

# PHILADELPHIA LANDSCARE WORKFORCE DEVELOPMENT:

IMPROVING GSI AND ECOLOGICAL LANDSCAPE  
INSTALLATION AND MAINTENANCE THROUGH TARGETED  
WORKFORCE TRAINING AND DEVELOPMENT

AUTHORS: JACOB KUKLICK, STEPHEN STONE-BUSH, AND STEPHEN PANASCI  
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Cities around the world are altering their infrastructure in response to growing concerns about climate change, acute environmental challenges, and the substantial impact on ecosystems that surround municipalities. In Philadelphia, the demand for Green Stormwater Infrastructure (GSI) and Ecological Landscape projects continues to increase, which presents opportunities to reduce the City's ecological footprint while also growing the local economy. This report specifically identifies and addresses the gap between demand for GSI projects in Philadelphia and the capabilities of the existing workforce required to implement and maintain these systems. Through qualitative interviews with representatives of Public Agencies, the design community, and Landcare Contractors, necessary skills and knowledge related to GSI and Ecological Landscapes have been synthesized to provide focused direction for workforce training initiatives. Increasing comprehensive training opportunities has been identified as a crucial way to improve the efficiency of the existing GSI and Ecological Landcare workforce, and engage an underutilized latent workforce in Philadelphia. There are existing workforce training programs and organizations in the City that are best positioned to increase and refocus their efforts in regards to GSI and Ecological Landcare. However, some new initiatives such as a new and unique certification are recommended.

## Authors:

Jacob Kuklick ISA Certified Arborist, Owner, Mosaic Landscape Restoration

Stephen Stone-Bush, Project Manager, Mosaic Landscape Restoration

Stephen Panasci PLA, Owner, Stephen Panasci LLC: Food Systems and Ecological Design

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# INTRODUCTION



Green Stormwater Infrastructure (GSI) and related Ecological Landscape projects are prevalent in public and private development in Philadelphia. These types of landscape improvements are becoming design standards driven by Public Agencies in the City, led by the Philadelphia Water Department (PWD) and Philadelphia's 2035 Comprehensive Plan. These design strategies aim to reduce the amount and impact of stormwater runoff, reduce the urban heat island effect, improve air quality, and mitigate other environmental impacts caused by dense urban development. These strategies are aimed at improving the quality of public and private spaces throughout the City of Philadelphia, and look to be a part of a resiliency plan as it relates to the changing climate.

There are a variety of factors that affect the success of GSI and Ecological Landscape projects in Philadelphia. This report specifically identifies and addresses the gap between demand for GSI projects and the existing workforce capabilities required to install and maintain these systems. This report is based largely on qualitative interviews with representatives from various public agencies, members of the landscape design community, local workforce training programs, and members of a diverse Landcare workforce in Philadelphia. The aim of this report is to inform and support workforce training programs in Philadelphia in order to increase the pool of contractors qualified to implement and maintain GSI and Ecological Landscape projects. The demand for these projects is likely to continue to increase, which not only creates a demand for qualified contractors, but also creates economic opportunities for a latent workforce. Creating greater competition among the workforce for GSI and Ecological Landscape projects can also potentially increase the quality of work done, and in time, decrease the cost of implementation and maintenance.

This report will provide:

- Background on current policy initiatives and design trends.
- Description of the Current Workforce in Philadelphia gained from interviews.
- Current challenges with implementing and maintaining GSI and Ecological Landscape projects identified by the sectors interviewed.
- Key areas of skills and knowledge related to implementation and maintenance of GSI and Ecological Landscapes that workforce training should focus on.
- Existing Agencies and Programs that provide workforce training opportunities and are positioned to better facilitate the training required for a better qualified workforce.
- Related challenges to address the success of GSI and Ecological Landscape projects outside of workforce training that have been identified by the interviewed representatives.
- Conclusion highlighting key takeaways from research and interviews related to workforce training.

The qualitative interviews forming the basis of information in this report were conducted with the following companies and agencies:

Andropogon Associates  
Bartram's Garden  
Cedar Run Landscapes  
David Brothers Landscape Service  
DS Landscaping  
Envent Builders, LLC  
Home Science, LLC  
Native Landscapes, LLC  
Nativescapes, LLC  
Naturescapes, LLC  
North Creek Nursery  
Pennsylvania Horticultural Society  
Philadelphia Office of Transportation, Infrastructure, and Sustainability  
Philadelphia Parks and Recreation

# INTRODUCTION

Philadelphia Water Department  
Philly Green Roofs, LLC  
RoofMeadow, LLC  
Roots to Re-Entry  
Ruggiero Plante Land Design  
Sikora Wells Appel  
Solo Real Estate  
Sustainable Business Network



**BACKGROUND**

# BACKGROUND

## POLICY AND DESIGN TRENDS

Philadelphia2035 Comprehensive Plan:

*“The Citywide Vision is the overarching policy document for Philadelphia2035, the city’s comprehensive plan. The Citywide Vision sets out a blueprint for how the city should grow and develop over the next twenty-five years. It establishes policy for the city to follow so that the city can be as sustainable and equitable as possible for residents, business owners and institutions. The recommendations in the Citywide Vision are the basis for the more detailed District Plans.*

*The Citywide Vision describes strategies for improving the quality and diversity of housing; locations and connections between neighborhood centers, commercial corridors, and transit hubs; key areas to expand access to neighborhood parks and open space, and a framework for implementing policy goals and priority projects.”<sup>1</sup>*

A significant focus of the Comprehensive Plan’s vision is on environmental sustainability. This is addressed through guidelines for Public Space, Historic Preservation, Urban Design, and Environmental Resources. This report will largely pertain to the Environmental Resources portion of the vision. The environmental vision outlines three key areas of focus: air quality, water quality, and tree cover. Strategies outlined in the plan to address these three areas are comprehensive in discussing urban design, policy, and operational standards to reduce impacts of industry and development. Among these strategies are ecological restoration projects, increasing vegetative cover of surfaces, planting more canopy trees, and a multifaceted approach to reducing stormwater runoff and improving the quality of this runoff water.

Effective stormwater strategies and their impact and relationship to fiscal responsibility are essential to complex municipalities undergoing broad infrastructural changes. The U.S. General Service Administration’s (GSA) Site Commissioning White Paper details the importance of stormwater strategies, proposing that achieving environmental, social, and financial resilience in the built environment requires a land development paradigm shift.<sup>2</sup> In Philadelphia, stormwater strategies are proposed in coordination with PWD Stormwater Regulations aimed at capturing stormwater on site and reducing flood damage.

As it pertains to GSI and Ecological Landscape design projects, it is important to recognize that there is a wide variety of site improvements that fall into these categories. Many are outlined in Philadelphia2035 and PWD’s Stormwater Design Guidelines, and others are best practices identified by Landscape Architects and Civil Engineers. Some are easily learned and relatable to more traditional landscape improvements, but some may be less common and require specific knowledge and skill sets. These projects include, but are not limited to:

Green Stormwater Infrastructure:

- Rain Gardens
- Bio Swales
- Tree Trenches
- Green Roofs
- Rainwater Harvesting
- Subsurface Storage and Infiltration
- Permeable Paving
- Green Streets
- Retention and Detention Basins
- Recycling and Reuse of Gray Water
- General Increase of Pervious Surfaces (Landscapes/Vegetation)
- Increasing Tree Canopy

Ecological Restoration:

- Restoration of Wetlands in Natural Areas (Especially Tidal Wetlands along the Delaware River and Lower

1 Philadelphia2035: Renew, City of Philadelphia Planning Commission, June 2011

2 Site Commissioning White Paper, US General Services Administration, July 2017



Schuylkill River)

- Restoration of Stream and River Banks
- Restoration and Increase of Forest cover in Parks and natural areas
- Restoration and Implementation of Meadows in floodplains, parks, and other natural areas
- General improvement of Philadelphia's natural habitats

## Ecological Landscape Design Best Practices:

- Use of Native Plants
- Improvement of Soils
- Selecting appropriate plants for the site and its uses
  - Understanding soils, water, light, and other factors affecting success of plantings
- Landscapes that mimic ecosystem functions (Meadows, Woodlands, Wetlands, Floodplain, etc.)
- Reduce need for maintenance such as mowing
  - Other less traditional maintenance may be required
- Exclude or minimize a necessity for chemical fertilizers in addition to inorganic herbicides and pesticides
- Reduce water use for irrigation in landscapes
- Sequester carbon
  - Through use of vegetation and soil management
- Reduce weed pressure through dense planting
- Provide habitat for native wildlife
- Minimize disturbances to habitat
  - Soil disturbance, removal of existing native vegetation, poor management practices, pollution, etc.

Outlined in Philadelphia2035 is a desire for the environmental vision to encompass both public and private development. This requires thorough coordination among City Agencies, private land-owners, design professionals, and the public. The improvements outlined in the Environmental Vision and above project lists are meant to be used in a manner that helps to establish a safe, welcoming, and beautiful City for old and new residents and guests. Providing education on environmental concerns and benefits, as well as access to as much of Philadelphia's landscapes are crucial to the plan.

Design best practices and City policy often influence each other. Philadelphia2035 and PWD's guidelines are based off of research and methods from trends in Ecology, Landscape Architecture, and Civil Engineering. Conversely, the implementation of projects is facilitated through policy and regulation. As the public gains better understanding of environmental issues and solutions, the demand for access to landscapes both public or private increases. It could be expected that the demand for more GSI projects, Ecological Restoration, and Ecological Design will increase as well. Additionally, best practices and knowledge within the industries will continue to evolve. It will be absolutely crucial that there is a broad workforce that is capable of implementing and maintaining these design improvements to achieve the City's visionary goals.

Some of these design improvements fall outside of conventional construction knowledge and landscaping. While many of the skills and equipment necessary to implement and maintain the improvements are not uniquely complex, they may be different than what the current workforce at large is accustomed to doing. There is a necessity for education on what all of these improvements are, why they're important, and how they work. In some instances, this information, when combined with industry specific knowledge, may be all that is required for a contractor to understand how to implement or maintain a GSI system or ecological landscape successfully. Education of the workforce will need to continue to evolve as quickly as the design trends and public policy. There are existing agencies and programs in Philadelphia facilitating workforce training and there may be a need for these agencies to adjust their educational focus and outreach to be more successful. There may also be a need for additional types of training that do not currently exist in Philadelphia. This report will address the needs identified by designers, public agencies, and the current workforce itself.

# BACKGROUND

## TYPICAL PROJECT STAKEHOLDERS

In understanding the successes and failures of GSI and Ecological Landscape Design projects, it is important to understand who is typically involved in their planning, implementation, and maintenance. The relationship between these stakeholders can create challenges, but also offer opportunities for close collaboration to enhance the likelihood of project success.

**Public Agencies:** The three most significant public agencies involved with site development in the city are The Philadelphia Water Department (PWD), Parks and Recreation, and the Philadelphia Streets Department. PWD is key in public and private development. The stormwater regulations and guidelines they have created are a significant facilitator of implementing the vision of environmental sustainability in Philadelphia2035. All development projects will go through an approval process with PWD to ensure they meet regulations, with PWD providing guidance on how to comply. Among other things, their role can include recommending specific areas to include GSI, recommending specific types of GSI strategies, and creating a limit of impervious coverage a site is allowed to include.

