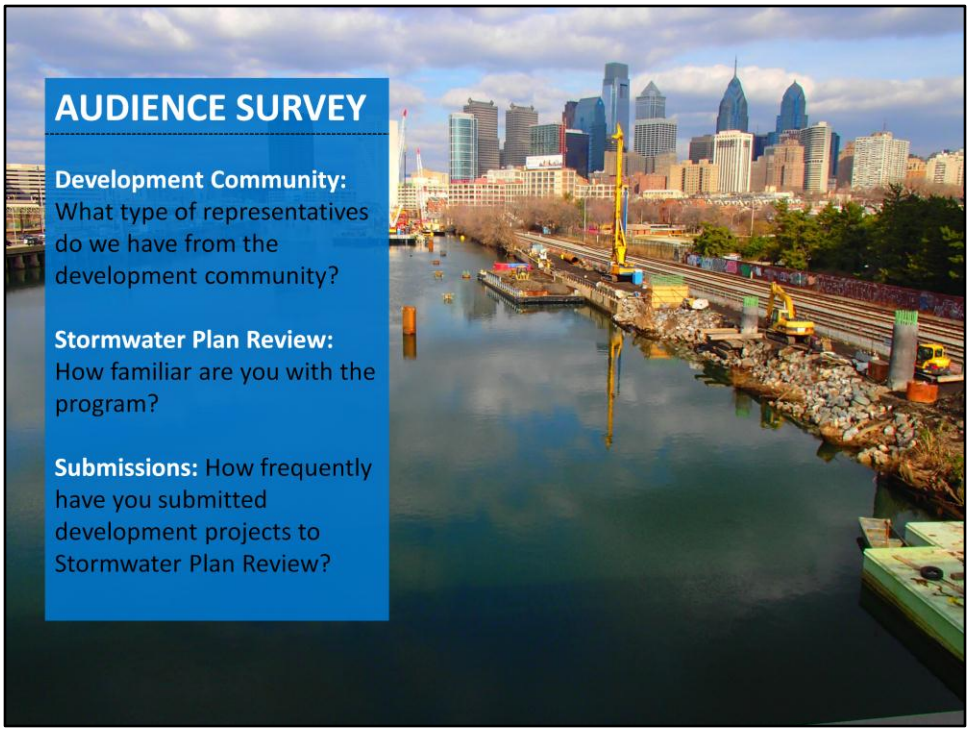

This is one of five information sessions we are having about the regulation changes. This culminates a two year evaluation and update process for us, so we have a lot of information to share – but – it is very important to us that you have ample time to ask questions.

# Agenda

- Introduction
- Updated regulations
- Questions & Break
- Plan Review Process
- Questions
- Access to information
- Summary
- Q & A Stations




Before we begin, we'd like to get a sense of who is in the room and your familiarity with these regulation changes and our Plan Review process. I know that we have many engineers in the room but also developers, landscape architects and we have people from the private and public sectors.

For a quick reference, by a show of hands…

- How many people here have heard some presentation about these changes?
- How many people work on submitting applications?

## Summary of Outreach Efforts

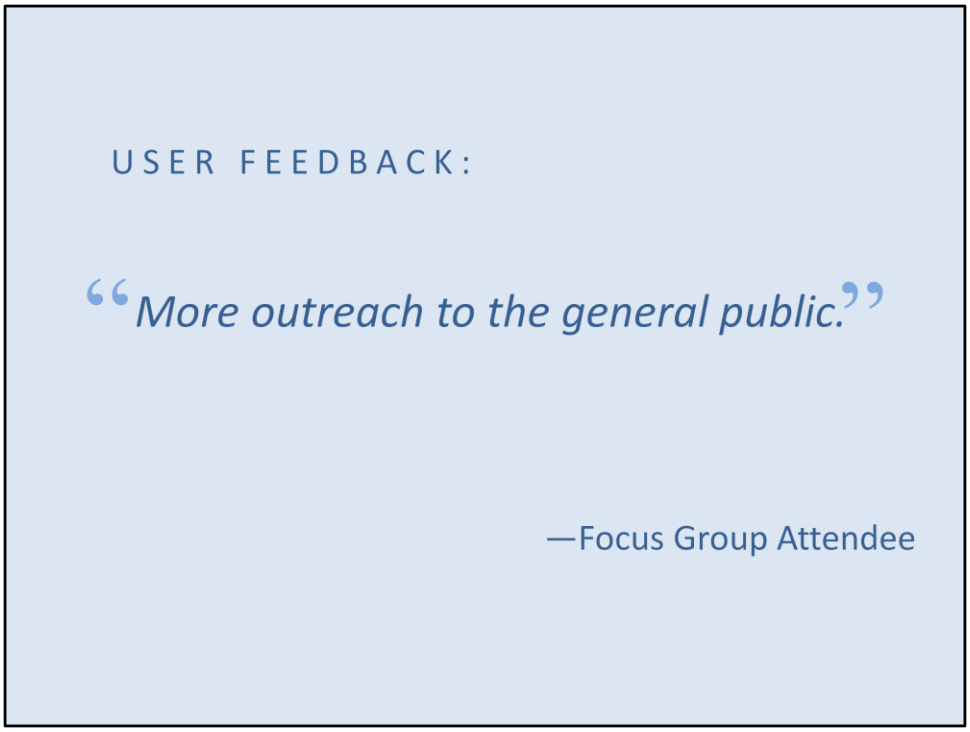
2 year process
8 DSC meetings, starting in April 2013
11 firms interviewed about the guidance manual
1 comprehensive website tracking the updates
3 Email blasts to 2400+ each time
- Leaders of industry associations, advocacy organizations, partners, government entities
- Contacts in Plan Review database
- ERSA automated emails

4 Focus Groups with 90 total participants
2 user testing groups for the website
6 presentations at outside agencies
+ 5 information sessions

This culminates a two year effort for us. We have been engaged with the development community the whole time. In the run-up to the new regulations, we have regularly reached out to the development community during this two-year effort.

