Improving GSI Outcomes from Redevelopment in Philadelphia

November 2023

sbn Sustainable Business Network of Greater Philadelphia

The Water Center University of Pennsylvania

The Nature Conservancy

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THE SUSTAINABLE BUSINESS NETWORK OF GREATER PHILADELPHIA is building a just, green, and thriving economy. We empower the region's diverse independent businesses to do well by doing good; we advance industries critical to a vibrant, local, equitable, and climate resilient economy; and we advocate for an economic ecosystem that centers localism, serves community needs, shares wealth, and protects our environment. Since its founding in 2001, SBN has remained the region's only membership and advocacy organization playing the important role of serving Greater Philadelphia's independent values-driven business community. Learn more about our work at www.sbnphiladelphia.org.

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Contents

Definitions

Combined Sewer System (CSS): A single sewer system that carries both sewage and stormwater in one pipe, to a water pollution control plant for treatment before being released to a waterway.

Combined Sewer Overflow (CSO): During moderate to heavy rainfall events, the combined sewer system will reach capacity, overflow, and discharge a mixture of sewage and stormwater directly to our streams and rivers from the 164 permitted Combined Sewer Overflow (CSO) outfalls within the City.

Development Review Process: The series of reviews, permits, and approvals that a real estate development project on private or non-City public lands in Philadelphia must follow in order to be built.

Directly Connected Impervious Area (DCIA): An Impervious Surface that is directly connected to the drainage system. DCIA generates surface runoff with a direct hydraulic connection to on-site drainage systems (e.g., inlets, curbs and gutters, pipes, etc.), PWD's drainage systems, or stormwater management practices (SMPs) without flowing over pervious areas.

Disconnected Impervious Cover (DIC): Impervious cover from which runoff is directed toward pervious areas for management within the landscape.

Greened Acre (GA): An expression of the volume of stormwater managed by a GSI practice. Typically, a conversion of the system storage volume into acre-inches. One Greened Acre is equivalent to one inch of managed stormwater from one acre of drainage area or 27,158 gallons of managed stormwater.

Green Stormwater Infrastructure (GSI): A variety of soil-water-plant systems that intercept stormwater, infiltrate a portion into the ground, evapotranspirate a portion into the air and, in some cases, release a portion slowly back into the sewer system to reduce stormwater pollution and combined sewer overflows. The guiding principle of GSI is to utilize rainwater as a resource where it falls, rather than a problem to be dealt with by collecting and treating it elsewhere. While many GSI practices include vegetative elements, some practices do not.

New Development: Development project on a tract of land where structures or impervious surfaces never existed or were removed before January 1, 1970 (as defined in the Stormwater Regulations).

Non-vegetated SMPs: Non-vegetated practices include all subsurface practices, blue roofs, porous pavement, media filters, and cisterns, and do not have significant vegetative components.

Redevelopment: Development on a tract of land that includes, but is not limited to, the demolition or removal of existing structures or impervious surfaces and replacement with new impervious surfaces. This includes replacement of impervious surfaces that have been removed on or after January 1, 1970 (as defined in the Stormwater Regulations). The vast majority of private development projects in Philadelphia are classified as "Redevelopment" due to historic urbanization and the lack of undeveloped land in the city.

Stormwater Management Practice (SMP): Any man-made or natural structure, system, landscape feature, channel, or improvement designed, constructed, installed, and/or used to detain, infiltrate, or otherwise control stormwater runoff quality, rate, or quantity.

Vegetated SMP: Stormwater management practice (SMP) that utilizes vegetation - such as trees, shrubs, and grasses - as a significant or dominant component within the storage area and includes bioinfiltration/bioretention basins, ponds and wet basins, green roofs, and vegetated media filters.

Many of the above definitions are taken verbatim from existing PWD guidance documents to ensure consistency.

Acronyms

CSS: Combined Sewer System
CSO: Combined Sewer Overflow
DCIA: Directly Connected Impervious Area
DIC: Disconnected Impervious Cover
eCLIPSE: Electronic commercial licensing, inspection and permit services enterprise
E&S: Erosion and Sediment
EPA: Environmental Protection Agency
ERSA: Existing Resources and Site Analysis
GA: Greened Acre
GCCW: *Green City, Clean Waters* plan
GSI: Green Stormwater Infrastructure
L&I: Department of Licenses & Inspections
PA DEP: Pennsylvania Department of Environmental Protection
PCPC: Philadelphia City Planning Commission
PCSM: Post-Construction Stormwater Management
PWD: Philadelphia Water Department
SMGM: Stormwater Management Guidance Manual
SMP: Stormwater Management Practice
SPR: Stormwater Plan Review

Key Resources

PWD Stormwater Regulations - Define the specific requirements that need to be met for various types of development in the City.

PWD Stormwater Management Guidance Manual - Provides the development community with detailed guidance on designing stormwater management systems to meet the Stormwater Regulations, understanding PWD's stormwater-related requirements and approval processes, and preparing submissions to PWD. In June 2023, PWD updated the Manual to version 3.3, but the Stormwater Regulations remained unchanged.

PWD Reg Finder - Allows users the ability to estimate applicable stormwater design requirements that may apply to their project.

PWD Find Your Watershed tool - Allows users to enter in an address to determine which of Philadelphia's seven watersheds the property is located in.

eCLIPSE - An online portal where L&I customers can apply for licenses and permits, schedule inspections, and request approval from multiple departments at the same time.

PWD Stormwater Plan Review - The unit within the Philadelphia Water Department (PWD) responsible for reviewing development projects in the City of Philadelphia to ensure compliance with the Stormwater Regulations. Stormwater management plans are submitted via an online application portal to Stormwater Plan Review.

Philadelphia Permit Navigator - A new tool to make permitting information more accessible for business and residential use cases. The Navigator is currently a pilot project but the City is working on expanding this tool.

Philadelphia Atlas - Allows users to find basic information about a Philadelphia property by entering in the address.

GSI Strategic Framework - A PWD strategy document that assesses what has been achieved to date as part of the *Green City, Clean Waters* program and what will need to be managed, along with where and how to achieve the program's ambitious goals.

Project Context

The City of Philadelphia is required by State and Federal regulations to clean up its waterways and has established several programs in order to meet its obligations.[1] While PWD is investing significant resources towards upgrading City-owned wastewater facilities and stormwater infrastructure, it requires the development community to contribute towards these clean water goals via the Stormwater Regulations. First enacted in 2006, the Regulations define the specific requirements that need to be met for development projects in the City based on development type, location and corresponding watershed, and amount of earth disturbance. PWD also promotes additional stormwater management on private and non-City public lands above and beyond what is required by the Regulations through its Stormwater Incentives program that includes specific development bonuses and incentives.

Established in 2011, *Green City, Clean Waters* (GCCW) is the City of Philadelphia's 25-year plan to reduce pollution resulting from combined sewer overflows (CSOs) as part of its State and Federal regulatory requirements under the Clean Water Act. The plan envisions a hybrid approach to stormwater management that emphasizes green stormwater infrastructure (GSI) practices, complemented by traditional gray infrastructure, to improve water quality and provide additional benefits to local communities. Although the combined sewer system (CSS) area only includes approximately 60% of the city, the GCCW program has a significant impact on GSI implementation and is worth examining in further detail.

***Figure 1**. Green City, Clean Waters Target Milestones. Source: Green Stormwater Infrastructure Strategic Framework (April 2022), Philadelphia Water Department.*

At the time of publication in 2023, GCCW was approximately halfway through its implementation period and at a critical point for assessment. In order to meet a minimum 85% CSO reduction, the City has determined that it will need to implement 9,564 greened acres (GAs)[2] by 2036. At the end of Year 12 (FY23),[3] PWD had recorded 2,863 cumulative GAs towards this goal and was on track with its target milestones as outlined in Figure 1.

[1] State and Federal regulations include the Clean Water Act (CWA) of 1972, the Safe Drinking Water Act of 1974, the Pennsylvania Stormwater Management Act of 1978, the National Pollutant Discharge Elimination System (NPDES) MS4 Stormwater Regulations, and CSO Control Policy. See the Philadelphia Stormwater Management Guidance Manual for more information: https://water.phila.gov/development/stormwater-plan-review/manual/introduction/#7

[2] As outlined in the *Green City, Clean Waters* plan, a Greened Acre is "an acre of impervious cover that is retrofitted to utilize Green Stormwater Infrastructure (GSI) which manages stormwater using source controls such as infiltration, evaporation, transpiration, decentralized storage, alternative stormwater routing, reuse and others…This quantity can include the area of the stormwater management feature itself, as well as the area that drains to it…One Greened Acre is equivalent to one inch of managed stormwater from one acre of drainage area or 27,158 gallons of managed stormwater."

[3] At time of writing, the most recently published CSO & Stormwater Annual Report by PWD was from FY23 and included cumulative greened acres implemented through June 30, 2023. This GA total was calculated using the revised calculation method developed by PWD that accounts for infiltration and slow release in addition to storage volume.