Parks and Recreation oversees the street tree planting programs as well many other public green spaces in the City of Philadelphia. The Streets Department is heavily involved in the approval process for public and private development where projects interact with street crossings, curb and sidewalk layouts, public transportation systems, changes to parking, and public utilities in the Right of Way. City agencies, in general, have their own in-house workforce crews that handle some public projects. However, in the case of larger, or more specialized projects, City agencies will hire outside contractors to perform construction or maintenance activities.

**Designers:** GSI and Ecological Landscape Design projects in the City of Philadelphia often incorporate both Civil Engineers and Landscape Architects as their designers. Depending on the project, there may also be Architects and other types of Engineers involved. They will be hired by the client developing a site, which could either be a private land owner, or a City Agency in the case of public projects. Their designs aim to address the client's goals for a project, but are also required to conform to regulations and public policy. Engineers and Landscape Architects will often work in direct coordination with the city agencies listed above. Landscape Architects and Engineers do not hire contractors, but can be in a position to recommend certain ones to the client for private projects. They can also help a client, public or private, review a contractor's qualifications to determine whether they are qualified for a specific project. Landscape Architects and Engineers will typically stay involved with a project through construction and into early stages of maintenance to aid in coordinating the construction process between client and contractors. Their role is to ensure that the design is being installed as per drawings and specifications so that it satisfies the client's vision and meets regulations.

**Landcare Contractors:** There is a vast diversity of contractors in regards to scale of business and focus of their work. Depending on the scale of a project, there is typically a general contractor that coordinates and oversees the entire project construction. Working under them, are subcontractors who may take on specific roles within a project such as landscaping or masonry work. Typically, the larger the project, the larger the amount of contractors involved. Construction management which oversees coordination between the various contractors, construction sequencing, and interfacing with clients and designers can have a great impact on the success of a project. In some cases, maintenance of projects can be performed by the contractors who installed them, though typically under a separate contract. In other cases, City employees may take on maintenance of public projects or an outside private maintenance crew may be hired independently.

**Other Related Stakeholders:** Neighborhood associations, friends of parks groups, and others such as the Philadelphia Tree Tenders can be involved with projects. In some cases, they will assist with maintenance at a volunteer level, aid in raising capital or maintenance funding, act as client representatives, or even drive policy and design. These groups can be essential in getting community buy-in for projects to ensure their long term success. It is often volunteer groups that successfully take on outreach and education for the public.



# DESCRIPTION OF CURRENT WORKFORCE

# CURRENT WORKFORCE

The current workforce of private contracting firms working on GSI projects or ecological landscaping practices is a diverse collection of companies and personnel. In the same manner that individual types of GSI projects and initiatives can vary greatly from project to project, the firms operating in this field or in related fields can be distinctly different from each other. The umbrella term used to collectively identify these contractors and firms actively doing business in this marketplace for this paper is Landcare Contractors.

The Landcare Contractors interviewed vary widely in many respects, including the size of the company, the companies organizational structure and which sectors of ecological landscaping practices or GSI project types they focus on. Some Landcare Contractors interviewed were not currently working on GSI projects, but were working on projects in related landscaping fields. Other firms indicated that a large proportion of their current projects were expressly related to GSI initiatives. No single firm interviewed actively competed in all the possible sectors of GSI and Landcare installation and maintenance, and their operations were tailored to their specific sector.

A noticeable distinction determined by the interviews was found due to different skills, knowledge, and equipment sets needed to install and maintain GSI and other Landcare projects. For the purpose of this report, firms making up the interview pool of private Landcare contractors could be loosely categorized into two broad types; generalist firms and specialist firms, based on how focused their business activities are in regards to GSI and other landscaping practices. Even within those broad categories, each firm has positioned itself into a unique competitive position in order to best utilize physical resources, personnel, and informational assets. This categorization is used in order to better compare and contrast interviewed firms responses and attitudes to a variety of topics. It is not an indication that any firm is more valuable or experienced in the industry in any way.

## BROAD CLASSIFICATION OF LANDCARE FIRMS

**Generalist Landcare:** Generalist Landcare firms primarily focus on projects at surface level. These projects are related to or include GSI specific projects such as rain gardens, retention basins, increasing tree canopy, depaving projects, permeable paving projects, and general rainwater mitigation practices. These types of projects usually require a more standardized array of tools, equipment and procedures for project installation and maintenance. In order to compete for more and larger projects, generalist firms need to continually add employees and physical assets, as well as additional layers of staff organization to manage their resources. These firms are also more likely to offer maintenance of projects they install, and were more likely interested in taking on maintenance specific contracts for surface level Landcare projects. These firms are less likely to use sub-contractors on projects, preferring to utilize their own staff and equipment where possible in order to maintain full operational capacity. The complexity of the projects undertaken, including size and scale of the project, as well as levels of coordination required between stakeholders, appears related to the company's size and available physical resources. Personnel training and management practices are a critical component for these firms to be able to deploy their physical resources effectively.<sup>(1;2;3;4;5)</sup>

**Specialist Landcare:** Specialist Landcare firms included companies that usually focus on projects at subsurface, surface level, or elevated locations. These types of projects might include subsurface water storage and infiltration projects, green roofs, any of the previously mentioned surface level landcare projects, as well as ecological landscaping practices such as streambank and wetland restoration, meadow installation, and projects geared toward native wildlife support. Some of the above types of specialist Landcare projects require specific equipment and procedures for installation and maintenance. Therefore, specialist Landcare companies are more likely to work with a narrow selection of GSI or ecological landscaping practices. Specialist firms are also more likely to be able to compete in their particular market sectors with smaller company sizes and physical assets due to their large amount of informational resources. These informational resources will likely include more staff with higher

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- 1 Cedar Run Landscapes, LLC, Interview with the author, December 2019
  - 2 David Brothers Landscape Service, LLC, Interview with the author, December 2019
  - 3 DS Landscaping, LLC ,Interview with the author, December 2019
  - 4 Native Landscapes, LLC, Interview with the author, December 2019
  - 5 Naturescapes, LLC, Interview with the author, December 2019

education credentials, accrued certifications, and experience in the field that directly relates to the company's area of expertise.

Specialist Landcare firms with smaller sizes and focused niche practices, are more likely than generalist firms to use sub-contractors for their projects. They are also likely to utilize their informational resources to perform consulting and monitoring services for clients and other organizations. Although all interviewed firms expressed a commitment to maintenance for GSI and Landcare projects, specialist firms are in some cases more likely to recommend other Landcare firms to perform physical project maintenance. Even with their smaller organization sizes, specialist firms are able to implement large and complex Landcare projects by leveraging their focused informational resources and coordinating with many different stakeholders. Lastly, personnel training is a major contributor towards the ability of specialist firms to coordinate multiple stakeholders, and complex equipment and Landcare techniques.<sup>(6;7;8;9;10;11;12)</sup>

## INDIVIDUALS INVOLVED IN THE PRIVATE LANDCARE MARKET

The private workforce currently involved with GSI projects and Landcare practices can be further examined by noting the skills, experiences and education of the individuals who are employed by, or operate, Landcare firms. The diversity of these individuals is significant and spans a wide spectrum of experiences. Interviewees consisted of individuals with little experience or education in Landcare practices, skilled workers or managers with years of experience and higher education credentials, and owner / operators with multiple decades of experience in the industry. Many respondents interviewed for this report were extremely experienced Landcare contractors, often the owner or a high level manager at their corresponding company. These people were able to confidently comment on themselves and the wide array of individuals working in the field. They were clear in noting that all of these individuals have unique skill sets, experiences, backgrounds, and perspectives that benefit their companies as well as the Landcare projects they work on.

Based on information collected from the interviews, a broad categorization of individuals is helpful for interpreting which individuals have what skill sets in the Landcare field. For research purposes, the categorization of individuals involved in Landcare workforce can be grouped into two categories; entry level and specialist. The qualitative metric used to determine these two categories is a collection of the individuals experiences working in the Landcare field, the level of specialization and training required for them to perform their job, and their formalized classroom education.

**Entry Level Individuals:** Entry level individuals participating in the private Landcare market usually perform the bulk of the physical labor required for the installation and maintenance of projects. These individuals are employees of private firms and other organizations, and are supervised and directed by a manager in their organization. The individual duties of the entry level worker vary by the exact job function they perform, but duties generally revolve around physical labor in an outside jobsite environment. Physical aptitude for moving heavy materials, and handling tools and equipment are required qualifications for this type of individual. Another critical requirement is the ability to communicate effectively with fellow employees and supervisors. The amount of prerequisite formal education and field related experience is relatively low to be able to function as an entry level individual in the Landcare market.

Qualified and motivated entry level individuals might move towards becoming more specialized as they gain experience in the field and engage in training activities which might include certifications, training courses, seminars

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- 6 Envent Builders, LLC, Interview with the author, December 2019
  - 7 Home Science, LLC, Interview with the author, December 2019
  - 8 Nativescapes, LLC, Interview with the author, December 2019
  - 9 North Creek Nursery, LLC, Interview with the author, December 2019
  - 10 RoofMeadow, LLC, Interview with the author, December 2019
  - 11 Philly Green Roofs, LLC, Interview with the author, December 2019
  - 12 Solo Real Estate, LLC, Interview with the author, December 2019



# CURRENT WORKFORCE

and possibly instruction at higher level educational institutions. When looking at the workforce involved in the physical implementation of GSI and Landcare projects, the majority of individuals involved will be entry level workers. This type of individual is also most likely to be seasonally employed; hired and/or laid off as the organizations they work for expand or contract their operations.

**Specialist Individual:** Specialist individuals are less numerous in the Landcare workforce and have more specific and diverse job functions than an entry level worker. Their job may consist of mostly physical labor or very little, and they may be in a leadership or higher level managerial position. In interviews, what separated a specialist individual from an entry level individual was not exactly defined, but a contributing factor would be the cultivation of a skill set that is uniquely applicable to the field that they operate in. Examples of job descriptions for these individuals are: workers with a wide array of industry knowledge, the skills to handle complex machinery, foremen and crew chiefs responsible for managing other workers in the field, technicians with a deep knowledge of a narrow range of landcare practices, landscape architects and designers, as well as organizational managers responsible for an entire firm's operations.

These individuals have a considerably deeper level of experience and training. Specialists are more likely to have a higher education degree or professional certifications that relate to the type of Landcare work they participate in. Often, these investments of time to develop specialized skill sets indicate that specialist individuals have been actively working in the Landcare field much longer than an Entry Level employee. These same investments in education and training also mean that Specialists may be less likely to leave the Landcare workforce than entry level employees. These individuals are less likely to be seasonally employed and often are less affected by staffing fluctuations in organizations as their skill sets and experiences can be hard for organizations to replace.