The Development Services Committee (DSC) has been a venue to work with representatives of the development community on the updates. In addition, Philadelphia Water conducted interviews with selected firms that have had extensive experience with Philadelphia's review process to solicit feedback about the Stormwater Management Guidance Manual.

Focus Groups and Website User Testing Groups have also been utilized to solicit comments and suggestions. PWD and its consultant team has strived to be responsive to feedback and many of the changes presented here reflect the feedback we've received.




A lot of the changes we have made are a direct result of feedback we've received so you will see some quotes like this one that come from our focus groups and guidance manual interviews. These information sessions are partly a result of us hearing that we need to do more outreach to the public.

# Introduction

## Stormwater Runoff

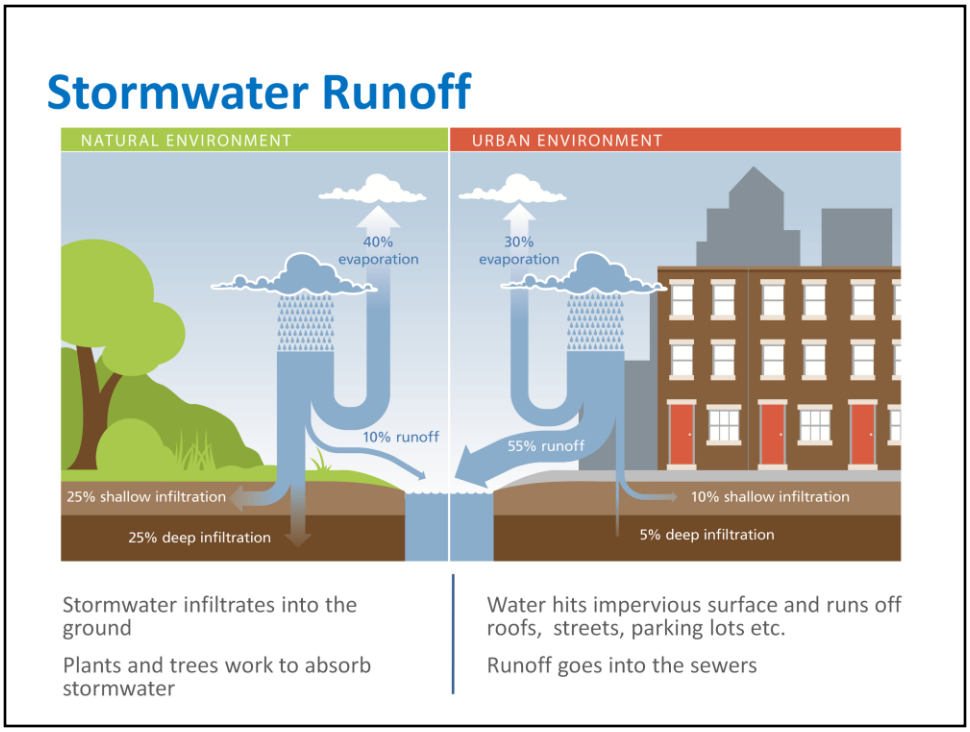
When it rains, stormwater runoff:

- pollutes our rivers with fertilizers, oil and sediment,
- destroys valuable aquatic and riparian habitat,
- contributes to combined sewer overflows,
- and floods homes and businesses.

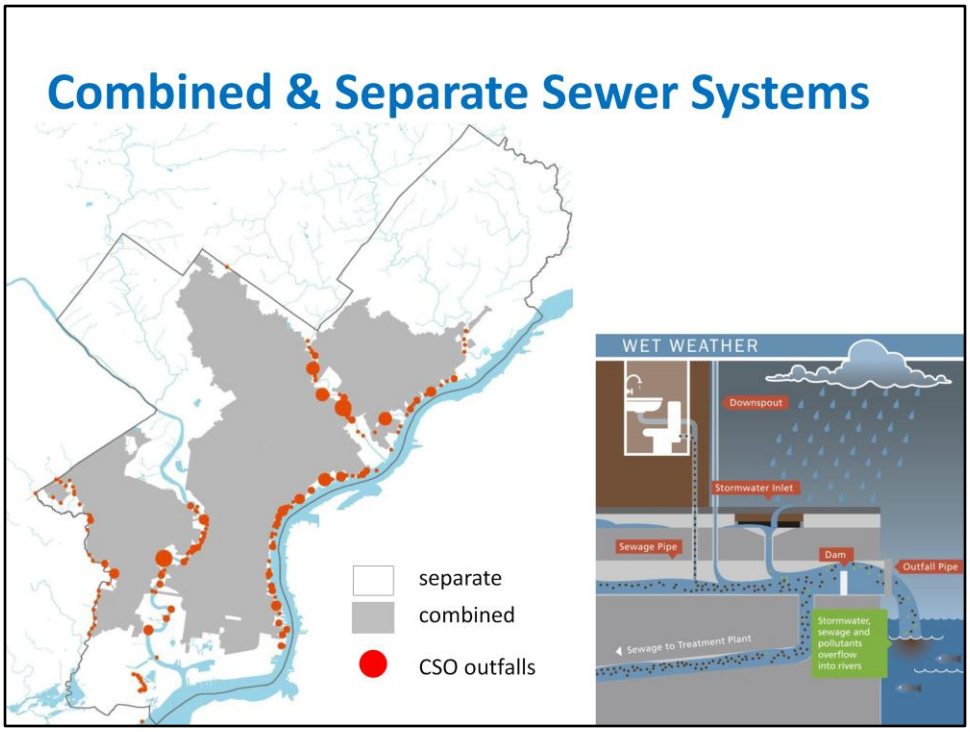
So, when it rains in Philadelphia, stormwater…

- Carries dirt and oil from the roadways and rooftops into our rivers
- Harms aquatic habitat – here the streambank is eroding
- Contributes to combined sewer overflows
- And can lead to flooding of homes and businesses

Philadelphia Water is trying to address all of these challenges in a number of ways throughout the City.




