masons and Concrete Finishers	0.8	0.8	2,120	11-106	$48,444	30%	32%	96%
Construction Laborers	0.6	0.7	9,830	49-492	$41,873	33%	49%	94%
Landscaping and Groundskeeping Workers	0.7	1.1	14,920	1,492-2,238	$29,034	39%	10%	93%
Roofers	0.4	0.9	1,650	8-83	$44,900	83%	13%	97%
Pesticide Handlers, Sprayers, Applications, Vegetation	0.7	0.5	200	20-30	$35,887	400%	N/A	93%

LQ < 0.5 = High Growth Market Opportunity

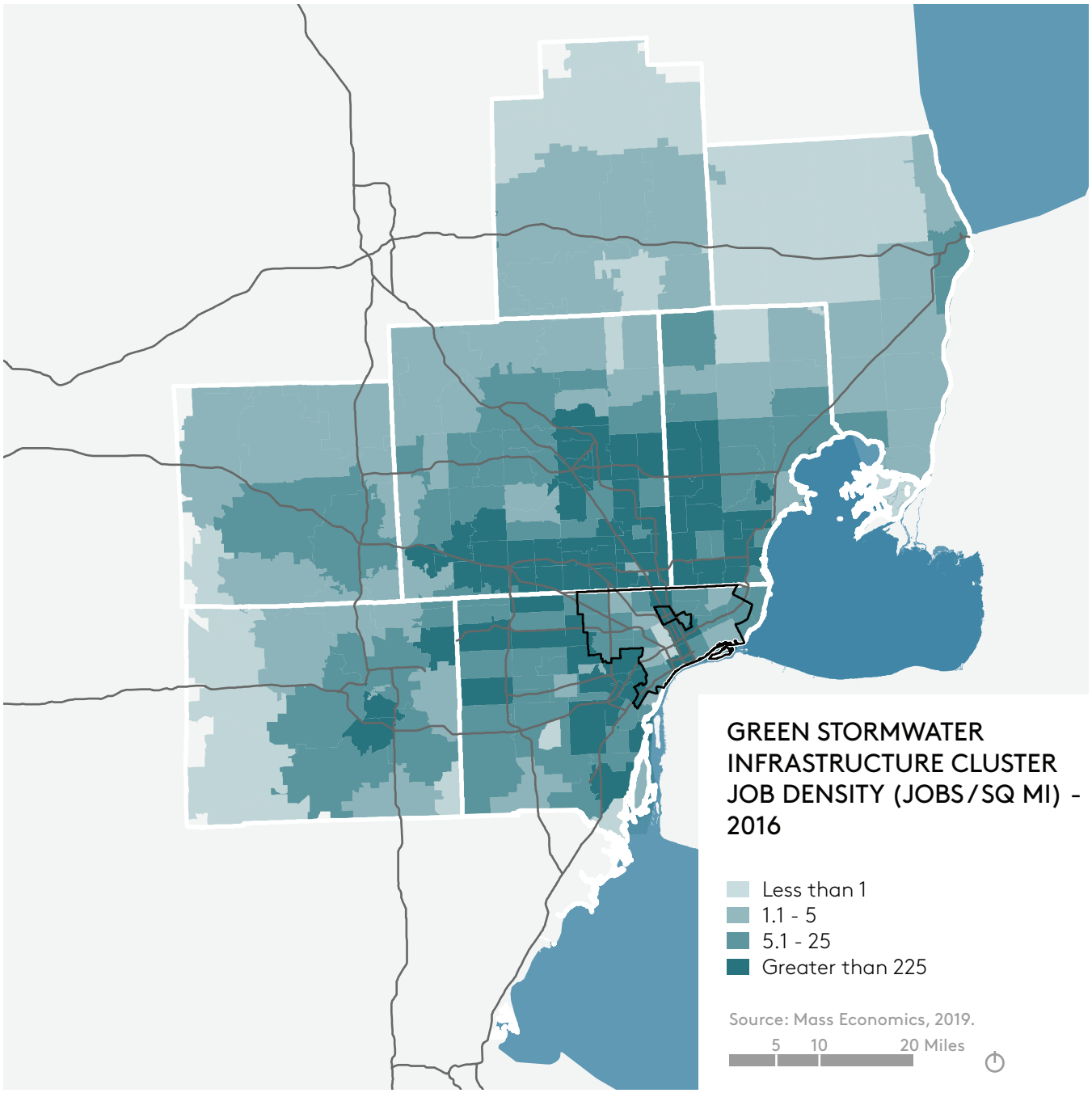
0.5 < LQ < 1.0 = Some Growth Market Opportunity

Middle Class Wage

Accessible & emerging occupations

Source: Mass Economics analysis of OES data, 2017

TABLE 1



GSI job density

FIGURE 5

Source: Mass Economics, analysis of OES data, 2017

Though certain jobs are growing and accessible, they are not necessarily concentrated in the City of Detroit or Wayne County. Figure 4 shows jobs are concentrated in the suburbs of Detroit, as well as in Ann Arbor and the Flint area. Intentional strategies would need to be created in order to make jobs performing GSI-related work more accessible to Detroiters.

Existing Detroit GSI Workforce Programs

A variety of local GSI workforce development programs exist and can be built upon, including:

- **Greening of Detroit: Green Conservation Corps –** This program offers Detroit residents six to eight-week trainings in tree artisanship and ornamental landscaping with a focus on GSI, training nearly 3,000 residents since 2010. The training includes hands-on experience with municipal and state contracts that Greening holds with the City of Detroit's General Services Department and the Michigan Department of Transportation. The programs have an 85% job placement rate for training graduates and have established partnerships through Greening's workforce development board.

Intentional strategies would need to be created in order to make jobs performing GSI-related work more accessible to Detroiters.

- **Sierra Club and Friends of the Rouge: Stormwater Action Team –** This team was created in 2019 to train residents in GSI maintenance. This eight-week program is in its pilot phase. It helps graduates from the Rain Gardens to the Rescue program, which installs residential rain gardens throughout Detroit, to obtain classroom and hands-on training in rain garden maintenance and a certificate for completion of the program.

- **Eastside Community Network: Green Team –** ECN launched the Green Team in 2018 to develop workforce talent to manage ECN's GSI investments. Participants received on-the-job training in basic landscaping and GSI services and gain substantial experience working on landscaping. This pilot program is under evaluation and seeking funding to re-launch in the future.