## COMMON PERSPECTIVES AMONG LANDCARE COMPANIES

**Positive Outlook for the Market for GSI Initiatives and the Landcare Sector:** All 12 of the interviewed Landcare firms responded that the particular markets they operated in were experiencing growth. 10 firms who currently worked on, were extremely familiar with, or did Landcare work that closely mirrored GSI related projects, felt that there would continue to be steady growth in GSI projects and practices would continue to be refined and improved on. There was also a clear message throughout the interviews that these firms held a very positive attitude toward GSI and its proposed economic, social, and environmental benefits.<sup>(13;14;15;16;17;18;19;20;21;22)</sup> The 2 firms who had very low familiarity with GSI projects indicated that they felt strongly that the more traditional building and landscape industries that they operated in would “continue to go green.” They expressed strong interest in adapting to that trend due to the increase in both consumer demand, and the firms’ increasing awareness of Ecological Landscape projects in the Philadelphia area.<sup>(23;24)</sup>

**Strong Perceived Value of Education and Training:** During conversations, it also became clear that many firms felt strong, positive feelings toward education and employee development, training, and certification. All 12 of the interviewed firms indicated that workforce development and training is very important to their business.

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- 13 Cedar Run Landscapes, LLC, Interview with the author, December 2019
  - 14 David Brothers Landscape Service, LLC, Interview with the author, December 2019
  - 15 Native Landscapes, LLC, Interview with the author, December 2019
  - 16 Naturescapes, LLC, Interview with the author, December 2019
  - 17 Home Science, LLC, Interview with the author, December 2019
  - 18 Nativescapes, LLC, Interview with the author, December 2019
  - 19 North Creek Nursery, LLC, Interview with the author, December 2019
  - 20 RoofMeadow, LLC, Interview with the author, December 2019
  - 21 Philly Green Roofs, LLC, Interview with the author, December 2019
  - 22 Solo Real Estate, LLC, Interview with the author, December 2019
  - 23 DS Landscaping, LLC, Interview with the author, December 2019
  - 24 Envent Builders, LLC, Interview with the author, December 2019

Locally and nationally recognized training courses were favorably viewed and often indicated as essential to training the firm's staff. Training programs were highlighted by individual business owners as important components of their own previous educational experience. Furthermore, several interviewees indicated that either their firm, or they themselves, had current or former involvement with education initiatives related to their field of speciality usually through classes and seminars. In some cases, firms who have need of physical showrooms or plant propagation facilities for their operations, have managed to leverage these spaces into educational uses for the public.<sup>(25;26;27)</sup> Many firms have close contact to the general consumer public and felt that they were in a unique position to listen to feedback, as well as educate consumers about ecologically responsible choices.

**Preferred Training Methods:** There was discrepancy amongst the interviewed firms in the manner that they trained their staff. Differences in this regard were due to the individual needs of staff within a given firm, as well as the resources able to be dedicated to in-house training programs. However, a common factor was that much of the training provided by firms was primarily informal and hands on, with training information being delivered on a local, nearly direct person to person scale. Whenever more formal, in-house training was mentioned, such as company wide seminars or distribution of written training programs, it was by firms with broader organizational structures and significant physical assets.<sup>(28;29)</sup> This kind of training implementation usually coincided with generalist firms, as they were more likely to utilize these resources to support, as well as require, larger more structured educational initiatives.

Although informal on the job training was common, all of the firms indicated a preference for training methods that mixed formal classroom training with informal field experiences. Formal training methods were desired as they added standardization and accountability to workforce training. Formal training procedures / programs were also noted as being easily disseminated throughout any organization. Informal, hands on training methods were still deemed critical for day to day training requirements, as well as essential for a deeper understanding of common Landcare practices.

All firms indicated that they were able to adequately train their staff according to the needs of their specific segment of Landcare business with current practices. Yet, the preference to have access to training programs that utilize formalized teaching methods combined with the difficulty and cost of developing formal, in-house training programs, points to an overall positive outlook of 3rd party educational opportunities and certifications able to offer a mix of formal and hands on training.

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25 Cedar Run Landscapes, LLC, Interview with the author, December 2019

26 David Brothers Landscape Service, LLC, Interview with the author, December 2019

27 North Creek Nursery, LLC, Interview with the author, December 2019

28 Cedar Run Landscapes, LLC, Interview with the author, December 2019

29 David Brothers Landscape Service, LLC, Interview with the author, December 2019

# COMMON CHALLENGES HINDERING PROJECT SUCCESS



During the interview process, clear and common challenges arose for each of the three main sectors that are the basis of this report. All conversations were focused on issues that affect the success of implementing GSI and Ecological Landscapes in Philadelphia, and the workforce training that can support that. However, other issues outside of workforce training often arose. Those factors not related to workforce training will be mentioned here as they were issues important to the interviewees, although the basis of this report is the information gleaned that can be related to workforce training initiatives. The information pertaining to other factors that arose will be discussed later in the report as additional factors related to the success of GSI and Ecological Landscapes.

## CITY AGENCIES

In Philadelphia, City Agencies, namely The Philadelphia Water Department (PWD), are at the forefront of GSI installation, maintenance, and monitoring. In addition to PWD, Philadelphia Parks and Recreation (PPR) participates in some GSI maintenance, tackling more projects each year as the field expands and more GSI is installed on PPR maintained land. PWD currently maintains over one thousand GSI systems, surface and subsurface, with hundreds of new projects being installed each year.<sup>1</sup> PWD has been very successful in facilitating installation, with tremendous attention being paid to routine, preventative, and reactive maintenance. Monitoring and research techniques have also been developed for PWD maintained systems aiding to research and knowledge of how these relatively new systems perform over time.

There is an extensive coordinating effort on the part of PWD and the Philadelphia Department of Streets concerning GSI projects built in the public right of way. For instance, Streets and PWD must consult on projects in which surface GSI alters the turning radii of intersections. Many projects require proper construction sequencing between the two departments such as re-surfacing and paving after a GSI installation.<sup>2</sup> Additionally, the Office of Transportation, Infrastructure, and Sustainability (OTIS) has played a large role in clarifying the multifaceted efforts of PWD. Through monthly meetings with PWD's executive team and bi-weekly meetings with the water commissioner, OTIS has increased inter-departmental communication on a broad scale.

Although these city agencies exhibit comprehensive care for GSI projects, they are still faced with numerous compound challenges. Four areas stand out as challenges: funding, public perception of GSI, a disconnect between capital project planning and operations and maintenance, and a lack of consistent training.

**Funding:** PWD prides themselves on both efficiency and holistic data collection. They draw from existing design best practices, use carefully crafted maintenance and monitoring manuals to collect data on existing systems, and team with universities such as Drexel and Villanova to analyze and predict GSI performance. They constantly conduct in-house demonstrations on new technologies, vehicles, and maintenance techniques. However, with 1000 GSI systems already being overseen by PWD alone, one has to consider what the demand on the labor force and maintenance look like when the number of completed projects triples or quadruples over the next 2-3 years, as it is predicted they will.<sup>3</sup> PWD is concerned that their current efficiency can only go so far.

Alternatively, PPR is just getting started with one, four-person GSI maintenance crew. For a city agency that oversees 12% of city land this might pose a difficult task for an already busy and active department. If GSI installation increases at the rate that it has over the last 10 years, funding for these agencies will undoubtedly have to keep pace.

**Public Perception of GSI:** Unmaintained GSI leads to a host of unwanted issues, including but not limited to misleading public perception. In order for the civic community to understand and appreciate a GSI system in the public Right of Way, they need to be engaged during the construction process.<sup>4</sup> In an interview with PWD, a project at a Philadelphia school was described. PWD was installing sunken curb-side planters which required construction outside of the school. Although PWD makes great use of its Communications and Engagement Team to facilitate the

1 Gerald Bright, PWD, interview with author, December 2019

2 Elizabeth Lankenau, OTIS, interview with author, December 2019

3 Gerald Bright, PWD, interview with author, December 2019

4 Daniel Lawson, PPR, interview with author, December 2019

# COMMON CHALLENGES

exchange of information between themselves, contractors, and the public, they were challenged by calls from both the school and concerned parents about the safety of their children. Having children in close proximity to in-ground depressed planters, as well as construction equipment in a high usage school zone, exacerbated concerns of parents and teachers as to the relevance and safety of the project.<sup>5</sup> Situations like these are not uncommon. In fact, public perception and public use of GSI are sometimes skewed when communities are uninformed about the purpose of public GSI.

Another project described in our interviews included an account of a design meeting in which members of a local community expressed concern that a GSI earth work element would inappropriately be used as a dirt bike ramp.<sup>6</sup> Finally, litter, a problem across Philadelphia landscapes, can add in negative public opinion of surface GSI systems. GSI elements easily collect and accumulate debris without routine maintenance. Thus, public perception continues to be a challenge for both the installation of GSI projects and their maintenance.

**Discrepancy Between Capital Project and O&M Funding:** A significant challenge identified primarily by PPR is the disconnect between capital project planning and operations and maintenance. On many projects, funds are allocated towards the design and installation of a GSI system without adequate funds and planning being assigned to the necessary continued upkeep of the system(s). A series of rain gardens were identified as succumbing to this process. 6 rain gardens were installed through PWD on PPR maintained land. PPR was slated to maintain them, but believed that because PWD completed the installation that PWD would also be responsible for maintenance. This instance was further perplexed by a department administration change within PPR, which can sometimes lead to confusion with regard to what agency is responsible for what project. The rain gardens eventually grew over with weeds, and provoked a large effort on the part of dedicated PPR staff to bring the rain gardens back from a state of disrepair.<sup>7</sup> Although this particular instance partially resulted in the formation of PPR's GSI maintenance crew, it is an example of the problems that can occur when proper time, energy and funding, are not attributed to operations and maintenance, regardless of which agency is ultimately responsible.

**Lack of Consistent Training:** Training as it applies to GSI operations and maintenance exists within PWD to a large extent. Crews there participate in local training courses and various professional development opportunities. Additionally, PWD supplies in-house staff to participate as instructors for local training courses catering to contractors. Conversely, PPR has had difficulty in getting staff trained in both base horticulture knowledge and GSI. However, this is not due to lack of effort. Rather, PPR personnel who would benefit most from comprehensive GSI training are often times the busiest of staff, and are routinely pulled away from training courses due to urgent parkland matters; incidents requiring immediate action.<sup>8</sup> The nature of PPR is that if a tree falls in a busy public Right of Way, it needs to be addressed by the department in a very timely matter. In this way, completing training courses continues to be a challenge for PPR.

As mentioned above, PPR maintains an extremely large public park system. Much of their seasonal staff mows, string trims, and does litter removal from parkland. For this reason, invasive plant species identification, native plant identification (commonly used in surface GSI), and base horticulture knowledge in general are not strong skill sets carried by maintenance staff within PPR, furthering the challenge of GSI maintenance.<sup>9</sup>

## DESIGN COMMUNITY

Landscape Architects and Civil Engineers are involved from the design process through construction, and at times beyond. The interviews with designers led to common challenges related to the major phases of a project. All three design firms interviewed shared mostly consistent views on these challenges with some unique insights determined by each firm's focus of work.