This simplified diagram illustrates that the amount of stormwater runoff related directly to land development. In a natural condition rainwater can soak into the ground. However, in urban environments where much of the ground is covered with roads and buildings (i.e., impervious surfaces), much of that stormwater rushes into the sewer system, resulting in significantly less infiltration and more runoff.




In Philadelphia, the situation is even more complicated because we have two different sewer systems. About 60% of the city has a combined sewer system, shown in gray. This area is generally the densest part of the city; therefore, more than ¾ of the city's residents are served by combined sewers.

In these areas, stormwater and sanitary sewage from homes and buildings mixes together in a single pipe. When the treatment plants are unable to handle all of that water, the system is designed to overflow into our rivers and creeks. The red dots illustrate the 164 combined sewer overflow (CSO) outfalls along the Delaware and Schuylkill rivers and the Cobbs, Tookany/Tacony-Frankford, and lower Pennypack creeks.

The area shown in white is served by a separate sewer system in which sewage and stormwater do not mix, but all of the stormwater is routed directly to local waterways and doesn't go to a treatment plant.

The regulations that a development project must comply with are partly dependent on whether the site is located in a combined sewer or separate sewer area.

## Stormwater Management in Philly

**Public Investment**
- Building & maintaining stormwater infrastructure
- *Green City, Clean Waters*

**Private Investment**
- Stormwater Billing
- Development Regulations
  - Three Components
    - Water Quality
    - Flood Control
    - Channel Protection
  - Apply to projects that disturb over 15,000 sf of earth
  - Differ in combined and separate sewer areas.

Philadelphia is addressing the challenges of stormwater management on public and private property. Philadelphia Water invests in public infrastructure throughout the city in the form of treatment plants, sewer pipes, inlets, etc. In addition, Philadelphia Water is investing in green stormwater infrastructure through its Green City, Clean Waters program.

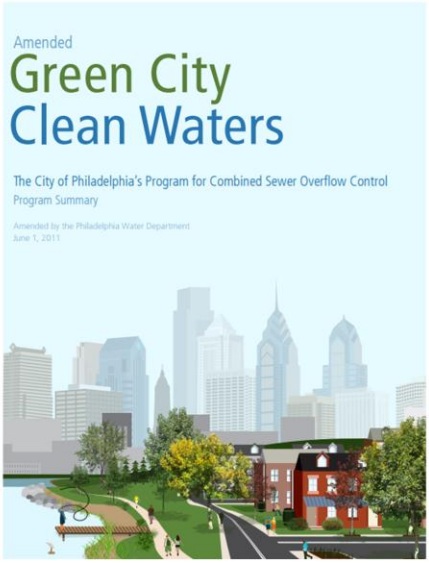
On the private side, PWD encourages stormwater management through the stormwater billing program, in which property owners that manage stormwater on their sites receive a lower bill. PWD also requires stormwater management on new development and redevelopment sites through the Stormwater Regulations.

There are three components to the regulations: water quality, channel protection and flood control. The changes we are discussing today primarily deal with the water quality component.

So why are we changing the stormwater regulations?
It's clear we want to continue to improve water quality in our waterways but Philadelphia is also regulated by complex Federal and State laws.

## Regulatory Timeline

- **2006** - Current Stormwater Regulations established
- **2005 to 2012** – Multiple Act 167 Plans Approved, Including updates to Pennypack and Poquessing Plans
- **2011** – CSO Consent Order & Agreement signed
- **2013 to 2015** – Worked to update Stormwater Regulations and evaluate/revise Plan Review Process
- **New Regulations will be effective July 1, 2015**




Philadelphia Water is regulated by the PA DEP and US EPA. Stormwater management started with the passage of the Clean Water Act in 1972.

The current stormwater regulations were established in 2006, but much has changed since then. For instance, Philadelphia has adopted several watershed management plans, as required by PA Act 167. The Act 167 plan for the Darby-Cobbs was approved in 2005; the Tacony-Frankford was approved in 2008; the Pennypack and Poquessing were approved in 2013, and the Wissahickon is expected to be approved by the PA DEP later this year. Furthermore, in 2011 we signed a Consent Order and Agreement with PA DEP for our Combined Sewer Overflow Long Term Control Plan Update (Green City, Clean Waters)

The Act 167 Plans and Consent Order and Agreement have revised the goals for stormwater management that the City has to meet, necessitating the regulatory changes we are discussing today.

## Why Update Regulations and Guidance Resources?

1. Align Philadelphia's Stormwater Regulations with our requirements (PA DEP and US EPA)
2. Improve the Plan Review process
3. Provide better access to information

While the primary focus has been to update the stormwater regulations to better align with our State and Federal requirements, Philadelphia Water also realized this was an opportunity to improve the Plan Review process and provide better access to information.

## Regulation Change Overview

Three big regulatory changes:

- **More water**: each site will manage more water
- **Slower water**: slow rate that water leaves a site
- **Cleaner water**: clean the dirtiest water on a site

Not changing the earth disturbance threshold. It will stay at 15,000 sf.

Regulations are effective July 1, 2015.

- Submit complete ERSA before July 1 – current regs apply
- Submit ERSA after July 1 – new regs apply

This slides summarizes the changes to the regulations.