- **Detroit Training Center/DWSD: GSI Training for Contractors –** DTC is a workforce-development organization that partnered with the Greening of Detroit and the Detroit Economic Growth Corporation to launch a contractor GSI training program in 2017 aimed at training residents to enter the GSI market after the introduction of the DWSD drainage charge and in anticipation of the Post-Construction Stormwater Management Ordinance (PCSWMO). The program partnered with the City and nonprofits to provide 50 hours of training to contractors on topics including GSI construction and maintenance techniques.

    - Unfortunately, the GSI Training for Contractors program was not as successful as originally hoped. The program didn't attract the type of contractor for

which it was originally intended. The training occurred before new DWSD drainage charge and GSI policies were fully established, thus there wasn't much demand for GSI projects after the training. Many of the program participants were non-profits and suburban landscaping contractors, not necessarily the desired target audience of Detroit landscaping companies. Lessons learned from this training informed many of the recommendations made in this report for training and workforce development.

If new GSI training programs are created, there are additional workforce-training programs to partner with, including:

- **Detroit Employment Solutions Corporation (DESC)** – DESC is the implementation entity of the Mayor's Workforce Development Board, and thus the workforce development hub for the City of Detroit. DESC focuses on high growth, high-demand sectors, including construction. Though they currently do not offer GSI training programs, they do work with local workforce development training centers and employers to support employer-led initiatives.

- **Detroit Public Schools Community District Sustainable Construction Program** – As Detroit focuses more on workforce development, the City has revitalized the DPSCD's Vocation and Career Technical Education programs. Focusing on seven areas, including construction, students can jointly take specialized vocational trainings and attend their high school classes, and some trainings are connected with six-week internships and apprenticeships. New program curriculums currently under development include sustainable construction management, bricklaying and masonry, and plumbing and pipefitting. The new program curriculums could potentially add a GSI training component.

FUTURE WORKFORCE GROWTH

The current GSI job market is driven by policies, regulations and the increasing investments made in GSI in Detroit. These drivers include public, private and philanthropic spending on GSI. Public spending has been driven by the Detroit Water and Sewerage Department's (DWSD) National Pollutant Discharge Elimination System (NPDES) permit requiring DWSD to spend $50 million on GSI plans, policies, and installations between 2013 and 2029.[11] This permit spending requirement drove DWSD to update its drainage charge and to create the Capital Partnership Program grant and the DWSD Post-Construction Stormwater Management Ordinance (PCSWMO), all driving more public and private spending on GSI. In addition, philanthropic investments in GSI are increasing.

DRIVERS OF GSI INSTALLATION IN DETROIT:

- **National Pollutant Discharge Elimination System permit requiring GSI as a solution to eliminate combined sewer overflows (CSOs) in the Upper Rouge Tributary by using GSI.[12]**
- **Mandate to spend $50 million on GSI installations, plans and policies by 2029 ($16.9 million spent as of fiscal year 2018).**
- **Update to DWSD drainage charge based on impervious surface and creation of the Green Credit program for nonresidential customers to lower their charges by installing GSI to manage stormwater.**
- **Allocation of $5 million per year for DWSD's Capital Partnership Program (CPP), providing matching funds for installation of nonresidential GSI (currently spending $0.9 million per year).[13]**
- **New DWSD Post-Construction Stormwater Management Ordinance (PCSWMO) requiring development projects creating or replacing 0.5 acre of impervious to manage stormwater.[14]**
- **Philanthropic spending on GSI including the National Fish and Wildlife Foundation's Southeast Michigan Resilience Fund.**

Projections were modeled using four scenarios:

- "Declining investment" phases out DWSD investment and DWSD's Capital Partnership Program after 2029.
- "Baseline investment" at current rate of spending and phases out DWSD investment after 2029 but maintains the CPP at 2019 levels through 2039.

- "Modest investment" phases out DWSD investment after 2029 and increases the CPP investment to $5 million per year by adding $1 million each year and continuing through 2039.
- "Significant investment" continues DWSD investment spending after 2029 at $13.7 million per year and increases the CPP investment to $5 million per year by adding $1 million each year and continuing at $5 million a year through 2039.

The four scenarios varied based on differing levels of investment of numerous GSI funding sources, as shown by Table 2. Post-Construction Stormwater Management Ordinance (PCSWMO) private investment remained constant for all scenarios due to modeling projections of annual spending, however, adjustments were made based on varied growth rates for each scenario. The Southeast Michigan Resilience Fund also remained at a constant for all four scenarios after speaking with the program managers, who anticipate that funding levels will remain around the current level. DWSD has not committed to any spending beyond 2029, so DWSD investment for the "declining" and "baseline" investment scenarios phases out its investment, and the "modest" and "significant" investment scenarios increase the department's spending. The "significant investment" scenario considers future DWSD spending at $13.7 million per year in order to project the jobs impact that could be realized if DWSD were to increase its GSI spending levels to half of the amount that Philadelphia spends on GSI per capita. Currently, the Philadelphia

GSI Investment Scenarios

TABLE 2

	DWSD INVESTMENT	CAPITAL PARTNERSHIP PROGRAM (CPP)	PCSWO	SE MI RESILIENCY FUND
DECLINING INVESTMENT	Phase out after 2029	Remain at $900K until 2029, then phase out	$800K	633K
BASELINE INVESTMENT	Phase out after 2029	Remain at $900K	$800K	633K
MODEST INVESTMENT	Continue DWSD investment post-2029 at $2.5 M per year	Increase to $5M per year by adding $1M each year, continue at $5M until 2039	$800K	633K
SIGNIFICANT INVESTMENT	Continue DWSD investment post-2029 at $13.7 M per year	Increase to $5M per year by adding $1M each year, continue at $5M until 2039	$800K	633K

Source: Detroit Future City, model scenarios

Water Department is estimated to spend $41 per person annually on GSI, while DWSD spends roughly $4 per person each year. It is important to note that Philadelphia and Detroit have different economies, populations, and permit requirements for GSI, however, it was chosen as a basis for significant investment because Philadelphia is a national leader in GSI. The modest investment scenario projects DWSD's investment at $2.5 million per year after 2029. Different Detroit development growth rates were considered using the compound annual growth rate of Detroit building permit data, however, the growth rate had little impact on the results, so a neutral growth rate was applied.