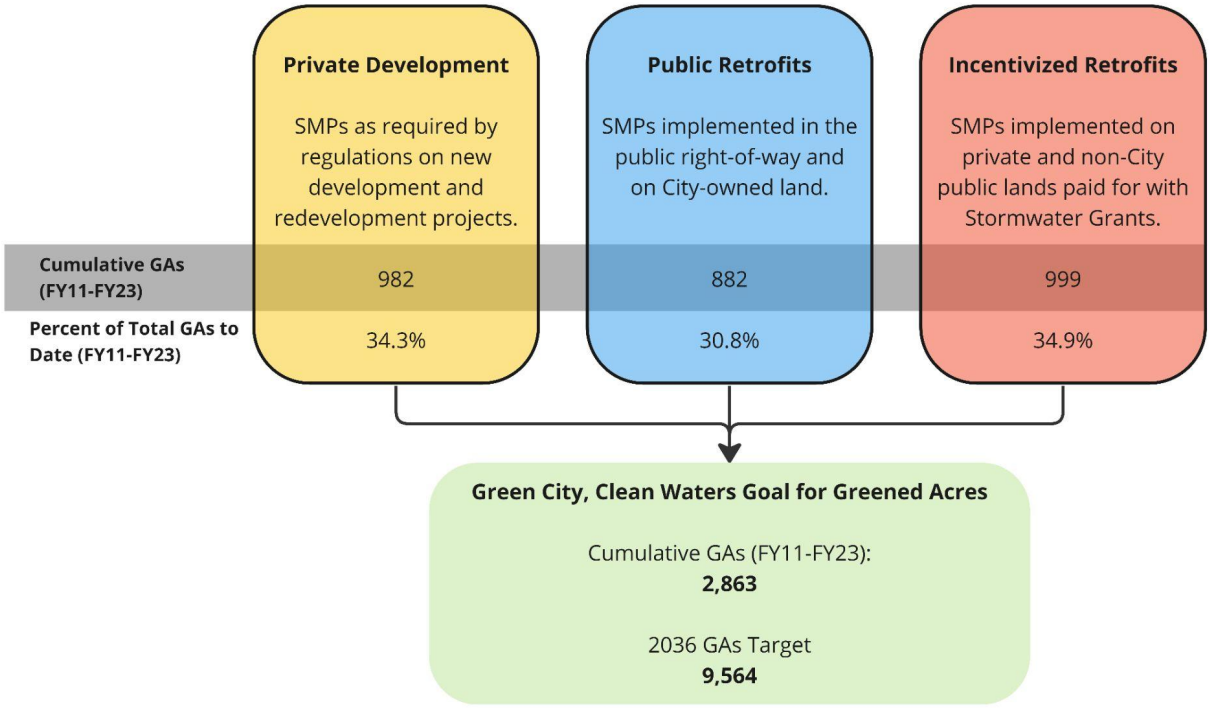

Figure 2. *Implementation Pipelines towards GCCW Goal for Greened Acres. Data source: Fiscal Year 2023 CSO & Stormwater Annual Report, Philadelphia Water Department.*

The Philadelphia Water Department has three implementation pipelines towards achieving its *Green City, Clean Waters* GA targets as outlined in Figure 2. The focus of this white paper is on the Private Development pipeline specifically, which encompasses New Development and Redevelopment projects as defined in the Stormwater Regulations, and does not consider the other two pipelines in great detail. To date, the Private Development pipeline has accounted for 499 total projects delivering a cumulative 982 GAs, or 34.3% of the total GAs implemented within the combined sewer area.[4] This significant contribution highlights the importance of private development to the overall success of the GCCW program and justifies a deeper dive into how this pipeline could be further improved for even greater delivery of GSI over the next half of the GCCW program. Indeed, PWD included "Optimize and refine the current redevelopment pipeline approach" as a critical action in its *Green Stormwater Infrastructure Strategic Framework*.

1. Introduction

The goal of this project is to examine the City of Philadelphia's real estate development review process and evaluate how it might be improved to facilitate greater consideration of green stormwater infrastructure (GSI) opportunities in the early stages of development project planning. Currently, private development projects that are required to manage stormwater on-site per the Stormwater Regulations often default to subsurface stormwater management practices (SMPs) that lack vegetative components. This occurs for a variety of reasons, including limited space, concerns about maintenance, tight schedules, and restricted funding. However, the vegetative ("green") components of GSI projects specifically can provide additional social, economic, and environmental benefits (or "co-benefits") to communities beyond stormwater quality and quantity, allowing these investments to have even greater impact.[5] PWD has also found that vegetative SMPs have a lower failure rate as opposed to non-vegetated SMPs and

[4] See *Fiscal Year 2023 CSO & Stormwater Annual Report*, p. 112 (Table 1-2), Philadelphia Water Department: https://water.phila.gov/pool/files/fy23-npdes-annual-report.pdf

[5] See Philadelphia Water Department website: https://water.phila.gov/green-city/ and Environmental Protection Agency website: https://www.epa.gov/green-infrastructure/benefits-green-infrastructure

demonstrate enhanced performance over time, meaning that these "green" systems perform better as they age and the plants become established.

For these and other reasons, it is critical to consider what changes might occur to improve GSI outcomes from these private development projects, considering stormwater management both as required by the regulations as well as above-and-beyond the requirements achieved through developer incentives. The desired long-term outcome is that private development projects requiring on-site stormwater management (defined as "New Development" or "Redevelopment" projects in the Stormwater Regulations) increase implementation of GSI practices that consist of vegetative ("green") components that offer co-benefits and better deliver the vision set forth in the *Green City, Clean Waters* plan.

The Sustainable Business Network of Greater Philadelphia (SBN) convened a research team that included significant expertise in GSI program evaluation. The research team included the following organizations and individuals:

Research Team:

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The research team performed desktop research and engaged with private developers, City of Philadelphia staff, and other key stakeholders through a series of focus groups and interviews to assess the current development review process and inform recommendations for how GSI can be more thoroughly considered in the early stages of private development projects. The final research questions are included here:

Research Questions

- How does the actual development experience differ from that which is codified? What are developers' perceptions of the current review and approval process and how stormwater management is integrated?
- What are the ways in which developers approach the development process and how (if at all) does this vary based on type of development (residential, commercial, mixed use, affordable housing, etc.)? What are the main touch points with the City (i.e. which departments depending on project type, location, etc.)?
- What are the main incentives to incorporate vegetated SMPs into development projects?
- Are there any redundancies or conflicting elements during stages of the development review process?
- How do landscaping requirements intersect with stormwater management requirements if at all?
- How does the development review process integrate with larger City objectives? How could it allow for more equitable development and distribution of GSI?

2. Stormwater Management Requirements and Incentives for Development Projects

2.1 Stormwater Regulations

As outlined in the Philadelphia Stormwater Management Guidance Manual v 3.3 (the Manual, or SMGM), the Stormwater Regulations require on-site stormwater management for certain development projects in order to improve the health and vitality of Philadelphia's waterways. The Regulations define the specific requirements that need to be met for various types of development in the City, including those classified as New Development and Redevelopment. Enacted in 2006, the Regulations underwent major changes in 2015, including increasing the Water Quality Volume from 1" to 1.5" of all runoff over impervious area within the disturbance area, and they are continually being updated to strive for better GSI outcomes from private development projects. The recent update to version 3.3 of the Manual in June 2023 did not include any updates to the Regulations.

The following text is from the Introduction of the Manual and provides a high-level overview of the Regulations. For more detailed information, refer directly to the Manual and Regulations.

"PWD's Stormwater Regulations fall into two categories, *Post-Construction Stormwater Management (PCSM) Requirements* and an *Erosion and Sediment (E&S) Control Requirement*.

- **PCSM Requirements** regulate how stormwater runoff leaves a project site in the built, or post-development, condition. There are four PCSM Requirements:
    - *Water Quality*, to recharge the groundwater table and reduce pollution in stormwater runoff;
    - *Channel Protection*, to minimize channel erosion resulting from stormwater runoff by controlling the peak flow rates for medium-sized storms;
    - *Flood Control*, to prevent, through peak flow rate control, flooding caused by large storm events that could cause damage to life or property; and
    - *Public Health and Safety Release Rate*, to minimize the impact of flooding in areas of the City with infrastructure capacity restrictions through peak flow rate control.
- **E&S Requirement** stipulates that practices be employed during construction to reduce any erosion and sedimentation that occur as a result of development activities."

The three key applicability factors that determine whether and which specific requirements of the Stormwater Regulations apply to a project are the following:

- *Development Type* - Projects fall into one of four development types: New Development, Redevelopment, Demolition, or Stormwater Retrofit.
- *Watershed* - While the Stormwater Regulations apply to all Redevelopment projects that result in earth disturbance totals of 15,000 square feet or more, watershed-specific regulations trigger the Stormwater Regulations at a lower disturbance threshold. Project sites located in the Darby and Cobbs Creeks Watershed and in the Wissahickon Creek Watershed are subject to additional watershed-specific stormwater management requirements.[6]
- *Earth Disturbance* - PWD requires submissions for all projects in the City of Philadelphia that generate earth disturbance of 5,000 square feet or more, yet not all projects will need to comply with all requirements of the Stormwater Regulations.

[6] See the Manual, section 1.1.2 Watershed for more information about watershed-specific regulations: https://water.phila.gov/development/stormwater-plan-review/manual/chapter-1/1-1-applicability-factors/#1.1.2

Taken directly from the Regulations, Table 1 delineates which projects trigger stormwater management requirements based on the applicable factors. Using the three Stormwater Regulation applicability factors, developers can determine a project's required submission and review process to obtain stormwater management approval or exemption. Developers can also utilize PWD's online Reg Finder application to estimate applicable stormwater design requirements based on applicability factors and pre- and post-construction impervious areas.

Table of Applicable Stormwater Regulations in Philadelphia*

		Earth Disturbance Associated with Development		
		0-14,999 sq. ft.	15,000 sq. ft.-1 acre	> 1 acre
Section 600.5(a) Water Quality	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
Section 600.5(b) Channel Protection	New Development	N/A**	Yes	Yes
	Redevelopment	N/A	Exempt	Yes
Section 600.5(c) Flood Control	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
Section 600.5(d) Public Health and Safety Rate	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes
Section 600.7 PCSMP Requirements	New Development	N/A**	Yes	Yes
	Redevelopment	N/A**	Yes	Yes

*– requirements of section may be waived depending on post-development site conditions (See Sections 600.3(a)(2, 3, 4, and 5), 600.5(b) and 600.5(c) for further details).

N/A - Not Applicable, Development project is generally not subject to requirements of indicated Regulations section. If the proposed development results in stormwater discharge that exceeds stormwater system capacity, causes a combined sewer overflow, or degrades receiving waters, the design specifications presented in these Regulations may be applied to proposed development activities as warranted to protect public health, safety, or property.