The major changes can be summarized in three short phrases:
More Water
Slower Water
Cleaner Water

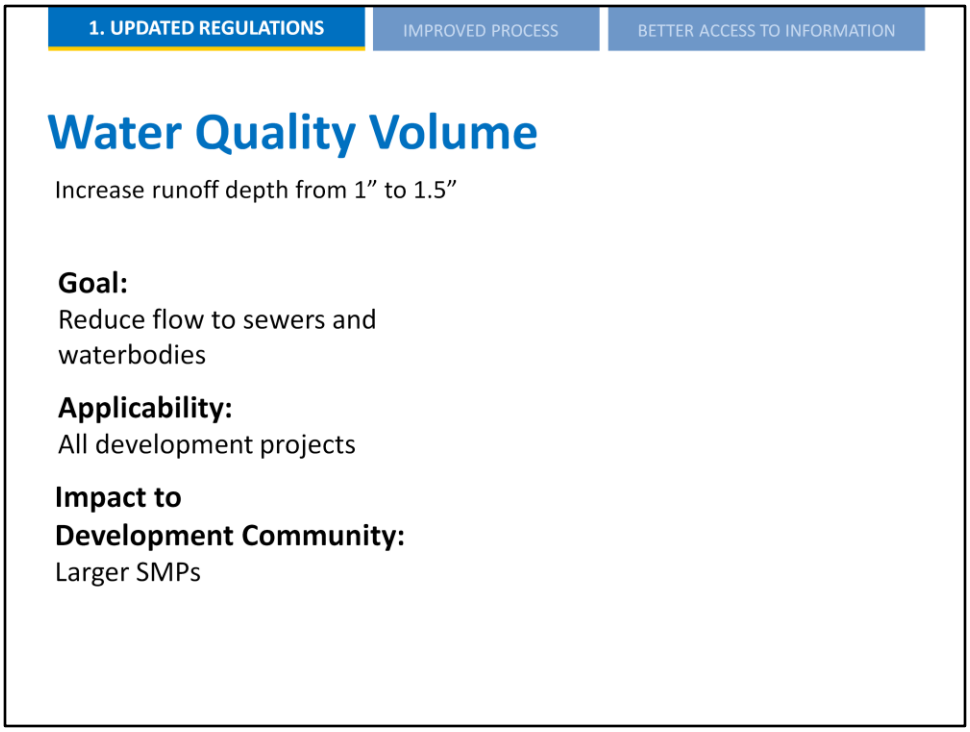
Philadelphia Water is not lowering the earth disturbance threshold at this time. It will remain at 15,000 sf.

Regulations are effective July 1, 2015.

The next part of the presentation will go into more detail about the changes and then we'll break for questions.


Not all of the changes will impact all sites in the same way. The project location within the city (e.g., combined sewer versus separate sewer) and the ability to infiltrate are the biggest factors in determining how the regulations will impact a project.

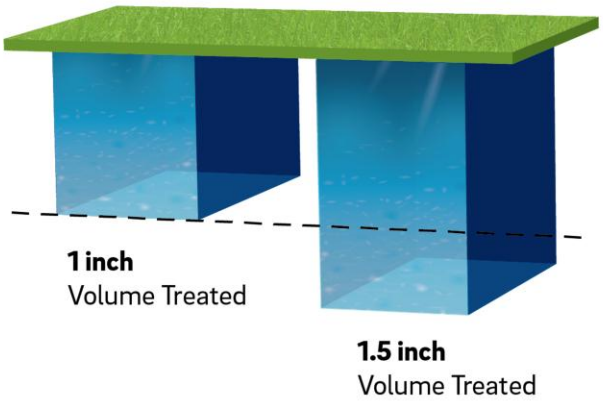
In addition to the updated regulations, there will be additional changes, such as new compliance tools that will help designers meet the new regulations.



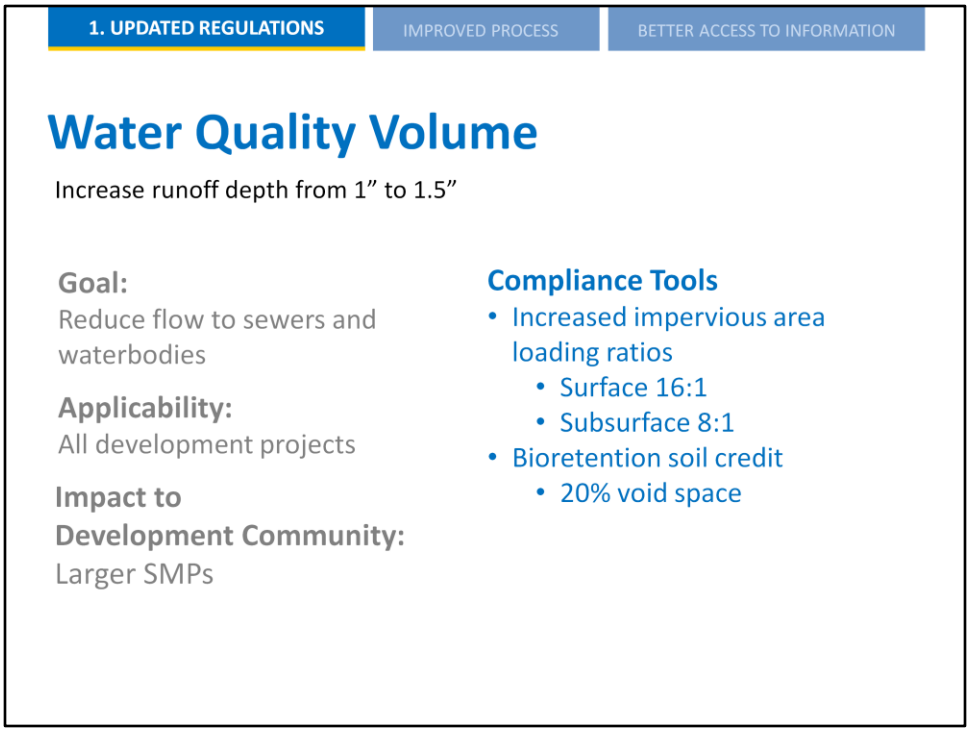

The increase in the water quality volume from the current 1” to 1.5” will be applicable to ALL projects. This change will likely result in deeper SMPs