5 Glen Abrams, PWD, Interview with Author, December 2019

6 Glen Abrams, PWD, Interview with Author, December 2019

7 Daniel Lawson, PPR, Interview with Author, December 2019

8 Daniel Lawson, PPR, Interview with Author, December 2019

9 Daniel Lawson, PPR, Interview with Author, December 2019



**Design Process:** In relation to GSI and Ecological Landscapes, there are two congruent tracks during the design process: addressing the client's project goals, and interfacing with PWD or other City agencies to ensure designs are approved per regulations and public policy. In many cases incorporating GSI is driven by a requirement by PWD to do so, while Ecological Landscapes are often introduced as a best practice solution to landscape design. In either case, getting a client's buy-in to the strategy is absolutely critical to ensuring that the design is followed through on.<sup>10</sup> Without this buy-in, it is easy for the design to be altered later in the construction process to save money or time that has not been adequately budgeted by the contractor.

Another major challenge can be the design approval process. Based on the interviews, there were varying responses about the ease of coordinating plans with PWD. In some cases, the approval process can be quite simple and easy if the design team incorporates PWD's boiler plate specs and standard details.<sup>11</sup> In other cases, PWD's standard details may need to be customized for a specific site to be more cost effective and incorporate evolving best practices. This coordination is not always a streamlined process. An extended approval process, or a less cost effective design can affect whether or not a client buys into the idea of incorporating GSI and Ecological Landscapes.<sup>12</sup> This can either prevent the systems from being incorporated altogether, or lead to issues during construction and maintenance detrimental to the success of the project.

**Construction Management and Project Sequencing:** In many cases GSI and Ecological Landscapes are one component of a larger site development project. In these situations, it is critical that the entire construction management process be aware of the landscape improvements and preemptively anticipate how they need to be installed and how they relate to surrounding site treatments. For surface treatments of GSI such as rain gardens, permeable paving, and bioswales, it is often a landscape contractor who performs the work. It is also typical that the landscape contractor does not perform their work on the project until other components such as excavation, grading, building construction, masonry and hardscape construction, and utility installation are all completed or close to it. With surface landscape treatments being installed late in the process, there are many instances of site disturbances that create a less than ideal subgrade and soil medium to be installing GSI in. In many projects where GSI or Ecological Landscapes fail, it is due to lack of coordination and project management during construction.<sup>13</sup> This coordination does not solely fall on any one party in the process, it is a collective effort between design team, client, contractors, and reviewing agencies. However, it is important that contractors are educated and aware of GSI systems so that they can preemptively plan for construction sequencing and issues that may arise.<sup>14</sup>

**Contractor Selection:** Selecting a contractor for a project is a different process depending on whether the project is public or private. In instances of private projects, the client has control over who they hire to execute the approved design drawings. In this case, design professionals more likely have an opportunity to recommend contractors they have had good experiences with, or are able to review the qualifications of contractors bidding on a project with the client. In the case of public projects, it has typically been the policy that work goes to the lowest cost bidder. The City policy has changed to reflect the best value bidder, but many still perceive that work goes to the lowest cost bidder. In this situation, it can be difficult to ensure the contractors have experience with GSI and Ecological Landscapes. It is many designers' experience that on public projects, due to lower budgets, stricter timelines, and potential lack of experience on behalf of contractors, work is of a lower quality and the construction management process is much more difficult to navigate to ensure project success.

This is a key area where workforce training can improve the current landscape of public projects. In creating a more universally qualified labor pool, it is more likely that lower bidders have similar qualifications to higher bidders. Common qualifications that designers look for in a contractor for GSI and Ecological Landscape Design projects are: strong horticultural knowledge (degree preferred), experience and knowledge of GSI systems, have work

10 Sikora Wells Appel, Interview with author, December 2019

11 Ruggiero Plante Land Design, Interview with author, December 2019

12 Andropogon, Interview with author, December 2019

13 Sikora Wells Appel, Interview with author, December 2019

14 Ruggiero Plante Land Design, Interview with author, December 2019

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crews with low turnover, have entry level laborers who have received training, and professional certifications.

**Maintenance:** Involvement with maintenance crews and operations was another common challenge raised by the design community interviews. Typically design teams are contracted through the construction process, but that is all. It is very rare that designers are hired to perform continuous monitoring of projects to assist maintenance crews with challenges that arise. Additionally, there are challenges with the way in which maintenance crews are typically hired. In many cases, the crews contracted to perform maintenance are not the same crew that installed a project, even if part of the same company. In other instances such as public projects or work with institutions such as universities, there may be in-house maintenance crews responsible for the care of projects after installation. These crews may not have experience with GSI or Ecological Landscapes. Some clients will hire designers to meet with these crews to explain the systems or provide maintenance instructions, but this is not always the case.

Maintenance of any landscape is typically better when the maintenance crews have the basic horticultural knowledge and site experience to be able to anticipate potential issues and perform preemptive care.<sup>15</sup> In many cases, maintenance of surface GSI systems is similar to standard landscape and hardscape maintenance, but familiarity with the systems and how they work is required in order to provide adequate care.<sup>16</sup> Arguably, the most significant concern with maintenance is funding. Typically clients, whether public or private, focus on capital improvement budgets to see projects installed. In the construction process, contractors provide standard 1-2 year warranties of their work to ensure everything is installed and established per the drawings. There is often no clear budget created or understood for operations and maintenance beyond this establishment period. This is often the greatest factor determining whether a project succeeds or fails. This can often lead to public and institutional maintenance crews being given new work to maintain, overburdening an already taxed workforce. In private projects, this often leads to the hiring of inadequate maintenance crews that are either underqualified, or do not receive the level of funding needed to properly maintain the systems and landscapes.

## LANDCARE CONTRACTORS

The systemic issues that private Landcare Contractors are especially sensitive to often intersect with private landscape design firms (as well as any privately run company), but primarily fall under the following categories. Landcare Contractors are motivated by the need to remain profitable, the need to efficiently utilize their limited amounts of physical, informational and time related resources, and they need to respond quickly to demands and forces that affect their companies' competitiveness in their chosen market sector. These factors are commonly experienced by any private for profit enterprise and can exert very strong forces on an organization.

**Profitability:** The need for a landcare contracting firm to remain profitable in their business sector is foremost to any other concern. All other factors are insignificant if the company cannot maintain enough revenues to be able to pay their employees, subcontractors, suppliers, and business expenses. Therefore private firms may prefer to seek opportunities that offer less perceived risk as well as opportunities that clearly align with their organizational competencies and assets. This is important to note when incentivising and engaging private firms as participants in GSI initiatives.

Unless the firm views GSI as profitable, as well as a low risk opportunity, they may be unlikely to actively seek out GSI projects. Furthermore many firms may lack the resources available to public agencies in creating forecasts to predict industry growth. Even when industry forecasts may be available there may still be a disconnect for these firms to integrate forecasts into their business decisions, especially if the information supplied cannot be interpreted as possibly profitable to them.

**Limited Resources:** To private contracting firms, time is money, and both resources need to be efficiently utilized in order to stay profitable. During interviews with Landcare companies conversation would point towards trade offs between investing more time and resources into training or investing resources into providing services.

15 Sikora Wells Appel, Interview with author, December 2019

16 Ruggiero Plante Land Design, Interview with author, December 2019



Although there was widespread support for workforce development and training, the time cost of having staff members in training and not actively working in the field, is an opportunity cost that private firms are conscious of. This notion was supported by the prevalence of on job training, as it was commonly viewed as the most cost efficient way to train staff with a firms pre-existing equipment and informational resources. Some Landcare Contractors were aware that this type of training may not create the best type of consistent training program, but the need to efficiently be operating at capacity whenever possible was accepted as the norm.

**Responsiveness to Particular Clients and Market Forces:** Firms are also responsive to their specific customer base, and depending on the needs of these customers, will tailor their operations to best match that. This is not necessarily a negative attribute as it helps Landcare firms develop long standing relationships with their clients and many firms indicated that their ability to communicate about and exceed their clients needs were a key element to their business's success. However, this level of constant attention to a customer base may make firms less likely to undertake new GSI projects if a trade off needs to be made between established customers and new untested clients. Furthermore, firms may not be used to communicating and interacting with certain organizations and agencies that do not share much in common with their usual customer.

## CONTRACTOR CHALLENGES RELATED SPECIFICALLY TO GSI AND LANDCARE PROJECTS

**Competitive Bidding Process:** Interviewees identified the competitiveness within the bidding process for GSI projects in Philadelphia as a particular systemic challenge. Interviews also indicated that some bidding processes were not as challenging or prevalent in generalized Landcare practices. This reason, along with the 3 systemic challenges mentioned previously, were often cited as causes for not being able to take on or seek out additional GSI projects.

Thousands of GSI Projects have been implemented since the beginning of Clean Waters Green Cities. PWD and other City agencies have been very active in posting RFPs for the private market to bid on. Unilaterally, these RFPs for city contracts have specific requirements that determine which private companies are able to participate in this process.<sup>17</sup> Smaller, less established firms have challenges meeting the requirements of having sufficient insurance and bonding amounts. Also noted, was a lack of time and knowledge to educate themselves about the process to qualify and bid on projects. Landcare firms who met the bid requirements, have won bids in the past, and are currently pursuing contracts for City initiated GSI projects, still identified having challenges in pursuing bids. The primary factors are the perceived awarding of contracts to the lowest cost bidder as opposed to current regulations promoting the Best Value method, the potential fluctuations in the amount of available projects, and the changing size and scope of projects to bid on.

The awarding of contracts to the lowest bidder is widely utilized by most major commercial firms and was the standard for the city of Philadelphia until a recent successful voter initiative for the City to adopt procurement regulations promoting a Best Value model,<sup>(18;19)</sup> which favors smaller and more local firms who may not be able to compete on price alone. Despite that change, there may be at least a perceived belief amongst private contractors that offering the lowest cost bid proposal is the way to acquire Philadelphia City issued contracts. This perception may be reenforced by the experiences of private Landcare Contractors bidding on other commercial or institutional RFPs for related Landcare services. The risk of spending time to pursue a bid for GSI work that in most cases ends up going to the lowest cost bidder regardless, is a significant deterrent for some smaller firms.

This is especially true when Landcare firms are aware of larger companies pursuing the same bid. In one instance, a contractor mentioned an experience where a larger firm had submitted a low bid with the intention of revising it after they've won the contract in order to discourage competition. The revised cost was closer to what the interviewed firm said they would have submitted as their initial bid. In this case, there was ethically questionable

17 Philadelphia Home Rule Charter, American Legal Publishing Corporation, December 17, 2019

18 Philadelphia Home Rule Charter, Title 17, American Legal Publishing Corporation, December 17, 2019,

19 Regulations Governing the Purchase of Goods and Non-professional Services Other Than By Awarding of Contracts to the Lowest Responsible Bidder, Philadelphia Procurement Dept, July, 26 2017

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behavior at play, showing the influence that larger firms may have over smaller ones in a competitive bidding environment. Time spent pursuing bids can also be wasted if a project bid is suddenly pulled, which can happen due to changes in funding, minimum bids not submitted, or a variety of other reasons. The time wasted on an unsuccessful bid, regardless of the circumstances, typically has a greater negative impact on smaller firms.<sup>20</sup>

Another risk in investing in the pursuit of public GSI project bids is that they can cause undesired fluctuations in the amount of staffing and resources required to undertake the projects. With no guarantee that future work may be forthcoming after a large project is brought to completion, there is a risk of having to hire and train new workers only to lay them off when the project is done. The firm associated with this notion indicated that there were cases where they did not participate in bidding for large Philadelphia GSI projects because of the amount of personnel that would need to be hired and trained to perform the work without guaranteeing they could keep them on as staff.