These four scenarios led to four different outcomes. The results depict full-time equivalent employment numbers supported each year by these GSI investments (not cumulative impact over time), and are meant to illustrate the range of potential jobs that could be associated with GSI. A full-time equivalent (FTE) is a unit that would be equivalent to an employee spending 100% of their workload on GSI projects. We know that no workers in GSI-related occupations are estimated to be spending 100% of their workload on GSI. Rather, the percentage of workload ranges from less than 5% up to 75%. The average amount of time spent on GSI projects in GSI-related occupations nationally was 3% to 8% in 2017.

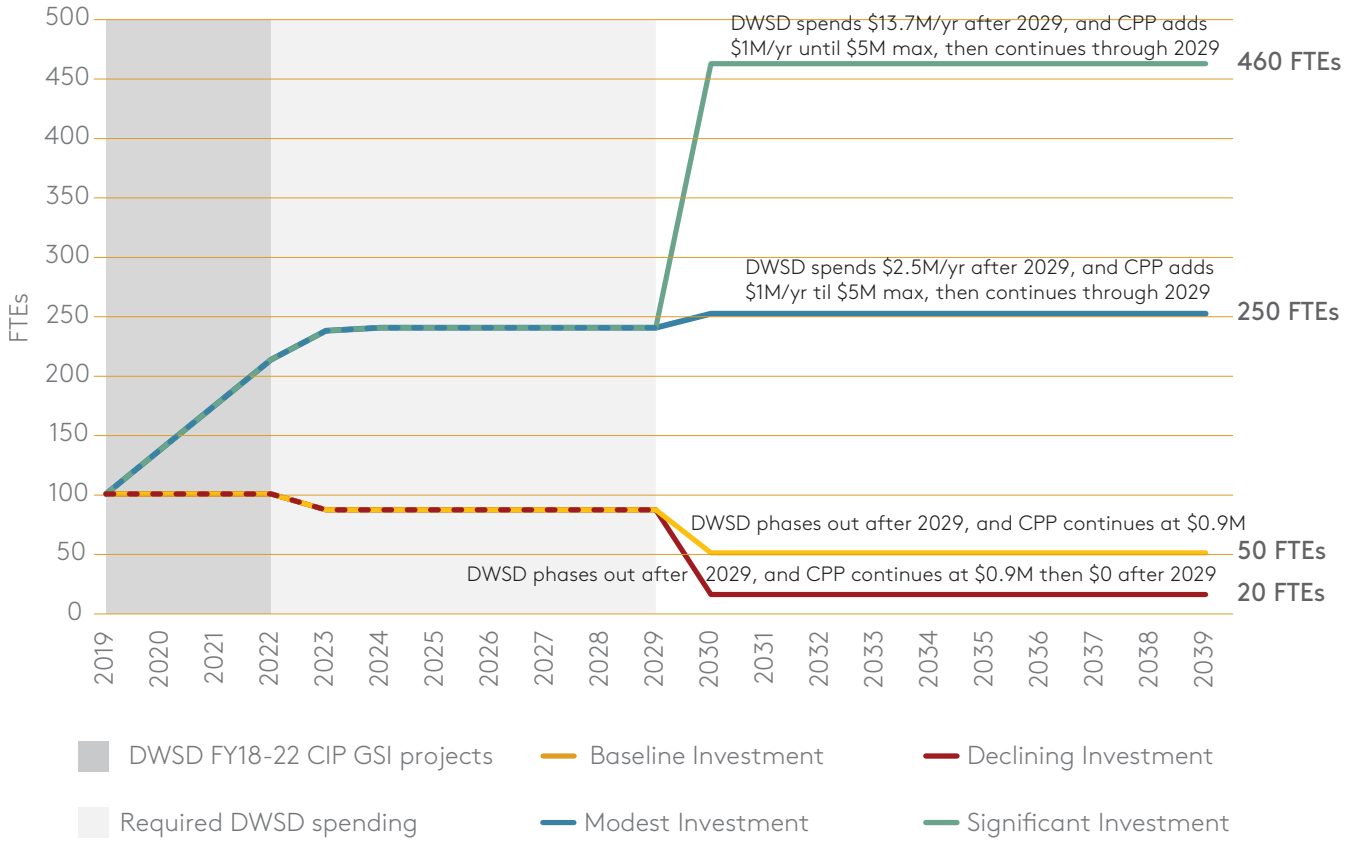
The jobs impact for 2019 is around 100 full-time equivalents (FTEs) for all four scenarios. By 2039, the scenarios demonstrate a range of approximately 20 to 460 GSI FTEs. The long-term estimate for the declining investment scenario is approximately 20 FTEs; the baseline investment yields approximately 50 FTEs; the modest investment scenario yields approximately 250 FTEs; the significant investment scenario yields approximately 460 FTEs. These FTE numbers would result in a larger number of job ranges for people performing GSI work as functions or tasks of their job., however it is difficult to extrapolate a range of workers that could spend a portion of their workload on GSI as that data does not exist. Therefore, jobs impacts are reported in FTEs alone, though the actual jobs numbers would be greater. Generally, blue-collar jobs (such as landscaping and construction work) make up two-thirds of all jobs across the four scenarios. It is notable to add that landscaping jobs have a higher average percentage of workload, at 10% to 17%.

Based on occupational data, it is estimated that Wayne County already has approximately 830 to 2,400 FTEs estimated to perform some GSI work. Because the projected demand for jobs falls within

GSI range of potential FTEs impact

FIGURE 6

the range of jobs in Wayne County, the results do not indicate that new jobs will be created but that the demand can be met with the existing GSI workforce. In order for new jobs to be created, investment would need to be increased. The results indicate that the GSI workforce can be developed with training programs targeted to the existing workforce.



Source: Mass Economics model for GSI jobs impacts, 2019

The results indicate that the GSI workforce can be developed with training programs targeted to the existing workforce.

It is unsurprising that GSI in Detroit may not have a large impact on job creation because of the current anticipated levels of investment. If public investment in GSI were to increase to levels seen in cities like Philadelphia, which has committed more than 33 times Detroit's public investment in GSI, then the demand for additional jobs in GSI-related occupations would be expected to increase accordingly. It is also important to acknowledge that public investment in GSI is not the only driver of GSI jobs and that public policy, as well as public acceptance and adoption, are also factors in GSI job demand. Accordingly, public spending is not necessarily proportional to GSI FTEs, but does play a significant role.