# Water Quality Volume

Increase runoff depth from 1" to 1.5"

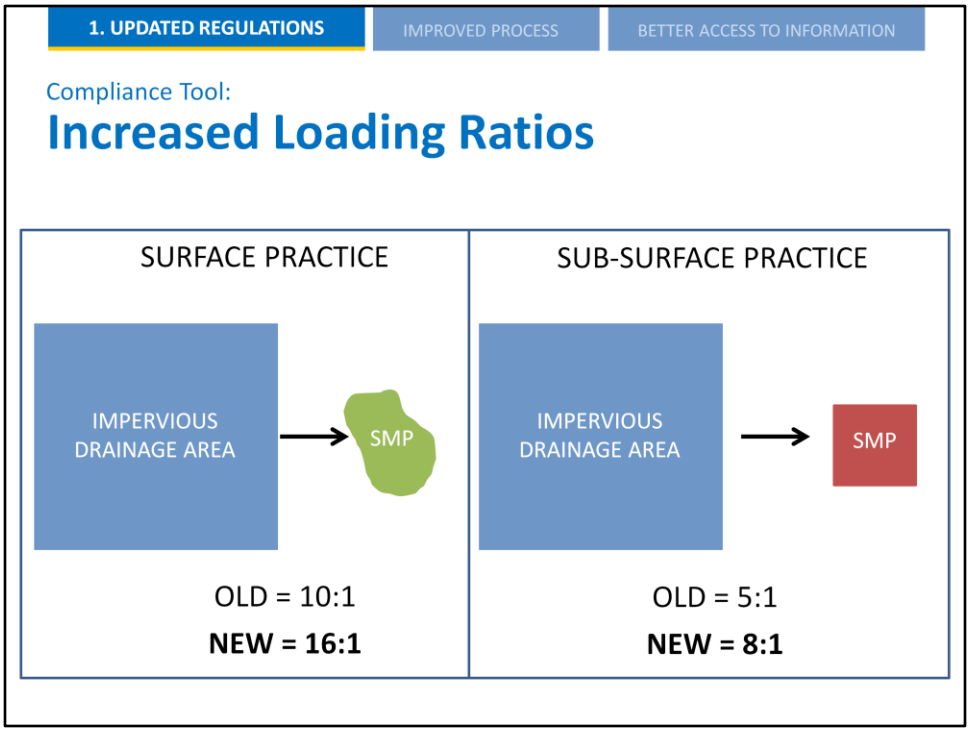



This diagram represents the increase in Water Quality Volume

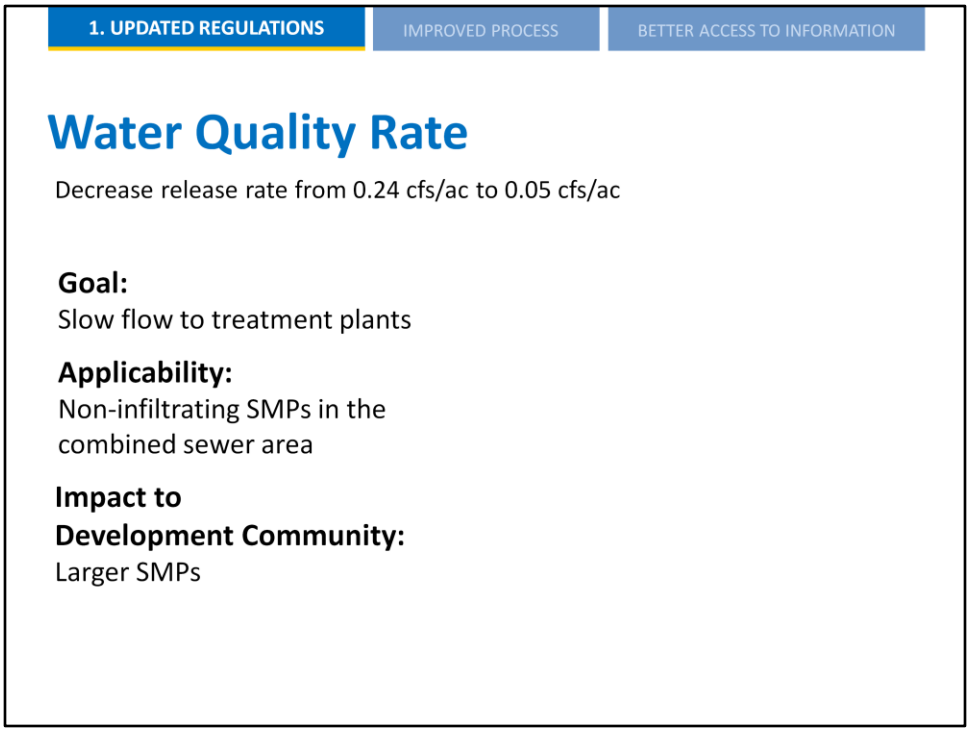



Philadelphia Water is making some changes to help designers meet the new water quality volume requirement.

Increased loading ratios should provide more flexibility for site design as SMP footprints per area of directly connected impervious area (DCIA) can now be smaller. Offering a bioretention soil credit will also accomplish this same goal of design flexibility.