The competitive bidding process for City issued GSI and Landcare contracts is designed to reduce costs for City budgets while ensuring work set forth by City Policy for the benefit of the public is executed in an efficient and responsible manner. This process is meant to ensure that the City has confidence in the contractor performing the work, and the contractor is not attempting to exceed their own capabilities, endangering their business as well as project success. However, the consequence is that smaller firms, with less financial resources or staffing, are unintentionally excluded from the public bidding process, even when they meet other desired qualifications.<sup>21</sup> A PWD representative interviewed indicated that when a firm was selected to work on a PWD issued GSI contract it was unimportant the number of workers a firm had trained in GSI Operations and Maintenance if the firm did not have the resources or size to own or lease heavy earth moving machinery.<sup>22</sup>

## CHALLENGES RELATED TO WORKFORCE DEVELOPMENT

Discussion regarding workforce development was specifically based on three main questions:

- Did the firm experience difficulty in recruiting qualified employees for their company?
- What skills sets exhibited by existing or potential staff was most valuable to their firm and the industry?
- What skill sets and attributes in their industry could be better improved with training?

**Difficulty Recruiting:** Landcare firms of all types overwhelmingly indicated that they experience significant challenges with both recruiting and training their individual staff members. 9 of the 12 interviewed firms indicated that their company had experienced issues in finding qualified potential employees or that they felt there were noticeable skill gaps in the candidates that they could possibly recruit from. 8 of those 9 firms indicated that entry level employee recruitment was the most challenging. This was not due to a lack of available candidates but due to a lack of necessary attributes and skills in the individual candidates.

There was also broad consensus on identifying the qualities and skills that made an entry level employee candidate “qualified” for the position or likely for advancement inside the organization. Familiarity with Landcare tools, practices, and basic horticulture was considered a great asset to candidates. However, the core primary qualifications private Landcare firms were looking for in entry level employees were more general: motivation, work ethic, alertness, adaptability, timeliness and work/personal life management, communication skills, basic education including english and math comprehension, and the ability to be receptive to additional job specific training.

(23;24;25;26;27)

20 PHLContracts, Philadelphia Procurement Dept., December 20, 2019

21 Philadelphia Home Rule Charter, Title 17, American Legal Publishing Corporation, December 17, 2019

22 Gerald Bright, interview with the author, December 2019

23 Cedar Run, Interview with author, December 2019

24 Philly Green Roofs, Interview with author, December 2019

25 David Brothers Landscape Service, Interview with author, December 2019

26 North Creek Nursery

27 DS Landscaping

Several conversations supported the consensus that these skills were also crucial in keeping entry level individuals reliably engaged with the firm once they began their employment. The challenge in recruitment arose when employees lacked a strong array of the above mentioned skills. Interviewees often believed that these missing skill sets stemmed from a lack of empowerment, confidence, early education, and economic stability for the entry level individual.<sup>(28;29;30;31;32;33)</sup>

**Skills Valued by Private Landcare Companies as Useful in Their Industry:** 8 of the 12 firms interviewed, indicated that horticultural skills were essential to their company and very valuable to the industry. These skills were also viewed as very useful for implementing vegetated GSI and specific types of Ecological Landscapes. Other skills that were mentioned as important were the ability to read industry specific field information such as planting diagrams and design drawings.

Although some interviewed Landcare firms indicated that their companies were very experienced with horticultural practices, they also described a desire to continually enhance their industries and staff with more horticultural knowledge. Firms felt there was a correlation between an employee's horticultural skills and the individual's value to the company. One generalist firm had programs in place to encourage all of its employees to take at least one industry related class per year. This company felt strongly that certain certified courses such as Certified Arborist, or Certified Plants Person, created direct and measurable impact on the effectiveness and efficiency of the company's employees.<sup>34</sup>

In many cases, horticultural knowledge was often mentioned to be so valuable as to be one of the firm's primary self identified competitive traits. Some firms noted their reputation for horticultural expertise as being responsible for bringing in new clients without the use of direct marketing.<sup>35</sup> Alternatively, one firm actively selected clients who would be receptive to their message of only using native and responsible horticultural stock as well as installing landscapes that were intentionally designed with wildlife in mind.<sup>36</sup>

Most firms were able to see the overlap between horticulture skills and GSI related skills, but also recognized the non-horticultural aspects of GSI. In some cases GSI projects with substantial underground components, requiring subsurface clean outs and trap clearing, or projects using relatively standard and regimented plantings, did not coincide with the preferences of certain Landcare firms. When looking to to build their industry reputations on expertise with live plants these types of projects may even be seen as unglamorous.<sup>37</sup> This idea was further illustrated when a specialist firm indicated that they wished to be more widely recognized as able to provide innovative solutions to GSI challenges, through utilizing novel and more efficient plant materials and pairings. They believed that there were a wide array of new GSI specific horticultural practices that were not commonly requested by clients and that more could be done by the design community to make GSI functional, ecologically diverse and enjoyable to clients.<sup>38</sup>

**Skill Sets Able to be Improved with Training:** Interviewed firms had varying responses when asked which skills to focus on for workforce training. Firms were more likely to bring up challenges unique to their specific business. There appeared to be three common groupings of skills to focus on regarding workforce development: the ability to read and comprehend construction documents, management and communication skills for advancement of entry level workers towards specialists, and more specific in-depth horticultural training.

The ability to read landscape architect/designer produced site plans, or industry specific maps, was plainly

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- 28 Cedar Run, Interview with author, December 2019
  - 29 Philly Green Roofs, Interview with author, December 2019
  - 30 David Brothers Landscape Service, Interview with author, December 2019
  - 31 North Creek Nursery
  - 32 DS Landscaping, LLC
  - 33 Native Landscapes, LLC
  - 34 David Brothers Landscape Service, Interview with author, December 2019
  - 35 RoofMeadow, LLC, interview with author, December 2019
  - 36 Naturescapes, LLC, interview with author, December 2019
  - 37 Native Landscapes, LLC
  - 38 RoofMeadow, LLC



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indicated as a skill set lacking in employees. Four firms indicated that the ability to read site plans and various hydrology or vegetative maps was directly applicable to their Landcare industry and also an attribute not commonly found amongst entry level workers and their immediate supervisors in the field. It was noted that having more workers with this skill could increase efficiency during projects, reduce potential errors or oversights, and more productively interact with clients, designers, and agencies.<sup>(39;40;41;42)</sup>

Management and people skills were topics brought forth during interviews as both important to a company's success and also difficult to train staff in. 7 of the 12 firms indicated their primary client was the general public and that they often operated as educators when providing service to these clients. Alternatively 4 of the 5 remaining firms indicated that they worked primarily with either private land or construction developers, and nonprofit organizations looking for private firms to manage or implement their Landcare or GSI projects. These groups were described as often times having questions about the materials, processes, and maintenance of projects. The ability for an individual to clearly explain the how and why of actions, and how to professionally direct questioning towards a higher level co-worker, was deemed important for both entry level employees and specialist employees.<sup>(43;44;45)</sup>

Employees in foreman and crew chief positions, as well as any specialist who supervised entry level workers, were also identified as requiring more communication and management training. Generalist firms who were likely to promote staff to these positions from within the organization indicated the lack of training focused on managing subordinate employees and communicating with clients. Conflict resolution skills, supervisorial and motivational skills, adaptive and flexible reasoning skills, as well as intermediate math skills, were highly desired.<sup>(46;47)</sup> Furthermore these same firms identified that their organization may be unable to create in house training for these employees as the skill sets were not as tightly aligned with the core technical competencies of the company. The ability to adaptably and proactively manage staff and stakeholders was identified as a core skill component that was not particularly related to the technical side of Landcare practices and often required firms to seek out 3rd party training. Individuals with these skill sets were considered valuable because they could be counted on to make calculated and rational decisions in the field as well as provide a sounding board for more specialized staff inside the company.

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39 Home Science, LLC  
40 Native Landscapes, LLC  
41 Nativescapes, LLC  
42 David Brothers Landscape Service  
43 Cedar Run, Interview with author, December 2019  
44 David Brothers Landscape Service, Interview with author, December 2019  
45 DS Landscaping, LLC, Interview with author, December 2019  
46 Cedar Run, Interview with author, December 2019  
47 David Brothers Landscape Service, Interview with author, December 2019

# **KEY TOPICS FOR WORKFORCE TRAINING**

# KEY TOPICS FOR WORKFORCE TRAINING

Throughout the course of interviews with public agencies, designers, Landcare Contractors, and related organizations, several areas of skills and knowledge that could comprise workforce training were synthesized. These topics were reflective of what Landscape Architects and Public Agencies look for in qualifications during the hiring process for Landcare Contractors. Additionally, these skills have been expressed by Landcare Contractors as knowledge sets they would like to see further developed in their staff or extremely important to the success of their company. Therefore, these skills can be interpreted as being essential to improve GSI and Ecological Landcare projects success as well as the quality of work done on individual projects. The skill topics range from technical skills and educational opportunities related to GSI, to general business development and management.

Based on the information collected, it also became clear that certain types of training should be targeted to different areas of the workforce. Therefore, topics for future workforce training have been categorized as targeting either the entry level workforce or the specialist workforce. Entry level workforce development topics focused heavily on foundational skills and knowledge in the Landcare Industry along with broad education efforts. Specialist workforce training topics assume prior industry experience or prerequisite education and would be targeted more towards foremen, company owners and specialized workers.

## AREAS OF ENTRY LEVEL WORKFORCE TRAINING

Entry level workers were identified as a key demographic to focus on for workforce training as they comprise the bulk of the workforce in the Landcare field. Indicators from Landcare Contractors and existing workforce training organizations, point towards persistent and urgent skill gaps with these workers. While specialist workers employed by Landcare Contractors, City Agencies, and other organizations may have received higher educational opportunities, training, and certifications, the entry level worker will likely not have had access to the same prior educational opportunities. These individuals may be at a significant educational and economic disadvantage when attempting to undertake new training.

Interviews with Landcare contractors consistently supported the value of workforce training. Interviews across all sectors implied that training was most appreciated when made available to all employees of a company or agency. Thus, the knowledge and skills necessary to install and maintain GSI and Ecological Landscapes should be equitably dispersed throughout the workforce.