LEARNING FROM PEER COMMUNITIES

The research looked to peer communities to assess their GSI workforce trends and analyze what policies, funding and programs were most beneficial for GSI-related occupations. Five cities and one county were chosen, including:

- Kansas City, Missouri
- Milwaukee
- Philadelphia
- Portland, Oregon
- Washington D.C.
- Washtenaw County

Highlights of peer community learnings are provided below, however further detailed information on policies and programs can be found in the GSI Workforce Assessment Peer Community Appendix.

Historical Context

These peer communities represent different environmental, economic, and political histories, and as a result, they are in different stages of developing GSI ecosystems.

- Kansas City and Milwaukee have nascent relationships with GSI: Kansas City entered into a consent decree with the Environmental Protection Agency in 2010 because of excessive combined sewer overflows,[15] and though green stormwater infrastructure was a substantial part of its control plan, the city has limited GSI programs.[16] Though the Metropolitan Milwaukee Sewerage District (MMSD) has supported GSI on a regional scale for several years, the City only recently published its Green Infrastructure Plan in 2019.[17]

- Philadelphia, Portland, and Washington, D.C. have established relationships with GSI: Philadelphia incorporated GSI into its long-term control plan, – Green City, Clean Waters – in 2011, in part due to the relative affordability of green over gray infrastructure.[18] Portland has long incorporated GSI into its planning efforts, dating back to the early 1990s. In 2005, Washington, D.C., like Kansas City, entered into a consent decree with the EPA, and has undertaken creative solutions, like the Stormwater Retention Credits Trading Program, to ensure that new development supports the city's environmental objectives.[19]

- Washtenaw County also has a fairly established history with GSI, as it has used education and technical assistance to increase community GSI awareness for more than a decade.[20] Washtenaw County is also valuable as a local comparison, as it adheres to the same state-level regulations as Detroit.

Public Spending and Jobs in Peer Cities

Among all communities studied, Philadelphia recorded the highest total amount of committed public spending, at $1.67 billion, followed by Portland at $167 million. Portland has the highest estimated number of jobs performing GSI work, approximately 1,200 to 3,400.

Table 3 shows peer community public spending on GSI and the estimated range of GSI jobs. It is important to note that job ranges are not directly proportional to public spending on GSI. These geographies have unique occupational strengths and weaknesses, economies, construction, and labor costs, as well as ways of allocating spending that all have an impact on the number of jobs in the area. Additionally, different geographies have different distributions of

Peer City Public Spending on GSI and GSI Full Time Equivalent Estimates

TABLE 3

PEER	COMMITTED PUBLIC SPENDING ON GSI	TIMEFRAME	ESTIMATED AVERAGE ANNUAL SPENDING	GSI JOB RANGE IN COUNTY, 2017[22]
Philadelphia	$1.67 billion[23]	2009-2034	$64.2 million	580-1,900
Portland	$167 million[24]	1991-2011	$5.1 million	1,200-3,600
Washington, D.C.	$90 million[25]	2015-2025	$8.2 million	430-1,200*
Kansas City	$70.9 million[26]	2010-2021	$6.4 million	Unknown
Wayne County	$50 million[27]	2010-2019	$2.9 million	830-2,400
Milwaukee	$54.8 million[28]	2012-2024	$4.6 million	Unknown
Washtenaw County	$21 million	2007-2019	$0.25 million	270-670

*Washington D.C. GSI job range is just for the District of Columbia, not the county area.

Source: Mass Economics, analysis of OES data, 2017

employment in GSI-related occupations, which can have an effect on the number of GSI jobs.[21] For example, one city may have a stronger landscaping industry than another, which will impact the GSI jobs. Table 3 also does not track the amount of private or philanthropic GSI spending. In summary, each geography is unique, and a number of different factors affect the GSI jobs range including public spending on GSI.

PHILADELPHIA: THE ECONOMIC IMPACT OF GREEN CITY, CLEAN WATERS, 2016

It is estimated that roughly 1,000 jobs per year and $60 million in annual economic impact is supported by the GSI industry in Philadelphia.

The 2019 update outlines that two-thirds of GSI projects were built in low-income census tract areas and were associated with a decrease in crime and health costs.

WASHINGTON, DC: GREEN COLLAR JOBS DEMAND ANALYSIS FINAL REPORT, 2009

This report was not limited to just GSI, but included a broad range of green policies, including green transit, solar, etc. It is estimated that more than 169,000 jobs in Washington, D.C. may be created over 10 years, largely as a result of the Green Building Act and its mandate for private development.

Despite the growing presence of GSI and related green workforce development initiatives, there are few studies in the peer communities that have analyzed the impact of GSI policies and programs on employment. Two examples, which analyze green jobs in Washington, D.C., and the impact of Green City, Clean Waters in Philadelphia highlight the economic impacts of the GSI sector.

Peer Community GSI Programs

TABLE 4

PEER COMMUNITY	GOVERNMENT PLAN OR PROGRAM
Philadelphia	Increased Investment: It is estimated that the GSI industry produces $60 million in annual economic impact within the City of Philadelphia.[29] Greened Acre Retrofit Program (GARP): Grant funding up to $90,000 per managed impervious acre, for multi-property programs.[30] Sustainable Business Network of Greater Philadelphia: Brings together GSI-related businesses to learn from one another and host the Excellence in GSI Awards.[31]
Portland	Workforce Landscaping Companies: Verde Landscape is a social enterprise which focuses on hiring under-employed Portland residents and trains them to work on GSI projects.
Washington, D.C.	Stormwater Retention Credits (SRC) Trading: Program that enables property owners to sell their stormwater credits achieved by installing GSI to noncompliant properties.[32]
Kansas City	10,000 Rain Gardens: Outreach campaign to promote rain garden installations across the city.[33]
Wayne County	DWSD Capital Partnership Program: Funding program designed to support the design and installation of GSI by nonresidential customers in the form of a 50/50 matching reimbursable grant of up to $50,000.[34]
Milwaukee	Fresh Coast Guardians: Resource center run by the Sewer District providing technical assistance for design, installation, maintenance and workforce training for GSI.[35] Workforce Landscaping Companies: Blue Skies Landscaping is a social enterprise which focuses on hiring under-employed Milwaukee residents and trains them to work on landscaping, urban agriculture and GSI.
Washtenaw County	Washtenaw County Master Rain Gardener Program: This program has supported the development of local landscaping talent with a focus on understanding native plants.[36]
Multiple Cities	National Green Infrastructure Certification Program (NGICP): National program to provide specialized GSI training to professionalize the industry.