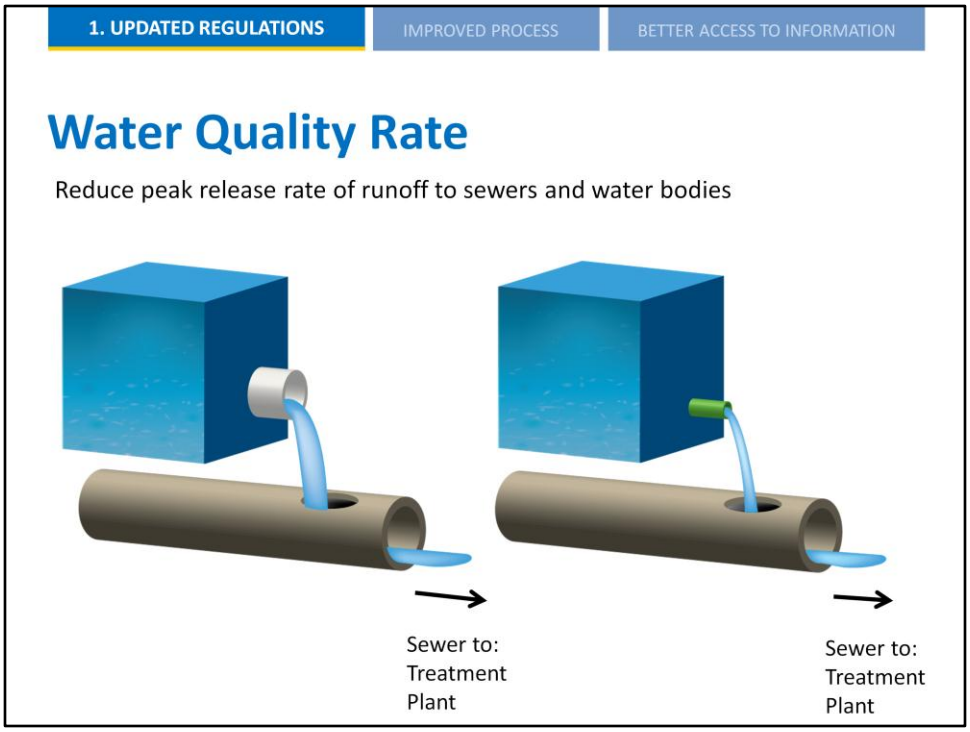



Again, increased loading ratios allow the same drainage area to be managed within a smaller footprint. This should be especially helpful for constrained sites. Note that the increased loading ratios only apply for infiltration SMPs.

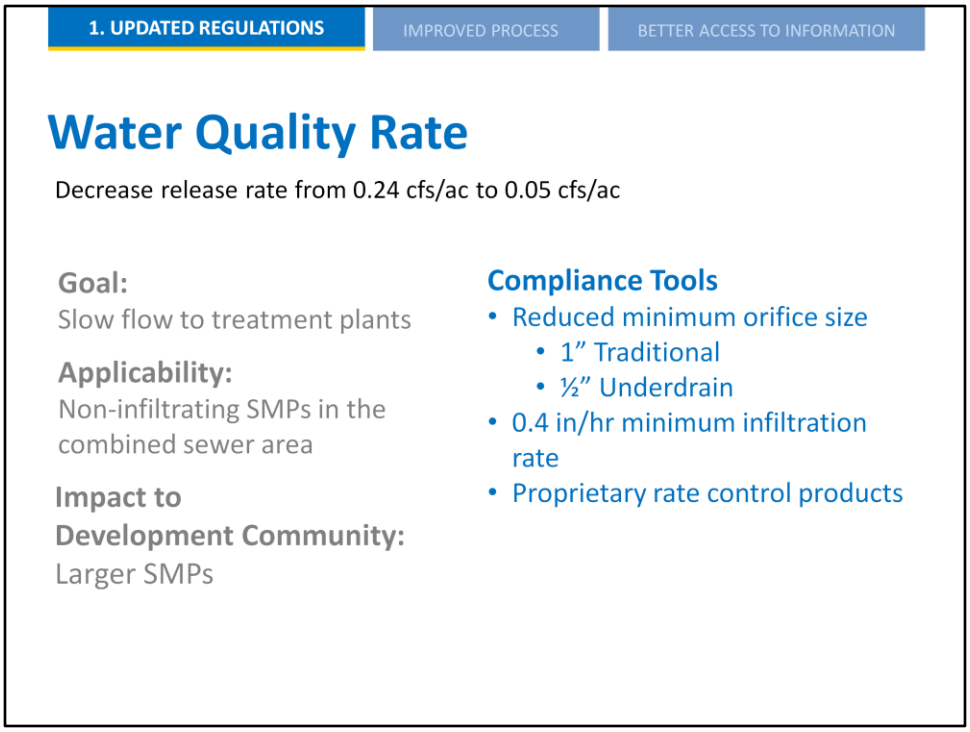



The decrease in the water quality rate from the current 0.24 cfs/ac to 0.05 cfs/ac will only be applicable to non-infiltrating projects. This change will affect about 25% of applicants based on historic submissions and will likely result in wider SMPs (i.e., increased footprint).

Since 2011, Philadelphia Water has completed extensive modeling and the change in the release rate was determined by calibrating PWD's model with treatment plant capacity.