Many Landcare companies and agencies hire and let go of significant portions of their entry level workforce seasonally. Therefore, skills and knowledge are less likely to be retained unless training opportunities exist for the entry level workforce population. Workforce training for these individuals is integral to providing professional and economic mobility in an evolving field. The key areas of skills identified by interviewees for the entry level workforce include:

- General Horticultural Knowledge
  - Plant Identification - native and invasive species, as well as weed identification
  - Basic soil science
  - Integrated Pest and Disease Management
  - Basic gardening skills
    - Weeding, pruning, mulching, planting, understanding of tools/equipment,
  - Safety training
- GSI and Ecological Landscape Knowledge
  - Basic Understanding of drainage and GSI systems
    - Surface Systems: rain gardens, bioswales, permeable paving, sunken planters, retention and detention basins
    - Basic understanding of Subsurface Systems: cisterns, infiltration wells, clean outs
    - Basic Green roof and green wall maintenance
  - Basic understanding of Ecological Landscapes
    - Meadows
    - Woodlands



# KEY TOPICS FOR WORKFORCE TRAINING

- Wetlands
- General Professional Development
  - Site management
  - How to read plans and drawings
  - Good work ethic and empowerment
  - Interpersonal communication

## AREAS OF MANAGEMENT LEVEL AND SPECIALTY WORKFORCE TRAINING

Throughout interviews for this report, higher level training for employees of Landcare firms and City Agencies was identified as desirable in order to increase success of GSI and Ecological Landscape projects and to further develop the industry. The targets for this higher level training are company and crew foreman, company owners, and employees of more specialty Landcare companies. In many instances, interview respondents expressed an appreciation of higher education institutions or degree programs and their effect on the specialist workforce.

Although this section of workforce training skills targets specialty and management level workforce, it is important that it not be exclusively limited to them. Firms expressed the need for advanced training to also be available to entry level workers to spread important knowledge to many levels of Landcare firms. This would allow entry level workers to have equitable access to economic and professional mobility by allowing them to improve their position within their firm or seek more specialty employment. However, many components of this training may still require some previous industry specific experience, training, and knowledge to be of most value to an entry level worker.

- Project management/Secondary business development
  - Knowledge of public agency processes
    - Understanding permitting, approvals, tax incentives for GSI, and performance requirements
  - Knowledge of construction sequencing and management
    - Understanding how GSI and Ecological Landscapes fit into the larger construction process on complicated projects to better coordinate with adjacent site work and the associated contractors
  - Understanding relationships with client, city, designer, and contractor
    - Understanding the entire process of a project to allow for better communication between the different parties and increase collaborative efforts to ensure project success
  - Personnel management
- Formal Certifications and Industry Standard Education
  - Some existing certifications that landcare professionals can receive:
    - Green Roof Professional (GRP) Training and Accreditation
    - Arborist Certification
    - Master Gardener/Master Naturalist Courses
    - Certified Plants Person
    - National Green Infrastructure Certification Program
    - Pesticide and Herbicide Applicator (preferably organic methods and IPM)
    - Certified Ecological Restoration Practitioner

## RECOMMENDATIONS FOR SUCCESSFUL TRAINING MODULES

Through interviews, it was noted that the above training, both for entry level and specialist individuals, be as hands on and physically engaging as possible. It was stressed that highly valued, skilled workers were often times

# KEY TOPICS FOR WORKFORCE TRAINING

the ones who had received hands on training in conjunction with classroom education. Some individuals with only on the job, hands on training may have good all around Landcare skills, but may have specific skill gaps and a lack of deeper knowledge related to GSI systems. Alternatively, some individuals coming out of a higher education degree program may have advanced knowledge of GSI, Ecological Landscapes, and general horticulture, but may not be immediately ready to contribute to working hands on in the field.

Two prominent topics stood out amongst most of the interviews. The first was an observed correlation between the reported importance of base horticultural knowledge, and the lack of available training in that field for entry level workers. Skills such as plant id, weeding, proper planting, and proper pruning methods are often lacking in entry level employees and are being taught on the job by employers. Higher level horticultural knowledge for some entry level employees is also valuable so that they are able to transfer that knowledge and perform their own training in the field. This process of knowledge and skill transfer could be supplied or enhanced through outside workforce training available to all entry level workers. Providing a standardized entry level horticultural training in Philadelphia would directly benefit the ability to install and maintain surface level GSI, various types of Ecological Landscapes, and conventional landscape projects. This would be a boon to the entire Landcare workforce of Philadelphia.

Another area related to developing workforce training programs where improvement is possible concerns that of certifications. Certifications are highly desirable amongst Landcare professionals, designers, and public agency communities that have an impact on deciding who is awarded bids for work. There are many relevant and desirable certifications that exist throughout industries. However, these certifications are not all directly applicable to the unique and successful GSI industry in Philadelphia spurred by PWD's plan and regulations.

Additionally, these certifications are largely inaccessible to a large portion of the workforce. Certifications are more attainable for business owners and management level workers, but not necessarily all. They are essentially unattainable for entry level workers, as these workers generally lack a large amount of horticultural knowledge to begin with. Therefore the opportunity for certifications and transitioning into a specialty workforce role becomes more difficult.<sup>1</sup>

It would be extremely beneficial for entry level workers to have access to a certification program for basic horticultural knowledge and skills that is universally acknowledged by employers and other sectors of the Landcare industry. A program such as this could also act as a platform, potentially leading to higher level certifications. Moreover, any locally offered certification programs ought to be nuanced and related to the Philadelphia region and its unique landscape as it pertains to GSI.

Finally, there would be a great benefit in providing more assistance to workforce members towards the higher level or specialty certifications mentioned above. Certifications all require a significant financial and time commitment that can be prohibitive without assistance from an employer. Not all employers offer that assistance. Consequently, entry level training and available certifications for all levels of the workforce are key components to addressing the gap between workforce capabilities and demand for GSI and Ecological Landscape projects.

## GENERAL WORKFORCE DEVELOPMENT CONCERNS FOR ENTRY LEVEL EMPLOYEES

Special attention should be paid to the reported challenges that relate to the Entry level Employee. Many interviewed organizations were very clear to point out that challenges to training these individuals have root causes that go deeper than industry specific knowledge. Organizations who currently have training programs in place have tailored these programs in order to attempt to specifically mitigate these issues, but the issues appear to be persistent, urgent and widespread.

Entry level individuals employed by firms may often be recruited from socio-economically disadvantaged communities. Interviews suggested the harm done to potential workers who did not have the opportunity to receive adequate schooling, or the benefit of a stable life. A common theme brought up was that some of these individuals lacked "life" skills, identified as a range of skills usually learned earlier in life that can have very strong impacts on work performance. These skills might be the ability to responsibly self regulate behavior and sleeping habits outside of work, time management while on the jobsite, confidence and articulation when speaking to managers and clients,

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1 Daniel Lawson, PPR, Interview with Author, December 2019

## KEY TOPICS FOR WORKFORCE TRAINING

as well as feeling that the work they performed created value. Some of these entry level individuals may also be lacking the economic resources to have reliable transportation to work and possession of appropriate personal safety gear and workwear. This lack of resources, as well as either low or seasonal wages associated with entry level workers, made them extremely susceptible to unexpected personal financial issues. These financial issues, compounded by a potential life skills gap, could cause significant negative impacts on their ability to remain engaged with the firm hiring them or with the industry as a whole.

The challenges expressed by Landcare firms when recruiting entry level employees, overlapped with challenges identified and actively targeted by PowerCorpPHL and Roots to ReEntry. This overlap is a clear indicator that the gap in foundational life skills for entry level employees as well as the sometimes precarious economic situations they experience, is a major and well documented challenge. It unfortunately continues to be extremely problematic to remedy as the primary causes are much too vast for any single organization to overcome. Its causes are also well beyond the scope of this report. But it is important to reiterate that any and all training for entry level workers should be considerate of the challenges facing them and actively promote self improvement, education, empowerment and financial stability for these persons.



**EXISTING AGENCIES  
CAPABLE OF  
FACILITATING CHANGE**

## EXISTING AGENCIES AND PROGRAMS

There are courses, non-profit organizations, city agencies, and workforce development programs that are best suited to facilitate and provide support towards growing a larger and more capable GSI workforce throughout Philadelphia. Identifying these groups is important in order to clarify which existing organizations are best equipped to aid in the dissemination of a comprehensive and accessible GSI and horticultural maintenance training module.

**PWD:** Within Philadelphia, PWD leads in facilitating GSI installation and maintenance. On a national scale, PWD has become a prime example of how city agencies can implement GSI in dense, intricate, urban areas. PWD has been successful in working with other agencies to train personnel in GSI operations and maintenance. They continue to collaborate with workforce development organizations in order to increase the amount of capable GSI maintenance personnel. It is appropriate to consider PWD as one of the key agencies able to conduct and participate in a more far-reaching, accessible GSI training course in the future.

**PowerCorpsPHL:** PowerCorpsPHL provides career-connected education and paid work experiences in collaboration with AmeriCorps and the city of Philadelphia, powered by EducationWorks.<sup>1</sup> PowerCorps already operates to some extent as a GSI maintenance training program by connecting underemployed young adults to organizations that conduct either GSI maintenance, ecological landscaping, or horticulture / Landcare. This is done through their GSI training academy. Through Powercorps, these young adults work in a related field to their desired career, whilst simultaneously supplying businesses, nonprofits and other organizations with workforce labor.

While at PowerCorps, participants not only receive education and skills training, but are provided work opportunities through the company. Graduates of the program can then opt to move on to other job opportunities, possessing skills and hands on experience in their field. While enrolled in the program, all participants receive basic training and skills for professional development, continuing on to more focused training for the job they desire. The program also offers support and mentoring for participants, helping to transition them from the program into the Philadelphia workforce. In some training programs, members of PowerCorps have access to certifications and related credentials.

**SBN and GSI Partners:** The Sustainable Business Network and their GSI Partners initiative are another leader in the effort to inform Philadelphia's diverse business community of the benefits and importance of knowing GSI. SBN attempts to accomplish change on a broad scale by engaging a wide network of businesses, encouraging member businesses to be impactful in their relative fields. Their collaboration with local government and PWD on GSI policy is of great importance with regard to informing and supporting their member businesses.<sup>2</sup>

SBN conducts the only comprehensive GSI operations and maintenance course in the Philadelphia area through their GSI Partners Program.<sup>3</sup> The O&M course launched in 2015. Its conception was based on the need for businesses to build their private and public GSI maintenance knowledge, in order to benefit from a rapidly growing field of Landcare. Prior to the formation of the course, Landcare professionals may have had limited exposure to GSI, mostly sticking to traditional landscaping (planting, mulching, mowing). SBN looked to leverage those existing skill sets into a new space.

The GSI Operations and Maintenance course takes place over 3 days, where time is split between the classroom and applying those concepts in the field. There are four modules of the course: Module 1) foundational learning including regulations, standard operating procedure types, anatomy of GSI systems, and landscape cultural practices. This has shifted to being included in a pre-course component which is also offered online to save time for attendees who may have some prior GSI experience. Module 2) Prescriptive techniques such as understanding operation & maintenance tasks, and inspection and safety. Module 3) monitoring and maintenance. Module 4) Adaptive techniques, managing performance issues based on prescriptive techniques.<sup>4</sup>

1 PowerCorpsPHL, Information from Website, January 2019

2 Fran Lawn, SBN, Interview with Author, December 2019

3 Anna Shipp, SBN, Interview with Author, December 2019

4 Fran Lawn, SBN, Interview with Author, December 2019

# AGENCIES TO FACILITATE CHANGE

Course material was developed by academic policy, as well as through a collaborative effort with approximately 12 experienced professionals from different sectors and businesses. The course is both partially taught by, and attended by PWD employees. GSI Partners continues to tweak the course through previous participant input and professional development specialists who focus on hands-on contextualized learning.