Exempt – Development project is not subject to requirements of indicated Regulations section.

** - If the Development results in an area of Earth Disturbance greater than or equal to 5,000 square feet in the Darby and Cobbs Creek Watershed, the Development is subject to the requirements of indicated Regulations section.

Any local, state, or federal requirements still apply.

Table 1. Applicable Stormwater Regulations in Philadelphia, Philadelphia Water Department Stormwater Regulations, p. 110.

2.2 Additional Development Requirements

Apart from the Stormwater Regulations, there are additional requirements and considerations for development projects that can impact decisions around design of stormwater management systems. Most notably, these include the following:

Landscape and Trees (§ 14-705)
Development projects greater than 5,000 sf are required by the Philadelphia Code to meet certain on-site landscaping and tree requirements, with the exception of certain uses (such as agriculture, environmental restoration, and sites with majority affordable housing). As written, these requirements often discourage more widespread implementation of vegetated SMPs because they are mutually exclusive and do not consider GSI features as meeting the landscaping requirements. Taking a more holistic approach and combining these so that vegetated SMPs could satisfy landscaping requirements would enable greater GSI implementation.

Tree Bill

Philadelphia has experienced a recent downward trend of the health of its urban forests. In the 10-year period between 2008 and 2018, Philly's urban forest decreased by 6%, much of which has been attributed to development. To combat this, the City passed the Tree Bill in the summer of 2022, which has been complemented with the release of the Philly Tree Plan in early 2023. The Tree Bill expanded requirements for developers around tree preservation and replacement. In addition, the bill created a separate tree fund which collects revenue from developers for tree planting when planting new trees or preserving existing ones is not feasible or desired. This can sometimes intersect with GSI when developers are considering particular installations and designs. Since space is often limited, tree requirements can compete with GSI and may add more complexity to the approvals process. The City recently updated the zoning code "Parking Landscape and Screening" section to incorporate the Tree Bill requirements in regards to approvals.

Parking (§ 14-803)
Parking requirements and associated landscaping can also compete with surface stormwater management features and have historically resulted in developers favoring subsurface retention basins due to limited space. Recently, the City updated section §14-803.(5) Parking Landscape and Screening of the Code to address this conflict and better account for GSI and tree preservation. The changes allow projects to use bioretention for required perimeter and interior landscaped areas to maximize stormwater management without compromising landscaping and tree requirements. Similar changes should be considered for section §14-705. Landscape and Trees as noted previously.

Plumbing (Subcode "P")
The Philadelphia Plumbing Code contains specific requirements and regulations which can also influence GSI implementation. Updated recently, the new code is based on the 2018 International Plumbing Code and reflects technological advances in housing material, most notably allowing the implementation of PVC piping, which served to cut construction costs significantly. Even so, developers continue to perceive the plumbing code as being out of date and hampering more widespread use of GSI. For example, one long standing issue with the code is the requirement that stipulates that roof leaders must connect to the system, which conflicts with the roof disconnection non-structural BMPs. PWD's Development Services Unit (DSU) is actively working with the Plumbing Advisory Board on Code updates for when stormwater management BMPs are in conflict with existing plumbing code requirements.

2.3 Developer Incentives for Stormwater Management

Developer incentives are a crucial tool in helping the City meet its greened acre (GA) goals, as evidenced by PWD listing "Promote and streamline incentives to maximize stormwater management on projects that trigger the regulations" as a Short Term Critical Action in their Green Stormwater Infrastructure Strategic Framework (*April 2022*). A variety of incentive mechanisms exist related to stormwater management, including expedited PWD stormwater reviews, height and density bonuses, PWD Stormwater Grants, and incentives for managing runoff from the public right-of-way.

Expedited Post-Construction Stormwater Management Plan (PCSMP) Reviews
Incentives are available to developers that offer expedited PWD stormwater reviews to lessen the turnaround from a 15-day review to a 5-day review for proposals that use preferred practices.

Disconnection Green Review - To be eligible for a Disconnection Green Review, projects must disconnect 95% or more of the post-construction impervious area within the project's limits of disturbance (LOD), and can only use disconnected impervious cover (DIC) to comply with Post-Construction Stormwater Management (PCSM) Requirements (Section 1.2.1). Examples of projects most likely to benefit from this approach include trail and park

projects, as well as residential and industrial projects where green roofs, permeable pavers, and/or reinforced turf are proposed.

Surface Green Review - Projects eligible for Surface Green Review should demonstrate that 100% of post-construction impervious area within the project's LOD is managed by DIC and/or bioinfiltration/bioretention basins to comply with PCSM Requirements (Section 1.2.1).
Eligible SMPs and disconnections include bioinfiltration/bioretention basins, green roofs, permeable pavers, reinforced turf, DIC artificial turf athletic fields, existing and proposed tree credits, pavement disconnections, and rooftop disconnections.

Height and Density Bonuses for Vegetated SMPs
Incentives are also offered through Philadelphia's Zoning Code, as outlined in the sections below. The below sections are summaries of Philadelphia Zoning Code sections. For more detailed information refer directly to the Philadelphia Zoning Code.

Stormwater Management Density Bonus– The Stormwater Management density bonus can be found in Philadelphia's Zoning Code, Section §14-702-14, and is specifically for properties in the below referenced overlay districts that contain at least 15,000 sq. ft. of lot area.

Within the East Callowhill Overlay (/ECO) district, the stormwater management bonus may be earned by:

1. providing a stormwater open space,
2. managing street drainage, or
3. providing both stormwater open space and managing street drainage.

Within the Central Delaware Riverfront Overlay (/CDO) district, a stormwater management bonus may be earned by:

1. managing additional street drainage,
2. managing additional on-site stormwater runoff in excess of applicable stormwater management requirements,
3. managing additional street drainage or additional on-site stormwater runoff in a surface feature, or
4. meeting the requirements for more than one of these three options.

Green Roof Density Bonus – The Green Roof density bonus can be found in Philadelphia's Zoning Code, Section §14-702.16, and is available citywide so long as the property is within an RM-1, CMX-1, CMX-2, or CMX-2.5 zoning district. As a result, this bonus is more commonly used than the Stormwater Management bonus, although it still represents a relatively small number of development projects required to comply with the Regulations. Per the Zoning Code, this dwelling unit density bonus may be earned by providing a green roof on a property that meets specific criteria as found here.

Stormwater Grants
PWD's Stormwater Grants Program pays for the design and construction of stormwater retrofit projects on non-residential properties in Philadelphia. Stormwater retrofit projects provide an opportunity to add new landscaping, fix drainage problems, and improve the appearance of a property. While these funds are typically used for voluntary retrofits, they can be applied to redevelopment projects for additional stormwater managed above and beyond that which is required. Projects awarded through this program are graded on a rubric (found on pages 20-21 of the Stormwater Grants Application Guide) that prioritizes stormwater management practices with a greening component, such as vegetated surface systems, trees, and depaving.

PWD Funding
PWD also offers limited funding to development projects that manage runoff from the public right-of-way through programs known as the Developer ROW Incentive and Green Street Buyback.

Developer ROW Incentive – This incentive is for property owners who are able to direct drainage areas from the right-of-way (ROW) into their SMP. More information can be found in Section 1.1.1 of the Development Type in the Stormwater Management Guidance Manual.

Green Street Buyback – Through this incentive, PWD engages project developers with the option to construct the GSI on behalf of PWD. At the close of construction, PWD purchases the GSI asset from the developer and takes on long-term ownership and maintenance. This arrangement is advantageous to both developers and PWD since it allows for the cost sharing of required street improvements including sidewalk repaving, accessibility ramps, and street trees and can reduce the overall length of time a street will be under construction. However, there has been minimal interest from developers in installing green street systems to date.[7]

Commercial Property-Assessed Clean Energy (C-PACE)

In September 2022, C-PACE financing, which is administered by the Philadelphia Energy Authority, was expanded so that it may be used for resiliency projects that improve the ability of properties to withstand damage from wind, precipitation, flooding, fire, and earthquakes. Eligible projects in Philadelphia include stormwater management, energy reliability improvements, and flood mitigation. Properties eligible to use C-PACE include any commercial property in Philadelphia, multifamily rental housing greater than 5 units, tax-exempt organizations, and new construction projects that exceed existing stormwater regulations.

From interviews, we found that developers are largely unaware that C-PACE can be used towards GSI, likely due to the recency of the C-PACE expansion. As more developers become aware of this change, it presents an additional opportunity for developers to finance stormwater management projects in the future.

3. Current Development Review Process

3.1 Visualizing PWD Stormwater Management Review Process

As outlined in the section Stormwater Management Requirements and Incentives for Development Projects, the three main factors that determine which requirements of the Stormwater Regulations apply to a project are the development type, watershed, and earth disturbance. While this is relatively simple in theory, we heard from various developers - particularly those with less resources and less experience developing projects in Philadelphia - that the stormwater management requirements and overall development review process were challenging to navigate. As a result, the project team developed a flow chart to better visualize this process and assist developers in determining the appropriate Review Path with PWD as well as map the various reviews, approvals, and permits required by PWD and other agencies through construction.

Figure 3 illustrates the appropriate PWD Review Path and development review process for New Development and Redevelopment projects, as defined in the Stormwater Regulations.[8] Notably, it shows how plans for proposed projects must be submitted for conceptual review to pursue a zoning permit, while the submission of detailed stormwater management plans must receive a technical review and approval prior to obtaining a building permit. Figure 3 also maps key interactions with other City departments, such as L&I and Streets, that are often necessary to obtain approvals and advance projects through this City process. For more information on specific requirements and steps in the development review process, refer to Appendix A.

[7] *Green Stormwater Infrastructure Strategic Framework* (2022), Philadelphia Water Department, p. 64.