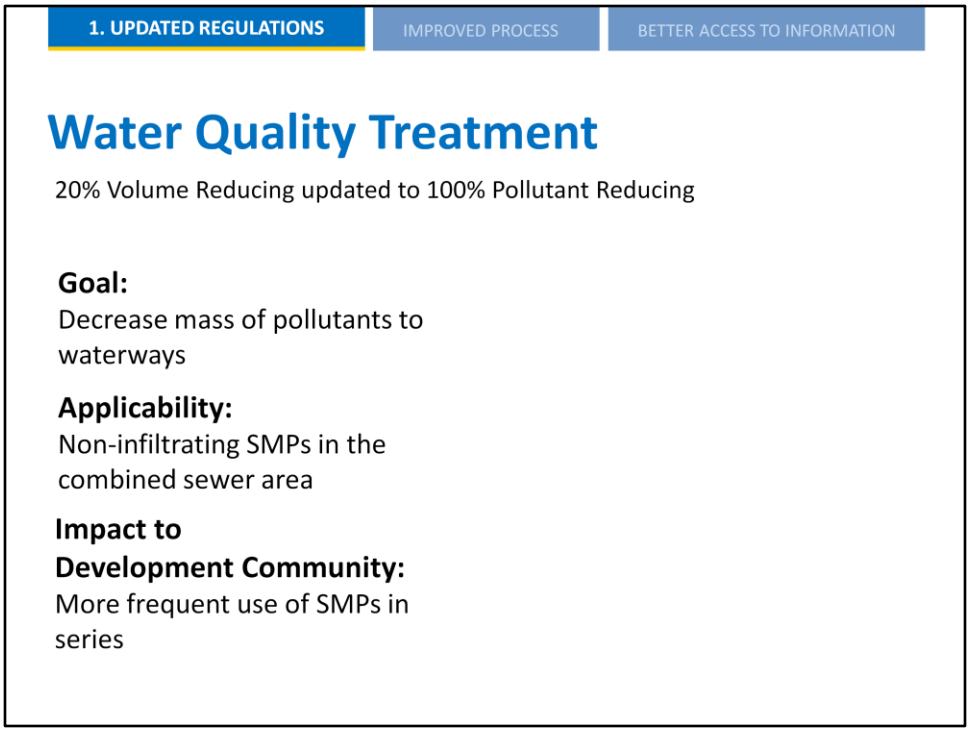



This diagram shows how water entering the sewer system will be slowed down.



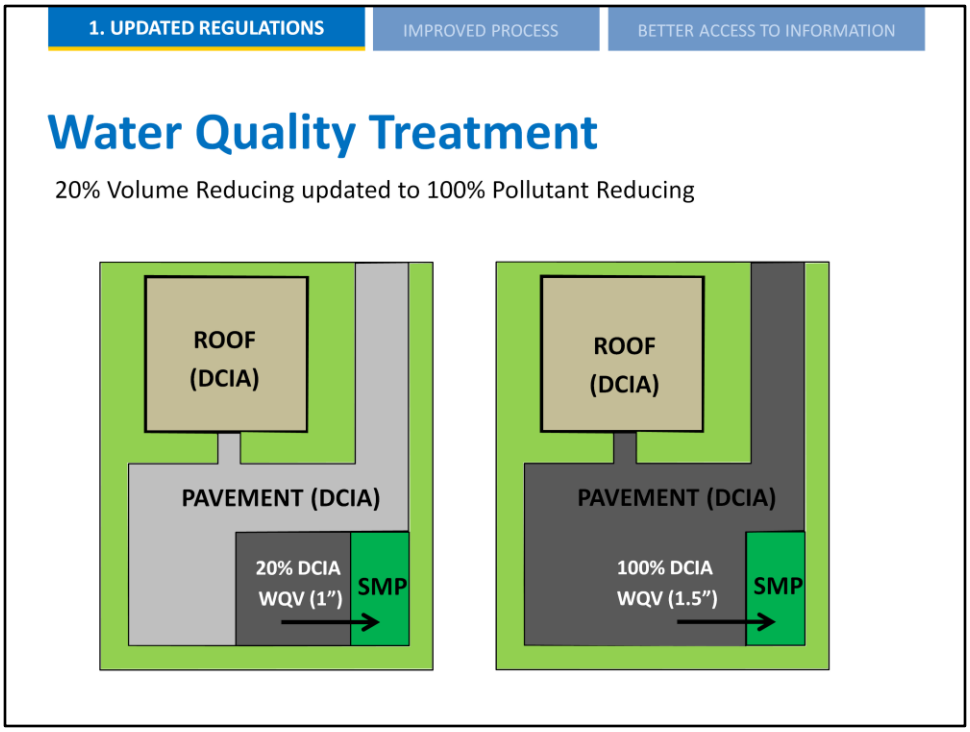

In order to help meet the decreased release rate, several new or updated compliance tools were added. The minimum orifice size was reduced to 1" (1/2" for underdrained bioretention system); therefore, waivers will no longer be necessary for these smaller orifices.

By reducing minimum infiltration rate to 0.4 in/hr, more projects should be able to infiltrate and therefore not have to detain and slow release. Philadelphia Water is allowing proprietary rate control products to help applicants to meet the new rate.