Source: Mass Economics & Detroit Future City, analysis of peer community GSI programs.

Spotlight on Philadelphia

Philadelphia's suite of GSI spending, policies, and programs stands out as an exemplary peer community. Philadelphia is expected to spend $1.67 billion between 2009 and 2034,[37] compared to $50 million in Detroit from 2010-19. This has resulted in an estimated 1,000 annual GSI jobs in Philadelphia. In addition, the GSI industry is estimated to have produced $60 million in annual economic impact.[38]

The Green Acre Retrofit Program has awarded $36.5 million in grants for large-scale stormwater retrofit projects, as of 2019.

In addition to the city's emphasis on GSI through its long-term control plan, Green City, Clean Waters in Philadelphia invests heavily in GSI installation through numerous programs, including:

- **Stormwater Management Incentive Program (SMIP):** Subsidizes the capital expenses associated with GSI and is offered in conjunction with the Philadelphia Industrial Development Corporation (PIDC).[39] Applicants can receive up to $100,000 in grant funding for each managed impervious acre.[40] According to Philadelphia's data on private GSI retrofits, SMIP has awarded $27.1 million in grants, as of 2019.[41]

- **Greened Acre Retrofit Program (GARP)[42]:** GARP solicits multi-property GSI proposals from developers, providing grants for "large-scale stormwater retrofit projects."[43] The program solicits bids from developers through a "competitive subsidy program" and makes grants based on the most cost-effective, multi-property project proposals. GARP awards up to $90,000 in grant funding for each managed impervious acre. GARP has awarded $36.5 million in grants, as of 2019.[44]

- **Rain Check:** Encourages residents to utilize GSI on their property, in part by subsidizing the cost of various GSI, such as rain barrels, rain gardens, and permeable paving.[45] (The amount of the subsidy varies based on the type of installation.) The program also includes workshops and installation help. Rain Check is overseen primarily by the Pennsylvania Horticultural Society (PHS) and the Sustainable Business Network of Greater Philadelphia (SBN).

Two-thirds of GSI projects in Philadelphia were built in low-income census tracts and were associated with a decrease in crime and financial gains in health savings in those areas.

Philadelphia also has a variety of programming partners that support the industry including: Sustainable Business Network – GSI Partners Program and PowerCorps PHL.

Two-thirds of GSI projects in Philadelphia were built in low-income census tracts and were associated with a decrease in crime and financial gains in health savings in those areas.[46] The economic benefits of GSI should also be considered as an important factor in prioritizing green over gray infrastructure.

Themes from Peer Cities Best Practices

Each of the peer communities operationalized their public GSI commitment in a variety of ways, however each focused on one or more of the following tactics:

- Establish green workforce training programs and/or (paid or volunteer) maintenance corps.
- Incorporate GSI into long-term control plan for combined sewer overflows.
- Leverage market strength to support new GSI.
- Target public assets or rights-of-way for GSI investment.
- Encouraged private investment in GSI by implementing tactics such as:
    - Grant programs.
    - Stormwater credits.
    - Technical assistance.
    - Development incentives/tax credits.
    - Educational campaigns and awards to showcase private GSI.

These best practices informed the recommended strategies chosen to strengthen the Detroit GSI market.

STRATEGIES FOR MAXIMIZING DETROIT'S GSI WORKFORCE

Using data analysis of the current and future GSI workforce in Detroit and the region, along with similar data and the qualitative analysis of six peer communities, a set of four overarching themes emerged:

- Policy and funding improvements
- Specialized GSI training
- GSI workforce development for Detroit
- GSI Detroit-based business support

Nine potential strategies are embedded in those four themes and are described below for Detroit to consider in order to maximize the economic benefits to Detroit and its residents.

Policy & Funding Recommendations

To increase the co-benefits of GSI to neighborhoods, such as reduced crime and improved air and water quality, while also increasing demand for workforce, the scale of GSI installations will need to increase. Though the projections show likely increases based on public and philanthropic investment, that increase could be amplified by adjusting existing programs and investing more in GSI installation. In addition, to match those jobs with Detroit residents, more needs to be done to encourage Detroit-based GSI businesses and jobs.

GSI Installation at Southwest Detroit Business Association

Site clearing at SDBA included depaving an alley to install a GSI practice

Photo Credit: Hamp Mathews & Associates

RECOMMENDATION # 1

INCREASE TECHNICAL ASSISTANCE TO PROPERTY OWNERS IMPLEMENTING GSI.

Though the Detroit Water and Sewerage Department has allocated $5 million per year for its Capital Partnership Program (CPP) to provide matching funds for the installation of nonresidential GSI, it is currently spending only $900,000 per year on this effort. One of the barriers to implementation includes a lack of technical assistance to understand the seemingly complicated process.

In order to increase the number of CPP applications and GSI installations by nonresidential property owners, DWSD could partner with local nonprofit agencies – such as Detroit Future City or the Greening of Detroit - to provide greater technical assistance. This community outreach to nonresidential property owners is needed to inform them about the CPP, as well as to provide detailed technical assistance in the design stage and into construction.

PROGRAM SPOTLIGHT: MILWAUKEE METROPOLITAN SEWAGE DISTRICT'S FRESH COAST GUARDIANS RESOURCE CENTER

Created in 2016 by the Milwaukee Metropolitan Sewage District, the Fresh Coast Guardians Resource Center (FCG) serves as a GSI information and service hub for residents and municipalities of Milwaukee County. FCG offers technical support to property owners seeking to install GSI.

Nonresidential support services provided include:

- Basic design assistance.
- Grant support of up to $15,000 for advanced design services.
- Project funding from MMSD's Green Infrastructure Partnership Program.
- Listing of local vendors.

Residential support programs include:

- Rain Check, a program that provides a home water conservation and GSI kit that shows residents how to prevent CSOs and protect Milwaukee's waterways
- Rain barrel workshops and giveaways
- A suite of tutorials on everything from lawn care to rain garden installations[47]

RECOMMENDATION # 2

PROVIDE 100% REIMBURSEMENT FOR DWSD CAPITAL PARTNERSHIP PROGRAM.