[8] This visualization was developed using existing review path graphics and information from the Philadelphia Stormwater Management Guidance Manual, City of Philadelphia Development Checklist, and City webpages. This graphic is intended to provide guidance and act as an overview of the stormwater management requirements for real estate development in the City of Philadelphia. If this guide conflicts with any regulation or review procedure adopted by PWD or other departments or agencies, the requirements of the individual department shall govern.

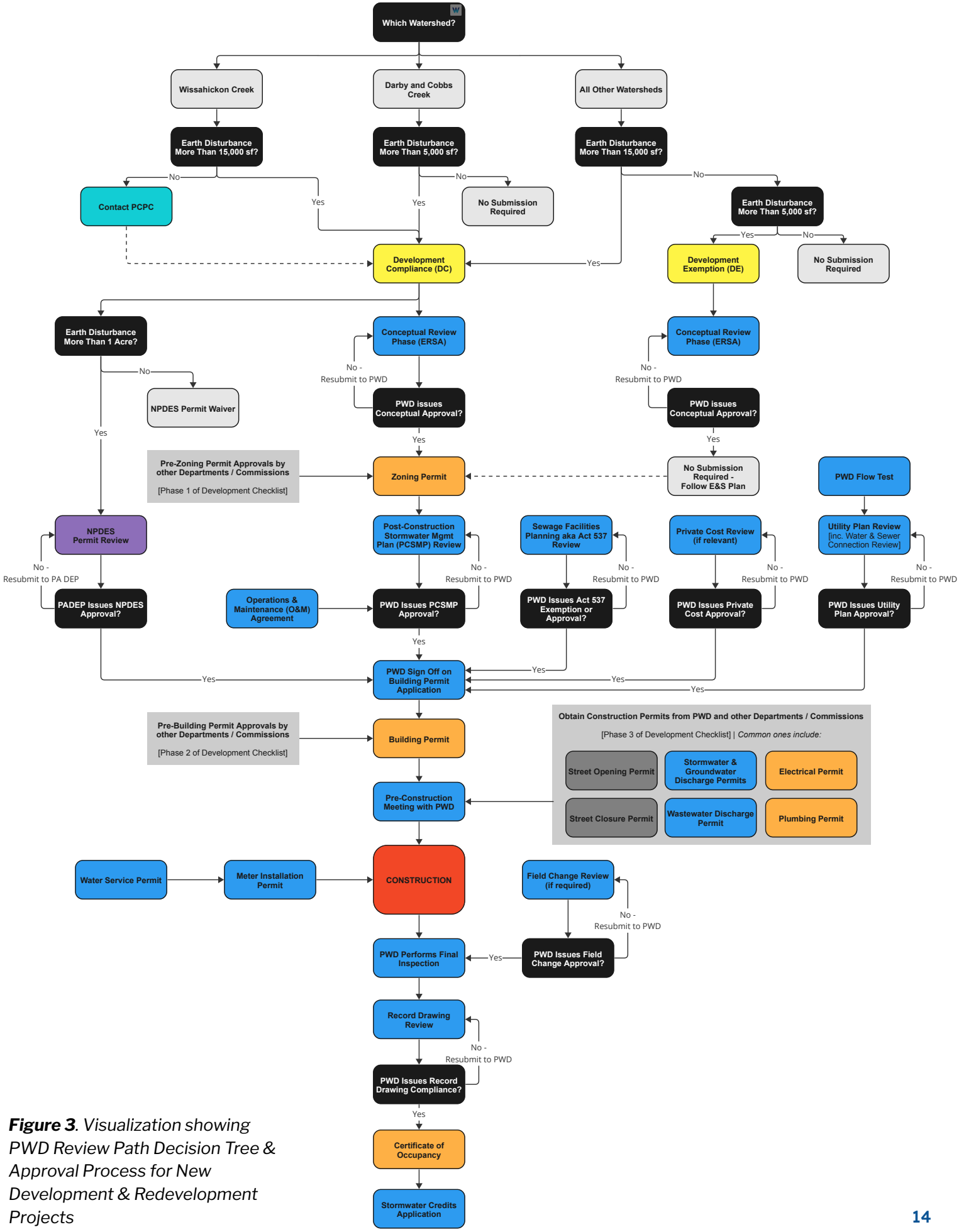

***Figure 3**. Visualization showing PWD Review Path Decision Tree & Approval Process for New Development & Redevelopment Projects*

"Developers are trying to make the most money, and the City is trying to make this development the best for residents of the city, and those don't always align." - City staffer

3.2 Developer Experience vs. What Is Codified

The project team received robust feedback on the development review process generally and PWD's role through several interviews and focus groups with developers. The following are key takeaways from these conversations that represent general perceptions of the process from the standpoint of developers in addition to highlighting some aspects of the process that have been improved upon or are working well.

Stormwater Management is Often Seen as a Hindrance

The majority of developers approached stormwater management as a "must-do" as opposed to a "want-to-do." For this reason, developers noted that they tried to avoid triggering stormwater regulations whenever possible, and this was even true of other City departments when leading redevelopment projects. We heard that GSI needs to be considered in the discovery phase at the beginning of projects as a lot of time and resources are typically spent towards design and value engineering prior to the zoning permit application. Later additions or changes to GSI design can therefore be costly and developers stated they would be unlikely to do so unless required, and even then vegetated features were seen as a liability rather than an asset due to perceived maintenance requirements.

PWD is Communicative and a Known Entity

Many developers agreed that PWD is generally one of the best departments to work with and especially as it relates to the development review process. Overall, developers felt that PWD is responsive to requests for meetings or information and does a good job notifying developers of updates made to the regulations or review process. PWD was recognized as an innovative department and a known entity for developers with a longstanding history of working in Philadelphia. Given the stormwater regulations have been in place since 2006, many developers we spoke with understood how to navigate this process and account for the necessary steps and review time early in the planning phase; however, it was noted that less resourced developers and those without experience in Philadelphia often found this challenging and even prohibitive. It is important to note that, while we did not specifically address the Stormwater Plan Review online portal during the interview process, it was not addressed as an area of concern by developers. No developers mentioned any issue with the Stormwater Plan Review portal specifically.

eCLIPSE has Improved the Review and Permitting Process

The developers noted that the COVID-19 pandemic caused significant delays to development projects both due to slowdowns in receiving necessary departmental approvals as well as interruptions to the supply chain and obtaining construction materials. Many expressed that the migration to eCLIPSE (Electronic Commercial, Licensing, Inspection and Permit Services Enterprise), which occurred in March 2020 as the pandemic was beginning to cause shutdowns in Philadelphia,[9] was definitely an improvement as the majority of permit applications were now processed via this online system. This has allowed developers to more quickly submit applications for review, particularly to Licenses & Inspections and the Streets Department, and improved the overall development process experience. However, many noted that there were still technical issues ("bugs") that needed to be worked out in eCLIPSE, but expected that these would be addressed and the entire process would run smoother with time.

*"We typically look at PWD rules and regulations **first** in the development process to come up with a cost/benefit analysis and see what is possible." -Developer*

[9] https://www.inquirer.com/real-estate/coronavirus-li-permit-philadelphia-eclipse-20200409.html

3.3 "Pain Points" in Development Review Process

Through the project team's interviews and focus groups, we identified "pain points'' where developers, City staff, and other stakeholders reported struggling with the development review process. We then investigated these "pain points" further, and ultimately utilized them in determining many of our recommendations. There was much overlap between what we heard from developers of varying sizes and from City and PWD staff, ranging from staffing issues within the City to challenges with the review process. Below is a summary of what we heard.

Challenges Utilizing Incentives

We heard from developers that there are issues with awareness of and ease of use of some of the existing stormwater management incentives, including the Expedited Post-Construction Stormwater Management Plan Reviews (*Section 2.4 of the Philadelphia Water Department's Stormwater Management Guidance Manual*).

While a majority of the developers that we spoke with were aware of PWD's Disconnection Green Review and Surface Green Review, we acknowledge that the group of developers that we spoke with were likely to have experience with increasing GSI due to the nature of our ask. It was their impression that most developers did not have a strong understanding of these and other developer incentives related to stormwater management. Additionally, one developer noted that, as standard review timelines have gotten shorter, the expedited review timelines provide less of an incentive than they originally did.

Even when developers are aware of these incentives, they cited challenges with utilizing them due to the uncompromising nature of some of the requirements. For example, to utilize a Surface Green Review, developers must "demonstrate that 100% of post-construction impervious area within the project's Limits of Disturbance (LOD) is managed by disconnected impervious cover (DIC) and/or bioinfiltration/bioretention basins." (*Section 2.4.2 of the Philadelphia Water Department's Stormwater Management Guidance Manual*). The developers we spoke with felt that meeting the 100% disconnection required to attain this incentive was unattainable in many redevelopment projects.

Competing Requirements Across City Departments

Developers cited challenges with reviews and requirements from different City departments that at times conflicted with each other as barriers to including GSI in redevelopment projects. Specifically, the developers that we interviewed noted that the Plumbing Code and the Streets Department's requirements were often conflicting with PWD's stormwater regulations.

> *"Folks are knowledgeable, but the process is so siloed that you get approvals from lots of different departments and it feels like one hand doesn't know what the other is doing." -Developer*

Additionally, developers cited the Streets Department as having regulations that are at times at odds with stormwater regulations, particularly when dealing with proposed GSI features in the right-of-way. This came up in circumstances where developers worked with PWD to design a bump out with a GSI feature and received PWD approval, but then didn't meet Streets Department regulations, resulting in the project being sent back to a redesigning phase. These costly delays then disincentivize developers from attempting to add GSI features to future projects.

Staff Turnover Resulting in Lack of Consistency in Process

We heard from both developers and from staff across City departments that understaffing and high rates of staff turnover has made the development review process and the integration of GSI in this process particularly challenging. Many developers cited a lack of consistency in the answers that they received from staff reviewing their applications. They referred to "ad hoc guidelines," where something listed as a suggestion in the Stormwater Management Guidance Manual would occasionally and unpredictably be enforced as a policy rather than a suggestion depending on which reviewer was assigned to your application.