Participants include PowercorpsPHL, the Nature Conservancy, various green roof firms, PWD apprentices, Landcare professionals, and NGO's who will be responsible for properties incorporating GSI. On average, attendees have 3-5 years of experience in the field. There are also many attendees who are newer to the workforce, including contractors and landscape designers with less advanced degrees. There has been a more recent shift towards engineers and designers as consistent attendees.

Although the course has been valuable to member business, SBN recognizes the need to reach more contractors. With approximately 25 course participants per year, SBN hopes to both reach more contractors who are less informed about GSI, and increase attendance as a whole.

SBN is ultimately seeking a certification for their GSI Partners O & M course that distinguishes participants in their fields. A significant concern is figuring out what that credential is. There is a preference to avoid becoming an engineering contractor credential because the courses aim is to reach a broader audience.<sup>5</sup> The course is ultimately built for contractors, so the desired credential would ideally be a great benefit to contractors as well as to SBN.

Other concerns surrounding the course include the fact that most jobs and professions have some form of industry standardization, but that operations & maintenance does not. SBN has taken on the difficult task of figuring out how to standardize an O&M curriculum. Because environments and regulations change so greatly on a national scale, it is hard to standardize curriculums such as the one offered by SBN. For example, the climate and environmental regulations in Houston differ greatly than those in Philadelphia.<sup>6</sup> SBN's challenge is preparing contractors for these kinds of environmental differences, as they think contractors should have as much mobility as an engineer, thus able to bring a GSI O&M skill set to wherever their careers may lead.

**Bartram's Garden:** Bartram's Garden is a non-profit organization located in South-West Philadelphia that engages stakeholders through site-based educational opportunities, a community farm, ecological and historic preservation, stewardship and restoration. The Bartram's Gardens grounds are a National Historic Landmark, and home to America's first botanist John Bartram.

The horticulture staff at Bartram's Garden participates in contemporary GSI projects, several of which have been completed in the last 5 years. Among other volunteer groups, Bartram's works with PowerCorps, and the Pennsylvania Horticultural Society's Roots to Re-entry program, to maintain their larger tracts of land.<sup>7</sup> In this way, Bartrams facilitates workforce training, as labor crews are able to learn basic horticulture knowledge, as well as some GSI understanding from working within a very ecologically diverse landscape.

Through these relationships Bartrams hopes to have workforce crew participants return as fellows or apprentices, eventually becoming employees at Bartram's Gardens. A current fellowship program is run through PowerCorps, but Bartrams ultimately desires longer term relationships, that would further support maintenance for their plethora of Ecological Landscape projects. Having more consistent and successful transitions from workforce crews to full or part time employees would ideally ease the burden on Bartrams horticulture staff, whilst simultaneously broadening the scope of training for the workforce individual.<sup>8</sup>

At Bartram's Garden the horticulture and facilities staff is small compared to the amount of land that needs consistent maintenance. The size of the staff dictates maintenance limitations. The PowerCorps fellowship mentioned above requires matching funds which is sometimes hard to come by as Bartams doesn't always have payroll flexibility.

The interview with Bartram's Garden alluded to the inherent difficulty in managing young work staff in labor intensive positions. They have had fellows and interns disappear, and some simply move on to other endeavors.<sup>9</sup>

5 Anna Shipp, SBN, Interview with Author, December 2019

6 Anna Shipp, SBN, Interview with Author, December 2019

7 Tom Reber, Bartram's Garden, Interview with Author, December 2019

8 Tom Reber, Bartram's Garden, Interview with Author, December 2019

9 Tom Reber, Bartram's Garden, Interview with Author, December 2019



# AGENCIES TO FACILITATE CHANGE

Bartrams also is home to a successful youth internship program through their community farm. The program is intergenerational, operating as a youth powered farm and community garden that engages the elderly in the local community. Over Summers, 25-40 students participate in the youth farm internships, with participation continuing through the school year, albeit with a slightly smaller group. The community garden and farm worked to accept SNAP, food stamps, and provide fresh, affordable produce normally hard to find in the neighborhood.<sup>10</sup> Bartrams has had success in this realm largely due to their proximity to the surrounding neighborhood and efforts to engage the local community. Bartrams identified desirable training programs as the ones located within the communities they looked to serve, rather than a “you come to us” structure. They have found that offering programs in communities where residents feel at home and comfortable, are better attended on a whole.

**Penn State Extension:** As an expansive online information source, including face-to-face educational opportunities, The Penn State Extension supports the distribution of horticultural knowledge on a broad scale. In the Philadelphia area, the Penn State Extension is especially valuable for local pest and disease management, soil analysis, and food crop management.

**PHS, Roots to Reentry:** Roots to Reentry, through the Pennsylvania Horticultural Society, is another workforce training program. Serving citizens transitioning from the Philadelphia Prison System back to their communities, Roots to Reentry offers training in various landscape management fields. Participants learn green industry skills, safe and effective usage of hand and gas powered tools and basic Landcare techniques.

Roughly 40 candidates, mostly in the 25-35 age range, participate in the program annually. Many are found through community organizations, while about 25% are trained inside prisons who are identified as eligible for early parole. Upon completion of a 6 week basic training course, participants enroll in another 6 week internship with PHS working towards placement with one of 20 employee partners.<sup>11</sup> Internships consist of four full paid days working in the field followed by one day of continued classroom training.

The bulk of the course is hands-on landscape maintenance training accomplished through both classroom and field settings. However, some of Roots to Reentry training is focused on basic life skills including conflict resolution, time management, and communication with employers. A persistent issue amongst participants is the lack of a valid driver's license and high school diploma. Roots to Reentry staff recognized these areas as barriers to future employment and thus in need of improvement. Recognizing that there are also economic barriers to its participants, current participants are given public transit transpasses and those who complete the program are also equipped with personal protective equipment and workwear to better prepare them to be able to enter the workforce.<sup>12</sup>

Participants often transition to private landscaping companies, with a 95% placement rate for persons completing all aspects of the course. Although the program appears to be very successful in placing its participants in private firms, interviews suggested that very few or none of the participants went on to work for public agencies including PWD and PPR.

## ANALYSIS OF CURRENT INITIATIVES

As identified above, many existing organizations and agencies are already providing key training, hands on experience, and important policy making with regard to GSI. These organizations have complex and active networks for communication, training and recruitment developed between each other, as well as other communities involved in Landcare. However, local outreach seems to be a primary concern. Landscape designers and engineers appear well served and aware of GSI through the growing popularity of these strategies through The GSI Partner's Operations & Maintenance Course. Alternatively, contractors and Landcare professionals focused on day to day operations can be less aware of possible training or employee recruitment opportunities these organizations offer. It is also possible that organizations may be providing similar training and workforce development programs but may be developing it

10 Tom Reber, Bartram's Garden, Interview with Author, December 2019

11 Keith Green, Roots to Reentry, Interview with Author, December 2019

12 Keith Green, Roots to Reentry, Interview with Author, December 2019

## AGENCIES TO FACILITATE CHANGE

independently from one another. It is clear that more research is needed on how to map the relationships between these organizations, their participants and their partners in the public and private Landcare industry. Effectively utilizing and strengthening these networks may be very beneficial for disseminating GSI training opportunities to a wider Landcare workforce in Philadelphia.

Accreditation of training programs may be an attractor for reaching the various members of the GSI and Ecological Landcare industry. SBN stressed the importance and desire to have their operations & maintenance course associated with a certification.<sup>13</sup> This mirrors the strong preference that Landscape Architects and designers have for contracting private firms with industry certification to implement their designs, as well as private Landcare companies' very positive view on formalized certified training.

Currently, there also exists the National Green Infrastructure Certification Program (NGICP). Formed through The Water Environment Federation and DC Water's paper titled The Need for National Green Infrastructure Training and Certification in July 2015, the NGICP offers a nationally recognized certification in Green Infrastructure<sup>14</sup>. Offered regionally, the week long course is 35 hours long, 10 of which are field work related, followed by an examination. This program is quite new for the industry, initiated nationally in 2018. The GSI partners Operations and Maintenance course is also a recent training program initiated in 2015. Therefore, additional research should be done to determine the efficacy of the training and the response from the local and national GSI and Landcare industry. A very pertinent factor to study would be looking into whether GSI training in one geographical region is relevant to other regions as municipalities may have very different policies for implementing GSI, as well as vastly different climates and existing infrastructure. Also of importance would be to determine how the length of training time, cost of training, and location of training courses, affect the ability of individuals to attend.

With regard to local training courses, Roots To Reentry fills an important role in job placement. However, the focus with this training program is not deep comprehensive horticultural knowledge, but rather basic landscape maintenance skills and the ability to transfer participants into private companies. PowerCorpsPHL has a successful model for training young workers, and most importantly, getting them experience in their fields. Many of their efforts do focus on training for GSI and Ecological Landcare as they have a dedicated training program and maintain a strong connection to PWD. Both organizations maintain strong connections to their graduates and to their employer partner organizations. However, as one of their primary goals is placement of their participating members into local jobs, there may be a strong influence from their partners on what training they are developing. Both organizations are successful and popular local programs with the potential to expand with coordinated funding and partnerships. As PowerCorps focuses on younger participants and Roots to Reentry focuses on ex-offenders, similar programs could be useful for members of the workforce in other demographics as well.

There does exist a pool of nonprofits focused in the field of horticulture. These organizations look to be central as facilitators of a more comprehensive, yet still local, horticultural training course and could possibly be tied to future GSI maintenance courses. A common opinion held amongst agencies interviewed is that there are potentially many unexplored relationships between organizations. Communication and idea sharing between these groups could have very positive synergistic effects on developing new standardized and widely recognized workforce training programs.

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13 Anna Shipp, SBN, Interview with Author, December 2019

14 "Program Governance", NGICP/IGICP, Web, accessed December 19, 2019

# **RELATED CHALLENGES TO THE SUCCESS OF GSI IN PHILADELPHIA**

## RELATED CHALLENGES

It is evident that the various professional sectors interviewed are deeply invested in carrying out Philadelphia's broad environmental goals, particularly as they relate to PWD's stormwater regulations. During the research process, it was apparent that workforce training is not the sole issue to determine the success of GSI and Ecological Landscapes in Philadelphia. In discussing the factors outside of workforce training, it is important to acknowledge that most, if not all of them, impact both the workforce and the feasibility of Philadelphia's goals regarding GSI. These various factors would require further study to provide solutions as they were not the focus of this report. However, based on the feedback received, they can be discussed in general terms. These other factors can be categorized as follows:

### DESIGN AND CONSTRUCTION PROCESS

**Designing with maintenance in mind:** There were several responses that alluded to difficult GSI maintenance based on an oversight in design. This includes surface treatments without easy access, or subsurface systems with poorly designed or inaccessible clean outs. Lack of maintenance ultimately causes the systems to fail. Failed systems tarnish public perception of GSI and put undue strain on the workforce responsible for maintaining them.