Another barrier to maximizing the Detroit Water & Sewerage Department's Capital Partnership Program is its cost to applicants. The high cost of GSI and its low return on investment, as well as the small pool of funding currently being offered, are major barriers for GSI projects in Detroit. DWSD offers reimbursement to cover half of the cost of GSI projects up to $50,000. Other cities, such as St. Louis and Philadelphia, offer capital assistance up front through a revolving loan fund that can be reimbursed by the water utility at the completion of the project.

It is recommended that DWSD increase the level of funding awarded to applicants for their projects to 100%. By working with local community development financial institutions (CDFIs), the CPP could be awarded through a revolving loan fund in which the CDFI could cover the upfront costs of design and construction with DWSD reimbursing the CDFI directly at the close of each project. This model would allow for more customers, particularly faith-based institutions and small businesses, to take advantage of the program in larger numbers and for projects to be implemented more quickly.

PROGRAM SPOTLIGHTS

GreenPrint Partners & St. Louis Rainscaping Grant Program:
GreenPrint Partners helps scale up GSI in St. Louis by managing and providing funding for the entire GSI project. They work with partners to manage the entire process by providing upfront capital, design, and installation. GreenPrint Partners is reimbursed at completion by the St. Louis Rainscaping Grant Program, which funds GSI projects at $180,000 per acre managed.[48]

Philadelphia Stormwater Management Incentive Program & Greened Acre Retrofit Program:
These programs offered by the Philadelphia Water Department fund GSI projects at 100% reimbursement. See the Spotlight on Philadelphia section above for more information.

RECOMMENDATION # 3

INCREASE ANNUAL PUBLIC INVESTMENT ON GSI.

The Detroit Water and Sewerage Department should increase its overall annual investment on effective GSI practices in order to achieve a greater economic and job impact. Though this report does not recommend a specific threshold of increased spending on GSI by DWSD, it did explore a significant investment scenario, which considered future DWSD spending at $13.7 million per year, which equates to half of Philadelphia's per capita annual spending on GSI. Increased investment in green stormwater infrastructure in Detroit will not only lead to reduction on stormwater overflows, but will also contribute to workforce development, higher quality of life, improved property values, and increased tax revenues. Those benefits will be even greater if more focus is put on building Detroit-based companies that employ Detroiters for GSI-related work.

SPOTLIGHT ON ECONOMIC IMPACT OF GSI IN PORTLAND & PHILADELPHIA

Portland, Verde Landscape:
Portland has a successful example of a local GSI and landscaping training program and social enterprise, called Verde Landscape that focuses on hiring low-income Portland residents. In a 2017 Ecotrust study, it was found that every dollar spent on a Verde Landscape project generated almost $2 of economic activity in Portland. Additionally, the study found that for each full-time equivalent job generated directly by Verde Landscape, a total of 1.44 jobs are generated throughout the Greater Portland economy.

Philadelphia:
Philadelphia's estimated $1.67 billion in public and private spending on GSI over the 25 years of the Green City Clean Water Program is estimated to result in a total expenditure impact of $3 billion within the city, supporting about 1,000 jobs each year and approximately $1.5 billion in total labor income.[49]

It is estimated that proximity to a GSI feature produces at least a 10% increase in house value, which means that the 496 GSI projects that were completed in the first five years have yielded an aggregate $1.3 billion increase in citywide property value, producing an annual increase of $18 million in property taxes for city government and for the School District of Philadelphia. In aggregate, the City of Philadelphia will gain an additional $48 million of additional tax revenue over 25 years, or about $2 million per year during that time.[50] Additionally, two-thirds of GSI projects in Philadelphia were built in low-income census tract areas and were associated with a decrease in crime and financial gains in health savings.[51]

RECOMMENDATION # 4

ENCOURAGE MORE DETROIT-BASED JOBS AND BUSINESSES WITH STRONGER LOCAL HIRING AND PROCUREMENT REQUIREMENTS.

Though there is currently a demand for workers in GSI, (and that demand could grow with increased GSI installations) those jobs are not necessarily going to Detroiters, as noted in Figure 5. In order to encourage more Detroit-based businesses and jobs, adjustments could be made to the local hiring requirements and price-equalization percentage points for awarding contracts by DWSD and other City departments.

Local hiring requirements

Detroit has local hiring requirements to help underemployed and unemployed residents gain access to employment opportunities. They could be strengthened, however. Currently, Executive Order 22 requires that contracts of more than $3 million have 51% of project teams comprised of Detroit residents.[51] DWSD currently complies with this order, but is not required to as they have procurement requirements which differ from other City of Detroit departments.

Philadelphia Water Department's focused efforts on increasing participation of minority, women, and disadvantaged business enterprises increased their contracts from 17% in 2010 to 30% in 2015.

Other cities' policies include:

- Milwaukee: Construction contracts of more than $500,000 or development projects with $1 million in financial assistance require 25% of the construction hours worked to go to residents of special impact areas.[52]
- Portland: The Subcontractor Equity Program mandates that construction contracts of more than $150,000 require 20% of the construction hours to be worked by minorities, women or small-business enterprises.[53]
- Philadelphia: The Director of Participation works to increase participation of minority, women, and disadvantaged business enterprises in water department contracts. The policy increased participation from these businesses from 17% in 2010 to 30% in 2015.[54]

The requirements could be increased over time so that GSI construction contracts receiving DWSD financial assistance (CPP) of $100,000 or more, or all DWSD construction contracts above $150,000, require higher local workforce levels by 2025.

Procurement requirements

In order to support businesses based in Detroit and the hiring of city residents, it is recommended that DWSD increase the Price Equalization percentage points[55] for GSI Request for Proposals (RFPs) as shown in Table 6. Price equalization helps level the playing field for disadvantaged business enterprises by applying percentage points to reduce the relative cost of their contract bids. The current percentage points given are not enough to cover the increased cost of doing business in Detroit (e.g. taxes, insurance, etc.). Increasing these points can help offset those costs.