Developers felt that this was a result of a lack of training and experience and frequent turnover in the staff who were approving applications across City departments. Consistent with this, many City departments also cited slow hiring processes and high levels of vacancies in their departments as ongoing challenges to optimizing the redevelopment approval process.

Notably, staff turnover was cited as a challenge mainly by smaller and less resourced development firms that may complete fewer projects in Philadelphia and are less familiar with PWD and City requirements, while larger and better resourced firms felt that there was a more consistent review process with a larger and more experienced team of reviewers assigned to their projects. While PWD noted that all their review staff are trained to the same criteria, frequent turnover of staff may lead to disruption and the perception of inconsistencies in the process.

Staff turnover and its perceived effects may limit GSI for less resourced developers who believe GSI adds steps to the process and would rather take on only what is required of them, whereas larger developers are more likely to know how and when to include GSI, and have the capacity plan for it.

Costs and Competing Priorities
Both developers and City staff who we spoke with mentioned competing priorities and high costs as barriers to including GSI in redevelopment projects in Philadelphia.

Specifically, we heard that space is at a premium due to the density of the City, and that as a result developers will often turn to gray stormwater management that can be placed underground instead of GSI features that compete with potential amenity spaces, parking lots, additional housing units, and more.

Perceived Lack of Transparency from City by Developers
Generally, the developers we spoke with felt that it was difficult to get information from the City that they thought would be useful to have or should be more readily available.

More specifically, developers had concerns about the variability of the Public Health and Safety (PHS) rates, which are determined based on the specific location of each development and are not available for developers to view on their own. The variability of these rates caused some confusion and mistrust when rates were higher than what the developer had anticipated. PWD encourages applicants to reach out early in planning to confirm PHS applicability and associated rates based on potential connection locations.

Zoning Variance
Obtaining a zoning variance in Philadelphia can often be a long process that adds months to the development review process, and that many developers avoid it if possible. Zoning variance applications must be submitted to Licenses & Inspections, who will issue either a refusal or a referral. Once either the refusal or referral is issued, the developer will need to appeal to the Zoning Board of Adjustments. Concurrently, the developer must meet with the development's local RCO (Registered Community Organization) for them to provide input on the project while waiting for the Zoning Board to make a decision. For more details on the process of applying for Zoning Variance from the City of Philadelphia, you can view their webpage here.

We heard from developers that the length, cost, and uncertainty of this process leads them to avoid zoning variances whenever possible. At times, the desire to avoid variances can limit innovation. Developers also found the RCO and community engagement process challenging, and cited frequent community desire for parking above and beyond what zoning codes require as a limiting factor for inclusion of GSI in projects that trigger zoning variances.

Challenges for less resourced developers
Smaller and less resourced developers, including those building affordable housing, may find the development process in Philadelphia especially challenging. While the potential pain points for affordable housing developers are

generally the same as non affordable housing developers, the differences are that these developers often do not have the capacity to withstand the approval process that others do.

"Navigating the development process in Philadelphia is like trying to hit a knuckleball." -Developer

We heard from the development community and academics alike that offering additional support to boost the capacity of smaller and less resourced developers to navigate the review process would be necessary for them to have the capacity to include GSI, as more of their capacity is typically spent navigating the financing process.

Redevelopment and Equity

GSI projects implemented via private development are predominantly driven by market forces and where redevelopment is occurring at any given time within Philadelphia. As a result, these projects are not equitably distributed and more likely to occur in certain areas of the city with higher redevelopment rates. This has significant equity implications as certain neighborhoods with historic disinvestment are less likely to benefit from these investments as well which risks perpetuating inequities, particularly around access to green space and the many social, environmental, and economic benefits that greening provides. While GSI delivered via public and incentivized retrofits provide easier pathways to locating GSI in under-resourced neighborhoods, it is still critical to consider the role private development can play in addressing environmental injustices and furthering racial equity.

With this in mind, our recommendations are crafted to facilitate a more equitable distribution of GSI in neighborhoods across Philadelphia and to increase the ability of less resourced developers to navigate and withstand the development review process. In doing so, it is also necessary to consider the potential for gentrification[10] and displacement related to GSI (or any type of greening) and to plan for these adverse outcomes so that historically marginalized communities stand to benefit from these investments in the near- and long-term. This should be a priority for further research especially as PWD seeks to bring GSI to scale in the second half of the *Green City, Clean Waters* plan implementation.

4. Recommendations

Based on our findings from interviews with developers, City staff, and other stakeholders, the research team developed a set of recommendations that specifically seek to address some of the identified "pain points" with the development review process and to increase use of vegetated SMPs in development projects. The recommendations are also informed by the research team's review of the Stormwater Regulations and Stormwater Management Guidance Manual, the City's development review process, the Philadelphia Zoning Code, and other fundamental documents and resources that influence GSI outcomes.

The research team acknowledges that, in some instances, PWD or another City department may already be considering or actively working towards a recommendation included here; if so, this report seeks to call attention to these efforts while also emphasizing support for those ideas and underscoring the need for their continued consideration.

Adopt a Maximum Extent Practicable (MEP) Framework for Preferred SMPs

Subsurface detention basins are currently the most popular stormwater management practice (SMP) used in private development projects in Philadelphia. In order to expand the use of vegetated SMPs, PWD should consider adopting a Maximum Extent Practicable (MEP) framework to approve stormwater management plans, as is already being

[10] Gentrification is defined by Merriam-Webster's as "a process in which a poor area (as of a city) experiences an influx of middle-class or wealthy people who renovate and rebuild homes and businesses and which often results in an increase in property values and the displacement of earlier, usually poorer residents."

implemented in the State of Maryland. Using MEP guidelines would put the onus on developers to use PWD's highest preference SMPs, such as bioinfiltration/bioretention, as found in their SMP Hierarchy (*Section 3.2.2 of the Stormwater Management Guidance Manual*) unless shown infeasible before moving to a lower preference SMP. It is important to note that PWD already uses a similar MEP framework related to the use of infiltrating SMPs. Although preferred SMPs that incorporate surface greening may not be feasible in all locations and particularly those that are highly urban, it will ensure that they are at minimum considered for all development projects requiring stormwater management. While this approach may require additional time during PWD's conceptual review phase, especially as this framework is first adopted, it would certainly result in greater implementation of vegetated SMPs leading to more surface greening.

Increase Stormwater Credits for Vegetated Practices

Developers often dismiss vegetated practices due to spatial constraints, added costs, and concerns about maintenance. After speaking with PWD and developers, it became clear that current incentives for the use of vegetated SMPs, including expedited stormwater reviews and height and density bonuses, are not enough to significantly increase their uptake by developers. In order to further incentivize the use of vegetated SMPs (and particularly if an MEP Framework is not adopted), PWD should explore crediting - both in billing and regulatory compliance - vegetated practices more than unvegetated systems. This change would offer developers an additional reason to incorporate these preferred SMPs into design plans and help address concerns regarding future maintenance costs by further subsidizing the stormwater fee on the monthly water bill. The additional credits offered to vegetated practices could be considered as volume credit for evapotranspiration provided by these systems.

Streamline Zoning Code Bonuses and Expand to Other Districts

As noted in Section 2.3, the City offers height and density bonuses to developers that include additional stormwater management or green roofs in their design plans, provided they are in the specified overlay or zoning districts; however, we heard from both developers and City staff that these bonuses were underutilized because of cumbersome approval processes and limitations on where they can be used. One challenge with the Green Roof bonus is that the approval for increased units occurs in the zoning phase, but the designs typically change following this phase which can lead to implementation challenges. In addition, it is difficult on occasion for the City to withhold permit close-out and certificates of occupancy until after green roof installation, meaning that follow-through can be a sticking point for these projects. The City should work to streamline these approval processes and also consider expanding these bonuses to additional overlays and zoning districts to allow for greater utilization in different areas of Philadelphia.

Combine GSI and Landscaping Requirements

As it stands, development requirements for stormwater management and landscaping in the Philadelphia Code are not well coordinated which can put them in conflict with one another as designs are developed. Unintended consequences of this include greater likelihood of subsurface stormwater management features, such as retention basins, as well as more sprawling developments seeking to meet all of the requirements. In an effort to address this, the City recently changed Philadelphia Code section 14-803(5)(.6) "Parking Landscape and Screening" to stipulate that bioretention can be used *instead of* rather than *in addition to* landscaping requirements, allowing landscape buffers or internal landscaping to be used for stormwater conveyance. Continuing to combine GSI and landscaping requirements in this way throughout the Code will help alleviate these issues and encourage more widespread usage of surface GSI features.

Increase Support for Maintenance of SMPs

Continued maintenance of GSI features is a challenge everywhere, including Philadelphia. Making vegetated SMPs easier to maintain and more cost effective to install could increase their use throughout the city, particularly in under-resourced neighborhoods where vegetation is lacking. To ensure the long-term success of GSI features, property owners must have the resources to maintain their SMPs, and vegetated SMPs in particular can be labor intensive to maintain. PWD recognizes that this is a challenge and is exploring options to help property owners perform maintenance.

Create a Development Services Liaison Position
We heard from developers that having a dedicated "liaison" to guide individual projects through the development review process would lessen the burden on developers and ensure better coordination amongst City departments. A liaison could be a valuable incentive alongside the expedited green reviews already offered by PWD.

Already in Philadelphia, a Development Services Committee is made available to large-scale development projects. This Committee meets monthly and brings together representatives from all relevant departments to discuss these projects. Smaller-scale projects and less-resourced developers could also benefit from additional support in navigating the development review process in the form of a Development Services Liaison assigned to guide their project through the various City reviews and permits. In Boston, the Boston Planning and Development Agency (BPDA) employs Project Managers who "take the lead role in overseeing and coordinating the development review process for all projects that meet the threshold for either Small or Large Project Review," per BPDA's Development Review webpage. However, giving one person or department this level of autonomy has raised concerns of having outsized influence over the development process, so it would require considerable controls and oversight.