**Flexible interface with PWD during design and approvals:** Through interviews with the design community, a desire was expressed for more flexibility within the design process in meeting PWD goals. In some cases this can be manifested through designers' ability to try new best practices that may not be explicitly mentioned in PWD regulations. In other cases its simply altering accepted best practices to better fit a site, client's budget, and realistic expectations of maintenance. Both affect the amount of GSI undertaken by clients and the long term success of projects.

**Construction management and project coordination:** Providing these skills in advanced workforce training was discussed earlier in this report, however, these are skills that all parties involved on projects could improve upon based on interview feedback. Many of the factors discussed throughout this report as it relates to project installation could be addressed most easily through better structured and more frequent communication between parties. This may include more time for designers and representatives from PWD to interface with clients during design and planning, and throughout the construction process.

### POLICY

**Policy initiatives and new data:** A consistent influx of new data is growing and evolving the field of GSI and Ecological Design. This research helps to expand the effectiveness of construction and maintenance methods, as well as the creation of novel technologies. Understandably, the accepted methods outlined in PWD's regulations are the longest and most well established. However, as discussed in the background section of this report, the need for workforce training and education to evolve, is likewise true for policy. Currently the tax credits offered by the city do not include credit for benefits such as soil absorption capacity of stormwater and evapotranspiration of vegetation. Evolving the policy could increase the amount of GSI projects undertaken by private landowners in the city.

**Policy and industry stability:** Many contractors interested in taking on more GSI work have expressed hesitancy to invest in either the training, hiring of new employees, or new equipment purchases required if these investments cannot be counted on to yield predictable returns. For smaller firms these investments may be significant and risky, while larger firms may not feel there is an adequate reward to transferring resources away from already profitable markets and customer bases.

### OUTREACH

**Private Landowners:** many large developers and landowners are aware of PWD's regulations and



requirements as they are heavily impacted when building large scale projects. It was expressed in interviews that many private landowners and even large developers are unaware of the tax credits and other benefits they could receive for opting in to GSI and stormwater best management practices.

**General Public:** While efforts exist to educate the population of Philadelphia on the impacts of stormwater and the importance of managing it, it was acknowledged across interviews that there needs to be more. Public buy-in to projects in local neighborhoods aids in long term project success through ongoing maintenance and care. Additionally, there are members of the general workforce that could be capable of maintaining or installing GSI projects in the city, but may be part of communities lacking information and awareness.

**Aligned Professions:** Further outreach could be undertaken to recruit companies and individuals from outside of the Landcare industry who may have related skill sets, but very low awareness or exposure to GSI. Engaging these communities could increase the pool of qualified workforce members able to benefit GSI projects throughout Philadelphia.

### PROJECT ADMINISTRATION

**Funding of Maintenance:** Current funding of public and private GSI and Ecological Landscapes separates capital project budgets from operations and maintenance. Representatives across interviews recognized that the majority of projects fail due to lack of maintenance. Providing funding for maintenance should be a top priority. A significant solution recommended in the US General Service Administration's Site Commissioning White Paper is to include two years of O&M funding in capital budgets.<sup>1</sup> Two years is representative of the period generally required to ensure systems are fully established and are sustaining functionality. During this time, maintenance crews can coordinate and troubleshoot for long term project success.

**Bidding Process:** Many small to mid-sized Landcare contractors interviewed expressed challenges with competing against larger companies when bidding on projects. Although the public bidding process has recently changed to a Best Value model, the relative newness of this bidding process, and the historical perception that public bids are awarded to the lowest cost contractor may discourage firms from bidding. The public bidding process also inherently favors large companies able to spend more resources pursuing bids than smaller firms.

#### Additional Areas of Study Related to the Discussion

- Economic data related to the GSI and Ecological Landscape Industries. Better understanding of demand, economic incentives for workforce, and mechanisms to grow industries.
- Further interviews and study of workforce training quality, methods, outreach, and comparative skills with formal degrees.
- Further discussion and research into how to build relationships between public agencies and the workforce while keeping pace with evolving information and programming.
- Further study in regards to the current public bidding process for GSI projects in Philadelphia and how it affects different types of Landcare contractors.

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1 US GSA, Site Commissioning White Paper, July 2017

# CONCLUSION

Within the sectors of Philadelphia's workforce, designers, and public agencies, many unique concerns regarding GSI and Ecological Landscape knowledge and training were raised. It became very clear that there were many overlapping challenges, affecting multiple organizations in the industry, that call for more consistent, comprehensive and available training solutions. This reinforced the tremendous importance of outreach, communication and inter-agency relationships when attempting to strengthen the GSI industry workforce. The current networks and professional relationships are strong thanks to the commitment of industry members and policy makers, but it is important to remain focused and dedicated to cooperation as the industry grows.

Philadelphia is currently home to a progressive, and high functioning water department. SBN partners have created a successful GSI O&M course, reaching numerous sectors and businesses. Local designers have reimaged the City's private and public greenspaces for citizens to enjoy, while contracting firms are devoted to the ecological and economic good that GSI and Ecological Landscape projects can bring to communities and employees. Credit must also be given to the existing workforce development programs as these programs are largely responsible for bridging the gap between Philadelphia's potential workforce, and the institutions and businesses that would benefit most from their services. Additionally, these developmental organizations' experience with tackling multiple challenges affecting their participating members, and level of community engagement, makes them valuable partners in any workforce training initiatives.

It is clear that the pieces may all be in place with an enthusiastic and dedicated group of agencies and organizations. Thus, addressing the current challenge may not necessarily require creating wholly new courses and drastic changes in policy goals, but rather connecting agencies to the workforces they might best serve, as well as to other organizations who might present a previously unlocked partnership. One discernable situation regarding partnerships that was noticed is that Philadelphia's arboretums and historic gardens present ideal locations for possible hands-on, comprehensive horticultural training. Rather than just places for workforce development and landscape maintenance, these natural landscapes are ideal locations for more formalized training, as they are both local and accessible, and spread throughout different areas of Philadelphia. It is not unreasonable to conceive of a training program offered at multiple locations, thus catering to entry level workers in the areas that they operate in, and are comfortable with. Additionally, private firms, who during interviews volunteered their physical and informational resources for training programs, could also be hosts for education sessions.

The lack of entry level horticultural training amongst the existing workforce is an issue each sector viewed as important to improve upon in order to increase the successful implementation and efficient maintenance of GSI and other Ecological Landscapes. Our interviews indicate that a remedy to this issue may begin with the development of a comprehensive and local, certified horticultural training program, or the expansion of an existing program in this regard, that specifically targets the entry level workforce.

While there currently exist many certifications for Landcare professionals, interview feedback indicated that these programs are largely out of reach of entry level workers whose participation in the growing field of GSI and ecological landscape maintenance is integral to its continued success. In order for specialist certifications to be obtained, entry level certifications might be offered on a larger scale to begin with. Certifications and accredited programs not only draw in attendees, but also carry more weight as training programs; clients of all kinds can recognize, research and distinguish the material that they offer. Additionally, certifications are associated with employee empowerment, providing greater professional and economic mobility to individual workers. Therefore, there is a commonly expressed desire for entry level workers to access certifications and training that are typically reserved for more experienced workers.

Although the connection between base horticultural knowledge and base GSI knowledge may be obvious, the differences between the two are also important. Base horticultural training can be applied to most ecological landscapes as well as surface GSI. Alternatively, base GSI knowledge also includes knowledge of subsurface systems, which is quite separate from horticultural knowledge.

For these reasons, a locally recognized certification for both GSI and Horticulture would be of significant benefit to a large, latent, yet capable workforce. These certifications might form a 2 part accredited training program under one umbrella: one section for base horticultural knowledge and one section for base GSI knowledge. Sections could be taken at different times, saving and spreading out time, money, and energy requirements of both attendees and instructors. It is also important that the parts of these training programs be tailored to the local needs of the municipalities, counties, or townships they serve.

# CONCLUSION

Furthermore, in order for any existing or new training programs to be successful, more research must be done into the issue of incentivizing workforce personnel to stay connected to the organizations they have participated with, after initial training has ended. This sentiment coincides with other issues such as the necessity for course participants to either possess, or be provided more training with “life skills”. Feedback from interviews revealed again and again the importance of potential employees being proficient in these rudimentary, but often undervalued attributes.

As shown throughout this report, Philadelphia’s leading institutions have already taken bold strides towards initiating and growing GSI in a complex metropolis. The inclusive interviews and opinions gathered in this report look to extend these broad efforts by helping to reach and utilize an undeveloped workforce, capable of aiding in this important ecological endeavor of increasing, informing and maintaining Green Stormwater Infrastructure.



# **INTERVIEWS AND SOURCES**

# INTERVIEWS AND SOURCES

## INTERVIEWS

### **Public Agencies and Workforce Training Programs:**

Tom Reber, Director of Landscapes and Facilities, Bartram's Garden

Elizabeth H. Lankenau, AICP Director, Infrastructure Program Coordination  
Office of Transportation, Infrastructure, & Sustainability | City of Philadelphia

Daniel Lawson, Manager of Sustainability and Quality Control, Philadelphia Parks and Rec

Glen Abrams, Deputy Commissioner, Communications and Engagement, Philadelphia Water Department

Gerald Bright, Administrative Scientist, Philadelphia Water Department

Keith Green, Director Philadelphia LandCare, Roots to Reentry, PHS

Fran Lawn, GSI Partners Program Manager, Sustainable Business Network

Anna Shipp, Executive Director, Sustainable Business Network

### **Design and Engineering:**

Darren Damone PLA, ASLA Principal + Director of Practice Development, Andropogon Associates Ltd.

Lauren Mandel PLA ASLA, Associate + Researcher, Andropogon Associates Ltd.

Peter Straus, Project Manager, Ruggiero Plante Land Design

Daniel Chieco PLA ASLA, Sr. Associate, Sikora Wells Appel

Joe Sikora PLA ASLA, Principle, Sikora Wells Appel

### **Landcare Professionals:**

Alden Zove, President, Cedar Run Landscapes, LLC

Donald Stuart, Owner / Operator, DS Landscaping, LLC

Jonathan Nuss, Sales/Design, David Brothers Landscape Service, LLC

Edward Brewington, Owner / Operator, Envent Builders, LLC

Bernard Drew, Owner / Business Manager, Envent Builders, LLC

Doug Demers, Owner / Stormwater Assessor, Home Science, LLC

Kevin Reis, Owner, Nativescapes, LLC

Drew Rinaldi Subits, Co-Owner / Founder, Native Landscapes, LLC

John Fridy, Owner, Naturescapes, LLC

Steve Castorani, President / CFO, North Creek Nursery, LLC

Jeanne Weber, BSLA, GRP, Principle and Owner, Philly Green Roofs, LLC

Angela Fleegal, Landscape Designer + Stewardship Director, RoofMeadow, LLC

Alejandro Franqui, Developer / Realtor, Solo Real Estate, LLC

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