Price Equalization Points

TABLE 6

EQUALIZATION CATEGORY	CATEGORY DESCRIPTION	CURRENT % POINTS
DETROIT-BASED BUSINESS	Business based in Detroit	2
DETROIT-RESIDENT BUSINESS	51% of employees are Detroit residents	2
JOINT VENTURES	Joint venture of separate firms, including a Detroit-based or Detroit-resident business, which provides at least 51% of the performance and receives at least 51% of the compensation	1
MENTOR VENTURES	Mentor venture of separate firms, including a Detroit-based or Detroit-resident business, which provides at least 30% of the performance and receives at least 30% of the compensation	1

Though other departments have funding streams that allow for more targeted support of women- and minority-owned businesses, DWSD does not have the legal flexibility to give preference to these categories of businesses. However, DWSD can engage these businesses by connecting them to the services that would help build their capacity to bid on municipal contracts. Through this type of support, there is a greater likelihood to increase participation by and selection of disadvantaged business enterprises in the bidding process.

City of Milwaukee Bioswale

On behalf of the City of Milwaukee Public Works, Blue Skies Landscaping maintains bioswales in many of the City's boulevards.

Photo Credit: Walnut Way Conservation Corp.

PROGRAM SPOTLIGHT: CITY OF MILWAUKEE & BLUE SKIES LANDSCAPING

In 2009, Milwaukee revamped its procurement process through its Resident Preference Program (RPP) to connect residents with living-wage jobs, particularly in construction. The RPP requires at least 40% of the hours worked on public works contracts to be completed by city residents who meet specific underemployment or unemployment qualifications. The RPP also applies to private development projects receiving financial assistance from the City. The City's housing authority also administers federal programs with targeted hiring requirements, and several other local governments have targeted hiring programs of their own, including Milwaukee County, the Milwaukee Metropolitan Sewerage District, and Milwaukee Public Schools.[56]

Blue Skies Landscaping (BSL) is a subsidiary of the Walnut Way Conservancy community development corporation and is a social enterprise that has benefited from the new procurement process. BSL was originally created to train residents to manage the landscaping, urban agriculture and GSI that Walnut Way had installed. BSL quickly became a trusted source of local talent in the landscaping industry. Based in one of the RPP ZIP codes that targets hiring, larger developers began to turn to BSL to meet their landscaping and GSI needs, as well as their RPP requirements. This allowed BSL to develop a mentorship relationship with Simon's Landscaping, one of the largest landscaping firms in the city. Through the mentorship, BSL gained experience in more complex GSI installations. This partnership allowed them to build capacity, access more expensive equipment, and build their skills to win more jobs, including municipal contracts.[57]

Specialized GSI Training

Local experts in the Detroit region recognize that GSI workers require specialized training to meet the growing demand. Specialized GSI training targeted towards existing GSI professionals will help to professionalize and develop the industry.

RECOMMENDATION # 5

PROFESSIONALIZE REGIONAL GSI FIELD THROUGH EDUCATION AND CERTIFICATION.

The current workforce has strengths in construction, engineering, and design, but it may need support to connect into GSI-specific jobs. Specialized training or certification could provide that training. Since its inception in 2016, the leading program is the National Green Infrastructure Certification Program (NGICP). Detroit could deploy a modified version of the NGICP that could include more site visits and hands-on learning by expanding the program to 70 hours from the typical 35, offering a flexible schedule, and a specialized curriculum. This effort could be coordinated with the existing training program that was launched by the Detroit Economic Growth Corporation in partnership with Detroit Training Center, the Detroit Water & Sewerage Department, Greening of Detroit, and Reroot Pontiac, who recently obtained certification to offer NGICP training.

NATIONAL GREEN INFRASTRUCTURE CERTIFICATION PROGRAM (NGICP)

Established in 2016, the NGICP is a national program that offers standardized baseline GSI installation and maintenance education and certification. Municipalities often supplement the NGICP certification with required additional localized training for graduates of the program through continuing professional education credits.

Graduates: 545 nationally

Target audience: The NGICP is tailored for individuals who are supplementing an already existing level of knowledge in the landscape or related field. Municipalities have the option of building a workforce development program around the NGICP program, doubling or tripling the length of the program to include basic math, reading, and job readiness skills.

Current program requirements: High school diploma or GED

Training length: The standard program is completed in 35 hours, over five days, including one day of training in the field. After the program, participants must pass an exam to receive certification.

How cities have modified the NGICP:

Though NGICP exists as a stand-alone program to educate and certify professionals in the GSI industry, each community deploys the training differently. Some municipalities supplement the program with additional localized training and services to transform NGICP to serve as a workforce development program, often tripling the length of the program and including foundational and job-readiness skills in the program.

NGICP was modified to 70 hours in Kansas City, Missouri; Milwaukee; Peoria, Illinois; Baltimore; New Orleans; and Pittsburgh. Washington, D.C., modified NGICP to 106 hours: 35 hours of intense GSI training, plus enhanced test prep, study prep, field work, class skills, enhanced safety training, and wrap around services. Other unique NGICP modifications include a current pilot program for a six-week online NGICP class with a two-day in-person training.

It is also important to acknowledge the barriers of program entry that many municipalities face with high numbers of residents who do not have a high school diploma or GED, including Detroit. NGICP is currently exploring the development of an alternative pathway to obtaining the certification for those without a high school education. The pilot training is anticipated to be launched in the summer of 2020.

GSI Workforce Development for Detroit

As more GSI projects are built as a result of recent policy changes by DWSD and the desire of Detroiters to use GSI to transform some of the more than 24 square miles of vacant land in Detroit, the need for Detroit-based firms is increasing. Currently, the majority of firms who specialize in GSI are located outside of the city. In order to meet the current demand through the development of Detroit-based contractors, efforts must be made to build the skills of current landscaping/construction firms that already exist in Detroit. Aside from ensuring that staff members are trained in GSI, businesses need support services to develop stronger business models, understand the bidding process for municipal and private projects, and gain certifications for being a minority-owned, disadvantaged, Detroit-based or resident-based business enterprise.

RECOMMENDATION # 6

LAYER GSI TRAINING ONTO EXISTING WORKFORCE DEVELOPMENT PROGRAMS.

A modified National Green Infrastructure Certification Program (NGICP) targeting Detroit residents should be offered and layered on to existing workforce programs to increase residents in GSI occupations. These resident-targeted programs should include wrap-around and supplemental services (e.g. GED programs because high school completion is currently an NGICP requirement) from local providers such as Detroit Employment Solutions Corporation (DESC), nonprofits such as Matrix Human Services, or others. Because many of these potential students may face difficulties in using traditional educational methods to learn foundational skills vital to GSI, it is recommended that this curriculum be taught to participants using a contextual learning lens[58] that is being pioneered and piloted in Detroit by United Way for Southeastern Michigan.