Expand the Philadelphia Permit Navigator
The Permit Navigator is a tool being piloted by the City of Philadelphia that is designed to make permitting information more accessible. Currently, the tool is designed to help residents determine necessary permits, estimated costs, and related information from the City for residential and commercial use cases. If expanded to include additional use cases or time estimates for review phases, we believe that this tool could prove even more useful to a wider range of developers. The City is already working on expansion of this tool with the efforts being led by the Departments of L&I and Commerce.

Increase City Staff Recruitment and Retention
Both developers and City staff acknowledged that challenges with recruitment and retention of staff throughout the city can complicate the development review process. We heard from developers that more complete GSI and stormwater training for review staff at PWD and across departments would be helpful, which they believed would lead to more consistency in outcomes. Notably, the smaller developers we spoke with cited inconsistencies between individual reviewers and projects, while the larger developers praised consistency in process and clear and expected outcomes. PWD should review its in-house training procedures and documentation and tracking of comment responses to ensure consistency among stormwater plan reviewers.

To address ongoing staffing challenges, some City departments have looked closely at job requirements to ensure that listed requirements match actual skills needed for each open position instead of simply reposting past job descriptions. Additionally, there have been efforts by Philadelphia City Council to find solutions to the City's staffing crisis as outlined in the Philadelphia Citizen article "How to End Philadelphia's Staffing Crisis," including a bill introduced by former Councilmember Helen Gym that proposed to end the City's requirement that some civil service positions must be filled by residents who have lived in the City for at least one year before their start date. It is unclear to what extent the staffing crisis is caused by the residency requirement, but proponents of the bill believe that it could help grow the talent pool and fill vacancies that, when left open, could leave residents exposed to gaps in basic service provision.

Encourage Earlier Estimates of Public Health and Safety Rates
Public Health and Safety (PHS) release rates are variable by site, and therefore can be difficult for developers to accurately budget for. Currently, rates are not made publicly available until a project requests their specific rate from PWD, and smaller developers may not have the capacity to absorb higher than expected PHS rates. Publishing actual PHS rates may not be feasible given that they are variable from site to site, but having an estimate of these rates across different areas of the city based on past projects would be helpful for developers when budgeting for new development projects. As it stands, PWD encourages applicants to reach out during the discovery phase of projects to confirm PHS applicability and the corresponding rate based on potential connection locations.

Expand Use of Stormwater Management Banking and Trading
Developers have expressed the desire for expanding the use of Stormwater Management Banking and Trading so it can occur on a larger scale and between different owners in different areas of the city. The developers we spoke with cited density in the city as a cause of increasingly expensive stormwater management, which often is directed underground as a result. At the time of writing, Philadelphia Water Department offers Banking and Trading as outlined in Section 2.3.4 of the Stormwater Management Guidance Manual. While PWD does currently allow Banking and Trading involving multiple parcels and/or property owners, this application has been seldom utilized by developers to date and it is recommended that PWD provide more guidance on this practice in the Manual as well as case studies of use in previously implemented projects. Greater use of banking and trading would enable more opportunities for vegetated SMPs, and particularly in areas of the city with lower redevelopment rates allowing more equitable distribution of GSI.

Additional recommendations to consider:

- **Amend the Stormwater Regulations to Increase WQv for all regulated projects**. Requiring additional stormwater to be managed on site is especially important considering increased annual precipitation and more severe storms as a result of climate change. Recently, the City of Pittsburgh updated its regulations to account for climate change projections.
- **Consider waiving fees or providing enhanced technical support for affordable housing developers and other smaller or less resourced developers**. The City of Pittsburgh recently included such a provision in its new Code.
- **Explore the use of solar green roofs as a way to fund green roofs (e.g., combining with solar subsidy, C-PACE)**. This could involve wrapping a stormwater pay-for-performance into a power purchase agreement.

Areas of further research:

- **GSI distribution and impacts as it relates to equity and gentrification concerns in Philadelphia.** Additional research and analysis is needed to understand the distribution of GSI to date in Philadelphia and how this varies across the three different implementation pipelines (private development, public, incentives). It is also critical to better understand potential gentrification impacts of these projects particularly in promoting a more equitable distribution of projects to favor neighborhoods with lower redevelopment rates.
- **Vegetated BMPs that can perform with little maintenance.** Continued research into plant and media selection would be helpful, as would the design of better pre-treatment and energy dissipation systems to avoid sedimentation and erosion within vegetated BMPs.

Appendices

Appendix A. Visualizing the City of Philadelphia's Development Checklist

This series of visualizations illustrates the 3 phases of real estate development projects as outlined in the City of Philadelphia's Development Checklist (2019): 1. Pre-Zoning & Zoning Permit Reviews; 2. Pre-Building Permit Reviews; and 3. Construction Permits & Reviews.

As with the Development Checklist document, the visualizations include the most common permits and approvals necessary for real estate development projects and highlight key information, including the action, submission location, standard review time, desired outcome, and project relevance. The steps follow those outlined in the Checklist and represent the recommended (or in some cases required) order of operations.

Based on input from individual City departments, changes have been made from the 2019 Checklist to reflect the current procedures. As with the Checklist, if these visualizations conflict with any regulation or review procedure adopted by individual departments or agencies, the requirements of the individual department shall govern.

Phase 1- Pre-Zoning & Zoning Permit Reviews

STEP	- 1a - PWD Conceptual Review Phase	- 1b - Streets Plan Review - Zoning Only		- 1c - City Plan Change	- 1d - Civic Design Review	- 1e - Development Plan Review	- 1f - Art Commission Review	- 1g - Historical Commission Review	- 1h - Zoning / Use Permit
ACTION	*Submit Existing Resources & Site Analysis (ERSA) Application* SPR	Simple Zoning Review	*Apply for Streets Dept. Review* eC	Complex Zoning Review	*Application for City Plan Action* eC	*L&I will determine if Zoning Permit application triggers CDR*	*Submit Development Plan Review* eC	*L&I will determine if Art Commission approval is required* eC	*Submission to Historical Commission for Review* eC	*Application for Zoning/Use Registration Permit* eC
REVIEW TIME	***5 Days*** *(for each round of review)*	***6 Days*** *(1 day for completeness; 5 days for technical)*		***15 Days*** *(1 day for completeness; 14 days for technical)*	***Several Months*** *(City Council ordinance required)*	***Varies*** *(CDR holds monthly meetings)*	***1 - 5 Days*** *(based on complexity and review type)*	***1 - 2 Months*** *(Art Commission holds monthly meetings)*	***1 - 2 Months*** *(Historical Commission holds monthly meetings)*	***5 - 20 Days*** *(Accelerated 5-day review is available for a $1,050 fee)*
DESIRED OUTCOME	*Conceptual Approval (pre-req for Zoning Permit)*	*Streets Review Approval (pre-req for Zoning Permit)*		*Streets Review Approval (pre-req for Zoning Permit)*	*Passing of City Council ordinance (not required for Zoning Permit)*	*Recommendation by CDR Committee to Approve plans (pre-req for Zoning Permit)*	*Development Plan Approval (pre-req for Zoning Permit)*	*Art Commission Approval (pre-req for Building Permit, rec. prior to Zoning)*	*Historical Comm. Approval (pre-req for Building Permit, rec. prior to Zoning)*	***Zoning / Use Permit***
PROJECT RELEVANCE	*Required for:* > Projects proposing earth disturbances equal to or greater than 5,000 sf > Projects subject to Wissahickon Watershed Overlay District Ordinance (contact PCPC prior to ERSA submission) > Projects applying for §14-602.7 of the Philadelphia Zoning Code for "Green Roof Density Bonus"	*Required for any plans that include the following:* > Existing and proposed encroachments > Existing and proposed driveways > 49 residential units or less > Mixed use corner properties > Building access ramps		*Required for any plans that include the following:* > Greater than 50 residential units > Any commercial or industrial use > Projects located on a state route with greater than 5 residential units > Projects involving City Plan Action, impacting intersections, or requiring a traffic impact study are typically considered complex developments > All items from Simple Zoning	*Required for:* > Placing a new street > Striking an existing street > Revising lines and/or grades of an existing street > Relocating curb lines and changing roadway widths > Placing, modifying, or striking a City utility ROW on the City Plan	*Required for:* > Projects that meet certain thresholds, including most projects exceeding 50,000 sq. ft. or including more than 50 units.	*Required for any Zoning Permits that involve:* > Lot adjustments > Landscaping around telecommunication towers > Locations in the Wissahickon Watershed Overlay District > CMX-4 and CMX-5 lots subject to compliance with the sky plane controls of the Zoning Code > Landscaping for open air parking lots > Steep slopes > Construction along watercourses subject to flooding > Parking garages in RMX-3, CMX-3, CMX-4, and CMX-5 districts or parking garages with 250 or more spaces located on lots adjacent to any other residential or commercial district. > Signs in the Market Street East Advertising District > Corner properties > Amendments to master plan districts (SP-INS, RMX-2, etc.) > Certain height and density bonuses	*Required for:* > Construction and alterations paid for wholly or in part by city funds > Construction or alterations that are on publicly owned land or in the right-of-way (e.g., projections above sidewalks or streets) > Construction and signs on private property in certain special control areas (see Section 14-502 of the Philadelphia Code for specific boundaries) > Building Identification Signs (Section 14-904(3)) > Acquisition of new works of public art by the City and conservation and maintenance of the City's existing collection that are executed by the Public Art Office > Public Art building height or floor area bonus (Section 14-702(5) of the Philadelphia Code)	*Required for:* > All building or demolition permit applications for properties on the Philadelphia Register of Historic Places.	*Required for:* > New construction > Additions > Changes in the gross floor area of a structure > Demolition (partial or complete) > Signage (accessory and non-accessory) > Changes in use > Decks/roof decks > Creation or reconfiguration of parking > Relocation of lot lines

Reviewing Department/Commission Color Coding

- Philadelphia Water Department (PWD)
- Streets Department
- Art Commission
- Philadelphia Dept. of Public Health (PDPH)
- Dept. of Licenses & Inspections (L&I)
- Philadelphia City Planning Commission (PCPC)
- Historical Commission
- Pennsylvania Dept. of Environmental Protection (PADEP)

Application/Review Process Via

- SPR — Stormwater Plan Review online portal
- eC — eCLIPSE online application portal
- PD — PWD Permit Desk (in person)
- AMS — Air Management Services online portal
- WTR — Water Transport Records
- SD — Streets Department, Right of Way Unit
- PWD — Alternative PWD submission (see notes)

Phase 2 - Pre-Building Permit Reviews

STEP	- 2a - Post-Construction Stormwater Mgmt Plan (PCSMP) Review	- 2b - National Pollution Discharge Elimination System (NPDES)	- 2c - Private Cost Review	- 2d - Sewage Facilities Planning aka Act 537 Review	- 2e - Water and Sewer Connection Review	- 2f - PWD Flow Test	- 2g - Utility Plan Review	- 2h - Façade Review
ACTION	*Submit PCSMP Review Application* (SPR)	*Submit NPDES Permit Application*	*Submit PWD Private Cost Review* (SPR)	*Submit Act 537 Application Mailer* (eC)	*Submit Water and Sewer Connection Review (Pre-Permit)* (SPR)	*Submit Flow Test Request (Pre-Permit)** (WTR)	*Submit Utility Plan (Pre-Permit)* (SPR)	*Submit Façade Review Application* (eC)
REVIEW TIME	***5 - 15 Days*** *(15 days for Standard, 5 days for Expedited)*	***Varies*** *(15 days for Completeness, 107 days for Technical)*	***15 Days*** *(Approximately 15 calendar days per submission)*	***10 Days***	***2 - 10 Days*** *(depending on size of the connection)*	***1 - 2 Days*** *($570/test)*	***25 Days*** *(to receive approval or to get additional comments)*	***Up to 60 Days***
DESIRED OUTCOME	*PCSMP Approval (pre-req for Building Permit)*	*NPDES Approval (pre-req for PCSMP Approval)*	*Private Cost Review Approval (pre-req for PCSMP Approval)*	*Act 537 Approval or Exemption (pre-req for PCSMP Approval)*	*Water and/or Sewer Connection Plans Approved (pre-req for connection permits)*	*Receive accurate flow test data for the project location (pre-req for Utility Plan)*	*Utility Plan Approval (pre-req for Building Permit)*	*Façade Review Approval (pre-req for Building Permit)*
PROJECT RELEVANCE	*Required for:* > Any projects proposing earth disturbances equal to or greater than 15,000 sq. ft. > Projects located in the Darby Cobbs Creek Watershed proposing earth disturbances of 5,000 sq. ft. or more > Projects subject to the Wissahickon Watershed Overlay District Ordinance	*Required for:* > Projects proposing earth disturbances of 1 acre (43,560 sq. ft.) or more	*Required for:* > Projects that involve relocating, abandoning, or constructing new PWD infrastructure. This includes new public water main and sewer extensions and relocating existing fire hydrants or inlets > Projects that propose to construct new Green Stormwater Infrastructure (GSI) or modify existing GSI will also go through Private Cost Review	*Required for:* > All Building Permits > Projects that propose a new connection to a PWD Sewer > Projects that require an NPDES Permit from PADEP > Projects proposing an On-Lot Disposal (septic) system, or any development on a lot with an existing septic system	*Required for:* > Connections to the City sewer > Any project that modifies water main connections	*Required for:* > PWD provides current flow test data necessary for the design of a domestic or fire sprinkler system. If there is no current data available at the project location, a new test must be performed by PWD. Current flow test must be obtained prior to the submission of a Utility Plan and Fire Suppression Permit application.	*Required for:* > Projects that require a building permit for new construction > Projects that require a site permit that includes a foundation activity > Projects that are proposing new water or sewer connections to PWD infrastructure, including changes in service size > Projects that are proposing impacts to PWD infrastructure and/or an encroachment into PWD's ROW	*Required for:* > Locations in a Neighborhood Conservation District > Locations in the City Avenue Overlay district with regards to site layout and landscape plans > The following locations for façade review only: Chestnut or Walnut Street (Blocks 100-2400) South Broad Street (Blocks 001 to 1000) East Market Street (Blocks 100 to 400) Ridge Avenue NCA Overlay PCPC Façade Review determines whether the project respects the historic and pedestrian environment.

Phase 2 (Continued)

STEP	- 2i - Streets Plan Review	- 2j - Foundation & TES Permits Review	- 2k - Encroachment Legislation	- 2l - Asbestos Abatement Review	- 2m - Air Pollution Permit Review	- 2n - Dust Control Permit Review
ACTION	*Submit Streets Plan Review Application* (eC)	*Submit Streets Plan Review Application & Streets Review Checklist No. 3* (eC)	*Submit Streets Plan Review Application & Streets Review Checklist No. 4* (eC)	*Submit Asbestos Abatement Notification or Permit Application* (AMS)	*Submit Air Permit Application* (AMS)	*Submit Dust Control Permit Application* (AMS)
REVIEW TIME	**Simple Building Review**: ***6 Days*** *(1 day for completeness; 5 days for technical)* **Standard Building Review**: ***8 Days*** *(1 day for completeness; 7 days for technical)* **Complex Building Review**: ***29 Days*** *(1 day for completeness; 28 days for technical)*	***29 Days*** *(1 day for completeness; 28 days for technical)*	***29 Days*** *(1 day for completeness; 28 days for technical)*	***10 Days in Advance*** *(Permit apps submitted 10 days prior to the start)*	***60 Days - 6 Months*** *(For difficult permits, req. public issuance & comment)*	***60 Days Minimum*** *(90 Days prior for demolition by implosion)*
DESIRED OUTCOME	**Simple Building Review**: *Final Approval of Site Plan - Simple Review (pre-req for Building Permit)* **Standard Building Review**: *Final Approval of Site Plan - Standard Review (pre-req for Building Permit)* **Complex Building Review**: *Final Approval of Site Plan - Complex Review (pre-req for Building Permit)*	*Foundation and TES Permits*	*Approval via City Council Ordinance*	*Asbestos Permit (pre-req for Building Permit)*	*Air Pollution Permit (rec. prior to Building Permit application)*	*Dust Control Permit (req. for Demolition)*
PROJECT RELEVANCE	**Simple Building Review**: *Required for any plans that include:* > Less than 6 residential units (excluding corner properties) > Infill > Wheelchair lifts > Egress wells > Areaways and cellar doors/steps > Bicycle racks (sidewalk) > Pedestrian enhancements > Historic streets > All other items from the Simple Zoning **Standard Building Review**: *Required for any plans that include:* > Between 6-49 Residential, Commercial, or Industrial units > Sidewalk cafes > Shelter platforms > Retaining wall > Corner properties > Properties not located on a state route > Historic streets **Complex Building Review**: *Required for any plans that include:* > 50 or greater residential units > GFA exceeding 50,000 > Curb cut greater than 24' wide > Driveways larger than 24' wide > Street lighting (private cost) > Projects located on a state route with more than 5 residential units > Historic streets > Projects involving City Plan Action, impacting intersections, or requiring a traffic impact study are typically considered complex developments	*Required for:* > All projects seeking L&I Foundations-Only Building Permits that have Temporary Evacuation Support (TES) systems and/or foundations which encroach into the public right-of-way.	*Required for:* > All projects with encroachments not permitted by Section 11-600 of the code will require approval by ordinance of City Council. Legislation can be prepared by the Streets Department or by the developer, City Council, or other party.	*Required for:* > Notification only—Any project that involves the removal, clean-up, or encapsulation of friable asbestos-containing material. > Asbestos Permit—Required to perform abatement of all friable materials greater than or equal to 40 linear or 80 square feet of asbestos. Permits are only granted to City of Philadelphia licensed asbestos abatement contractors.	*Required for:* > Equipment that causes or controls air pollution, such as equipment that burns fuel, uses paint or solvent, emits particles outdoors, or is used to control emissions from these sources. > Any mechanical ventilation system used in below-ground or enclosed parking garages. In addition to an Air Permit, a Complex Source Permit is required for large parking garages or lots with a capacity of 250 vehicles or more in Center City and 500 vehicles or more in the rest of the city.	*Required for:* > Completely demolishing any building or structure that is more than 3 stories , greater than 40 feet tall, or en-compasses more than 10,000 square feet. > Completely or partially demolishing a building or structure by implosion. > Engaging in the clearing, grubbing, or earth disturbance of any land in excess of 5,000 sq. ft.