Several peer communities have invested in layering existing workforce development trainings with the NGICP training or their specialized-GSI training, including:

- Kansas City Green Stewards
- Philadelphia Power Corps
- D.C. Water

RECOMMENDATION # 7

OFFER A DETROIT GSI APPRENTICESHIP PROGRAM.

To increase the number of Detroiters employed by firms doing GSI work, a GSI apprenticeship program could be created to provide a pipeline between training programs and GSI jobs. Graduates of a Detroit NGICP modified program could be paired with jobs from the City's General Services Department and private firms with GSI contracts.

Ensuring that Detroit residents who complete the modified NGICP program have access to employment opportunities after completing the program is critical to diversifying the landscape sector and employing Detroiters in the sector. Locally, training provider Greening of Detroit has found success in placing its landscaping program alumni in jobs with local contractors.

SPOTLIGHT PROGRAMS: DC WATER & POWERCORPS PHL

D.C. Water NGICP: The National Green Infrastructure Certification Program offered through D.C. Water connects program graduates to employment opportunities with local GSI contractors and D.C. Water itself. The utility was interested in NGICP originally to ensure the development of talent to meet local workforce hiring requirements that mandate that district-funded contracts must have 60% of their workforce hours performed by residents.

PowerCorps PHL: PowerCorps works to ensure that students who complete the first five months of GSI training are connected to local paid internships where they gain valuable work experience. After the internship, assistance is provided to secure permanent employment or to explore secondary education.

RECOMMENDATION # 8

TEACH GSI SKILLS TO SPECIALTY TRADES WORKERS.

In order to properly install or maintain GSI, trades workers could receive specialized training modules to expand their skills to include GSI-specific installation & maintenance, such as sewer taps, fine grading, pipefitting, permeable pavers, green roof installation, etc. The attainment of these new skills will allow traditional construction firms to expand their experience to include GSI projects. Ultimately, this also benefits skilled trades professionals, preparing them with transferrable skills that will make them more marketable.

The Detroit Training Center and Michigan Building Trades Council could help fill these gaps, and local unions could cover a portion of the training costs for apprenticeship participants and union members. GSI skill training could be layered onto current construction training programs being offered through the Detroit Employment Solutions Corporation, including:

- Heavy tractor trailer and equipment operator.
- Laborer and freight drivers, material movers.
- Plumbers and pipefitters.
- Construction mangers.

GSI Detroit-Based Business Support

As Detroit continues to rebuild, the growth of small businesses is key to ensuring economic stability. By investing in small businesses, particularly women- and minority-owned, we create a pathway toward equitable economic vitality.

RECOMMENDATION # 9

CREATE A GSI SMALL-BUSINESS NETWORK.

It is crucial to professionalize, specialize and support existing Detroit-based businesses from small landscaping ventures up to established firms, as well as increase participation from Detroit-based enterprises (DBEs), resident-business enterprises (RBEs), women-business enterprises (WBEs), minority business enterprises (MBEs), and micro-enterprises in DWSD contracts. It is recommended that a small-business network be created to connect service providers and funnel small businesses into the GSI field. This network could offer businesses knowledge from other small businesses, as well as assistance in obtaining certifications, such as DBEs, RBEs, etc., that will help them win GSI contracts.

Partners in this work could include:

- Detroit Water & Sewerage Department (DWSD)
- Detroit Economic Growth Corporation (DEGC)
- BUILD Institute
- TechTown/SWOT CITY
- Goldman Sachs 10,000 Small Businesses
- U.S. Small Business Administration
- ProsperUS
- JPMorgan's Entrepreneurs of Color
- Design Core Detroit
- Greening of Detroit
- Land + Water WORKS Coalition

PROGRAM SPOTLIGHT: SUSTAINABLE BUSINESS NETWORK

The Sustainable Business Network of Greater Philadelphia (SBN) has been serving Philadelphia for nearly 20 years by establishing a network of sustainability-based businesses dedicated to creating a social and environmental impact in their city. SBN developed a framework of support to aid in sustainability-focused business development. SBN developed the Entrepreneurs' Round Table, where business owners can connect with local government leaders to discuss topics that are critical to achieve triple-bottom-line success. Members are also able to take part in best-practice forums, where attendees learn from each other on a variety of topics unique to sustainability-based businesses. Another initiative of SBN is GSI Partners, which connects entrepreneurs in this sector to exchange knowledge and best practices to help strengthen the GSI sector as a whole. Key to the success of the GSI Partners Initiative has been the support of the Philadelphia Water Commission, which values the impact that these private-sector partners have on the city's stormwater and sustainability goals.

City of Cincinnati Bioretention Basin

The Metropolitan Sewer District of Greater Cincinnati constructed a two-tiered rain garden at St. Francis Court Apartments in South Fairmount.

Photo Credit: Project Groundwork

CONCLUSION

Though GSI-related jobs have grown over the last decade, the jobs available can likely be filled by natural matriculation and training of the existing workforce. The modeling for future projections was conservative and does not assume a large increase in GSI spending as seen in cities such as Philadelphia and its spending of $1.67 billion compared to $50 million in Detroit. If GSI remains a leading technique in protecting water resources and water quality, and if federal and state governments continue to require GSI as part of the solution to stormwater management, then it is possible that Detroit could experience much larger investments, resulting in the need for a larger workforce.

However, even with the existing demand, there is a need to train workers in GSI-specific skills and provide on-ramps for Detroit's workforce to enter the field. This will require investment in policy and funding changes, GSI training, workforce development and business support.

The economic development potential for green stormwater infrastructure and its co-benefits of reutilizing vacant land, enhancing water and air quality, mitigating climate change, and beautifying the landscape provide additional rationale for further investment in GSI and the workforce that designs, installs, and maintains it.

Endnotes

Table of Contents Photograph Credits:
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DETROIT FUTURE CITY

Detroit Future City is a nonprofit charged with catalyzing implementation of the DFC Strategic Framework, a 50-year vision for the City of Detroit developed with input from more than 100,000 Detroiters. Our role is to steward equitable implementation of the recommendations made in the Strategic Framework through providing access and information to Detroiters, informing and guiding decision-makers' initiatives and projects, and the coordination of a multitude of stakeholders.

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