Phase 3 - Construction Permits & Reviews

STEP	- 3a - Stormwater & Groundwater Discharge Review	- 3b - Water Service Review	- 3c - Meter Installation Review	- 3d - Wastewater Discharge Review	- 3e - Hauled Wastewater Discharge Review	- 3f- Hydrant Permit Review	- 3g- Water Discontinuance Permit Review
ACTION	*Mail to PWD Industrial Waste Unit (IWU)* — IWU	*Submit Water Service Permit Application at PWD Permit Desk* — PD	*Submit Meter Installation Permit Application* — SPR	*Mail to PWD Industrial Waste Unit (IWU)* — IWU	*Mail to PWD Industrial Waste Unit (IWU)* — IWU	*Contact Joseph Yeager at PWD* — PWD	*Submit Water Discontinuance Permit*
REVIEW TIME	***Varies***	***Immediate***	***Varies***	***Varies***	***Varies***	***7 - 10 Days*** *(1-week permit: $1,205, 6-month permit: $6,295)*	***24 Hours*** *($100/disconnection, regardless of size)*
DESIRED OUTCOME	*Stormwater & Groundwater Discharge Permits (req for Construction)*	*Water Service Permit (pre-req for Meter Installation Permit)*	*Meter Installation Permit (req for Construction)*	*Wastewater Discharge Permit (req for Construction)*	*Hauled Wastewater Discharge Permit (req for Construction)*	*PWD Hydrant Permit to receive access to hydrant during Construction*	*Discontinued Water Service by PWD*
PROJECT RELEVANCE	*Required for:* > Diversion of stormwater from a site into the City sewers during construction or environmental remediation. > Removal of groundwater from a site into the City sewers during construction or environmental remediation.	*Required for:* > Any project that modifies water main connections or services.	*Required for:* > Installing or replacing a water meter in residential and commercial properties.	*Required for:* > Any Significant Industrial User (defined on page 66 of the PWD Regulations) pro-posing to use the City sewer for the disposal of wastewater from production processes that will connect or contribute to the City's Water Pollution Control Plants. > Proposals to use the City sewer for the disposal of wastewater from production processes that will connect or contribute to the City's Water Pollution Control Plants.	*Required for:* > Discharge hauled wastewater at the PWD's Southwest Water Pollution Control Plant. At this time the PWD only allows discharge of hauled septage.	*Required for:* > The use of a hydrant, where no adequate water source is available. Applicable to construction and demolition projects proposing use of a hydrant.	*Required for:* > Discontinuing water service to property.

Phase 3 (Continued)

STEP	- 3h - Building Permits - All Types	- 3i - Electrical Permit Review	- 3j - Plumbing Permit Review	- 3k - Street Opening Review	- 3l - Street Closure Review	- 3m - Certificate of Occupancy Review	- 3n - Fire Suppression Systems Review
ACTION	*Application for Building Permit* — eC	*Application for Electrical Permit* — eC	*Application for Plumbing Permit* — eC	*Application for Street Opening Permit* — SD	*Application for Street Closure Permit* — SD	*Application for Certificate of Occupancy (if no Building Permit)* — eC	*Application for Fire Suppression Systems Permit* — eC
REVIEW TIME	***5 - 20 Days*** *(15 - 20 days for Standard, 5 days for Accelerated)*	***5 - 20 Days*** *(15 - 20 days for Standard, 5 days for Accelerated)*	***5 - 20 Days*** *(15 - 20 days for Standard, 5 days for Accelerated)*	***Unspecified***	***Unspecified*** *(must be submitted 10 days in advance of start date)*	***20 Days***	***20 Days*** *(An accelerated review is available for a $1050 fee)*
DESIRED OUTCOME	***Building Permit***	***Electrical Permit***	***Plumbing Permit***	***Street Opening Permit*** *(not req. if obtained L&I Plumbing Permit)*	***Street Closure Permit***	***Certificate of Occupancy Permit*** *(not req. if obtained L&I Building Permit)*	***Fire Suppressions System Permit***
PROJECT RELEVANCE	*Required for:* > New Construction > Alterations to existing structures > Demolitions > Foundations > Mechanical work (HVAC, refrigeration, etc.) > Fire suppression systems > Signs > Excavation > Electrical work > Plumbing > Site work	*Required for:* > Most projects that involve: □ electrical □ fire alarm □ communication wiring	*Required for:* > The installation, alteration, renewal, replacement, or repair of plumbing. > Plumbing plans are also required, except for the following project types: New construction and additions for a one-or-two-family dwelling, up to four stories. Alterations in buildings with four or fewer dwellings, up to four stories high. Alterations in commercial buildings involving seven or fewer new fixtures, excluding food equipment. Replacement of any number of fixtures with fixtures of the same kind. Pipe repair. New or replacement water service, with service to a single building. New or replacement house drain, with service to a single building. New or replacement curb trap or fresh air inlet. Sealing a lateral. Installing of a backflow device.	*Required for:* > Excavation above or below City streets/sidewalks, including opening, sheeting/shoring, vaults, or areaways. *Exception:* L&I Plumbing Permits do not need to obtain a separate Street Opening Permit.	*Required for:* > Projects where streets (including bike lanes) or sidewalks need to be fully or partially closed for reasons such as site development, utility work, crane placement, dumpster or other equipment placement. *Due to the varied nature of site development, there is not one single Street Closure Application, and in some cases multiple permits will be required for a project.*	*Required for:* > Any change in the use and occupancy of a space in which a separate L&I Building Permit is not required for the project. Most projects that require an L&I Building Permit will receive a Certificate of Occupancy with an approved Building Permit. These projects will not typically require a separate Certificate of Occupancy Permit described here.	*Required for:* > Fire hydrants on private property > Fire department connections > Fire Safety and Evacuation Plans > Fire Command Centers > Emergency Responder Radio Coverage Systems and > Other required emergency information and systems

Other Common Streets Department Construction-Related Permits

> Areaways & Cellar Doors/Steps
> Historic Streets
> Legislation for Changes to Parking Regs or Roadway Direction
> Sidewalk Cafes
> Bicycle Racks
> Pedestrian Enhancements
> Street Lighting (Private Cost)
> Bollard Installation Permit
> Curb and Footway Permit
> Special Hauling Permit

Additional notes regarding selected steps in the Development Review Process:

The following is additional information regarding specific steps in the review process that was not incorporated into the above visualizations due to spatial limitations. As with the visualizations, if these notes conflict with any regulation or review procedure adopted by individual departments or agencies, the requirements of the individual department shall govern.

1f. Art Commission Review

Action: Submit through eCLIPSE for L&I to determine if Art Commission approval is a prerequisite. If it is, then the applicant emails their submission materials to the Art Commission email at artcommission@phila.gov.

1h. Zoning/Use Permit

Review Time: Review time is 5-20 Business Days based on scope. An accelerated review is available (except for sign review) for a $1,050 fee. Accelerated review times are 5 Business Days.

2e. Water and Sewer Connection Review

Review Time:

Review times are as follows:

- Small connections (<6 inches in diameter): 1-2 Business Days
- Large connections (>6 inches in diameter): 7-10 Business Days
- Special Review: Additional 5 Business Days

2f. PWD Flow Test

Action: Instructions on the flyer. Submit a letter of request with a check for $570 payable to "City of Philadelphia." Email the letter of request with a utility plan or sketch to WTR@phila.gov.

Mail the check to:

Philadelphia Water Department,
Attn: WTR FLOW TEST
1101 Market St, 2nd Floor
Philadelphia, PA 19107

Fee: $570/test

2f. Hydrant Permit Review

Action: Applicants contact Joseph Yeager at Joseph.Yeager@phila.gov or 215-685-9655 with location of the hydrant they are requesting to utilize during construction. After initiating contact, the hydraulic conditions will be examined at the particular location and the permit will be approved/denied. If approved, PWD will furnish a list of approved backflow prevention equipment. Once approved, the permit will be available for pickup in the basement of the Municipal Services building @ 1401 John F. Kennedy Boulevard. Before being issued the permit, the customer will be required to show proof of acquisition of backflow prevention equipment to the PWD agent.

Fee:
One Week Permit for use of standard pressure hydrant……$1,205
Six Month Permit for use of standard pressure hydrant……$6,295

2l. Asbestos Abatement Review

Asbestos Permit — An independent certified Asbestos Project Inspector (API) must be hired as well.

3a. Stormwater and Groundwater Discharge Review
Action: PWD Industrial Waste Unit issues these permits. Applicants are to mail their applications to the PWD – Industrial Waste & Backflow Compliance Unit (IWU) at 1101 Market Street, 6th Floor, Philadelphia, PA 19107. The point of contact for IWU is Jennifer L. Moore (Jennifer.L.Moore@phila.gov).

3b. Water Service Review
Action: Submission is via email. For new service, the applicant must obtain pre-permit(s) through PWD Water Transport Records (WTR) by emailing WTR@phila.gov. Then, they are to contact the PWD Permit Unit by emailing Jason.Pezzetti@phila.gov and submitting all their documents. More information about the requirements can be found here.

3d. Wastewater Discharge Review
Action: PWD Industrial Waste Unit issues these permits. Applicants are to mail their applications to the PWD – Industrial Waste & Backflow Compliance Unit (IWU) at 1101 Market Street, 6th Floor, Philadelphia, PA 19107. The point of contact for IWU is Jennifer L. Moore (Jennifer.L.Moore@phila.gov).

3e. Hauled Wastewater Discharge Review
Action: PWD Industrial Waste Unit issues these permits. Applicants are to mail their applications to the PWD – Industrial Waste & Backflow Compliance Unit (IWU) at 1101 Market Street, 6th Floor, Philadelphia, PA 19107. The point of contact for IWU is Jennifer L. Moore (Jennifer.L.Moore@phila.gov).

3g. Water Discontinuance Permit Review
Action: Submit your current water bill, a photo ID, a notarized letter from the property owner authorizing the permit (if you are not the property owner*), a letter on the property owner's letterhead authorizing the permit (if a company or organization owns the property) to the PWD Permit Desk at MSB.

Fee: $100/disconnection, regardless of size

3h. Building Permits - All types
Review Time: Review times are 15 Business Days for one- and two-family residential and 20 Business Days for all other applications. An accelerated review is available (except for sign review) for new construction and alterations for a $2,000 fee. All other projects have a $1,050 fee for accelerated review. Accelerated review times are 5 Business Days.

3i. Electrical Permit Review
Review Time: Review times are 15 Business Days for one- and two-family residential and 20 Business Days for all other applications. An accelerated review is available (except for sign review) for new construction and alterations for a $2,000 fee. All other projects have a $1,050 fee for accelerated review. Accelerated review times are 5 Business Days.

3j. Plumbing Permit Review
Review Time: Review times are 15 Business Days for one- and two-family residential and 20 Business Days for all other applications. An accelerated review is available (except for sign review) for new construction and alterations for a $2,000 fee. All other projects have a $1,050 fee for accelerated review. Accelerated review times are 5 Business Days.

3k. Street Opening Review
Action: Submit application to the Streets Department Right of Way Unit at streetclosure@phila.gov.