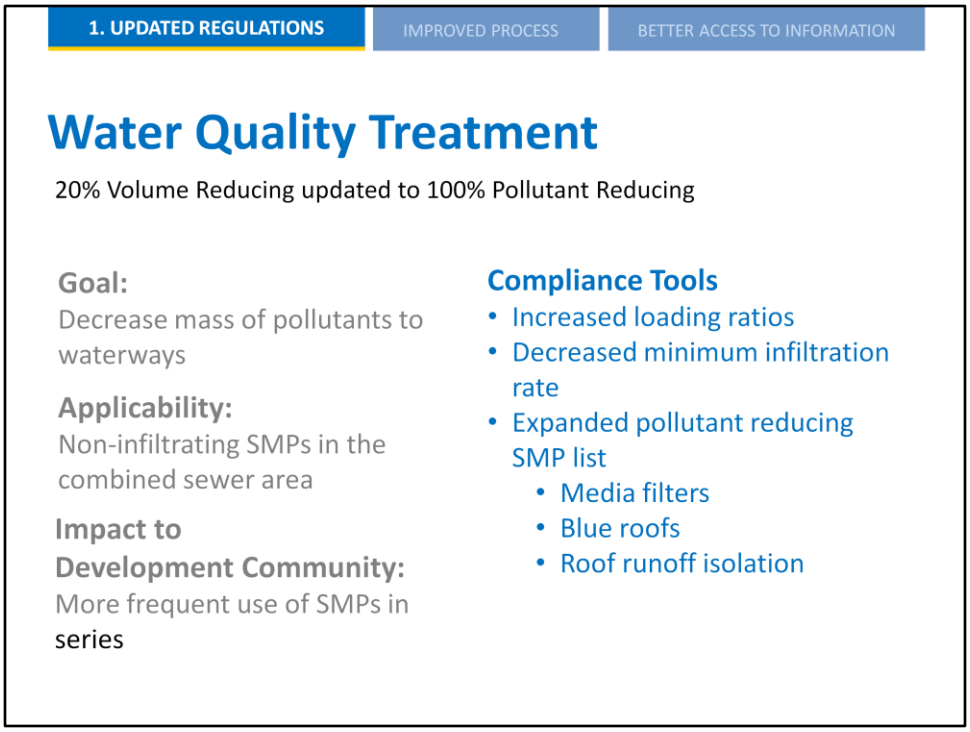



The updated water quality treatment requirement only applies to non-infiltrating projects in the combined sewer service area. If your project infiltrates you automatically meet this requirement.

Now 100% of non-infiltrating runoff must go through pollutant reducing practices. A detention practice alone will not meet the water quality treatment requirement, so Philadelphia Water anticipates more frequent use of SMPs in series.




This diagram shows the change in the amount of runoff that must be directed to a stormwater management practice (SMP).




Philadelphia Water has established some new compliance tools to help applicants meet the changes to the water quality requirement. Increased loading ratios allow SMPs to be smaller, enabling them to be more easily incorporated onto sites. The decreased minimum infiltration rate enables more projects to utilize infiltration.

PWD has also expanded the list of pollutant reducing SMPs to help meet this requirement, allowing certain proprietary media filters and blue roofs. A new concept is roof runoff isolation, recognizing that non-vehicular rooftops generate relatively clean runoff. Therefore, if non-vehicular rooftop runoff is isolated it is considered "pollutant reducing." Roof runoff must still meet the rate control requirement.

1. UPDATED REGULATIONS | IMPROVED PROCESS | BETTER ACCESS TO INFORMATION

Compliance Tools:

## Non-Infiltrating Pollutant-Reducing SMPs

| | Combined Sewer | Separate Sewer/ Direct Discharge |
|---|---|---|
| Bioretention | Yes | Yes |
| Porous Pavement DIC | Yes | Yes |
| Green Roofs | Yes | Yes |
| Cisterns | Yes | Yes |
| Blue Roofs | Yes | No |
| Ponds and Wet Basins | Yes | Yes |
| Vegetated Media Filters | Yes | Yes |
| Media Filters | Yes | Yes |
| Roof Runoff Isolation | Yes | No |

Blue roofs, media filters, and roof runoff isolation are three new strategies to assist applicants meet the Water Quality Requirement. However, note that blue roofs and roof runoff isolation are not eligible for use in separate sewer or direct discharge areas.

1. UPDATED REGULATIONS | IMPROVED PROCESS | BETTER ACCESS TO INFORMATION

Compliance Tool:

## Rooftop Isolation

**Not all roof runoff needs to be routed through SMPs.**

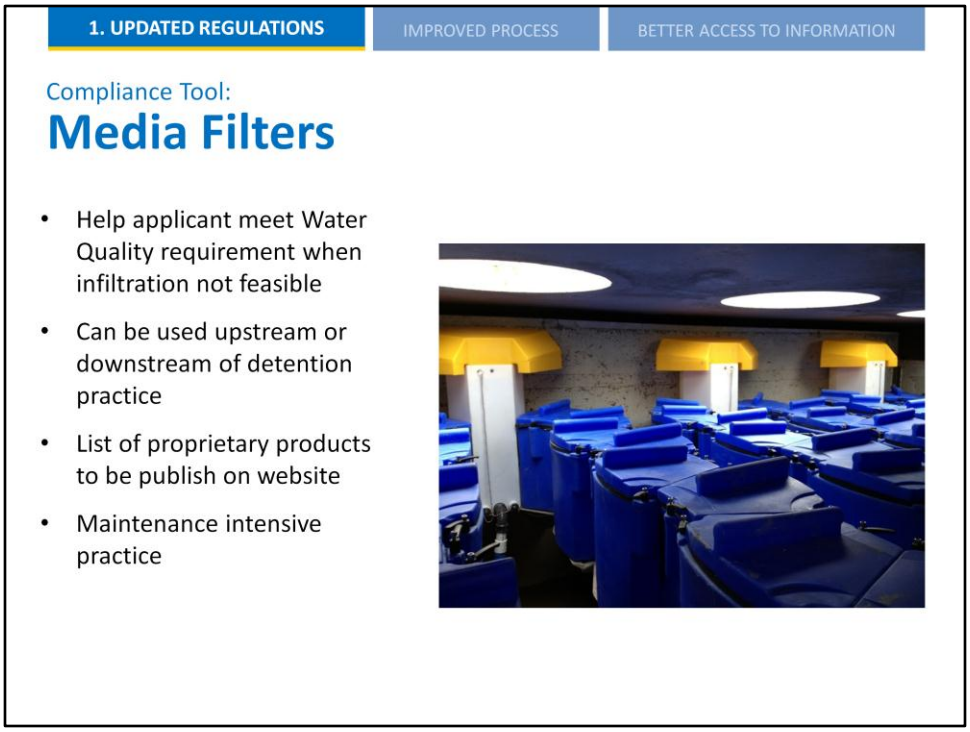
Clean Rooftops
Qualifying Criteria:

- Non-vehicular area
- Not mixed with unmanaged runoff
- Combined Sewer System only
- 0.05 cfs/acre release rate applies

▲ Non-Qualifying

▲ Qualifying

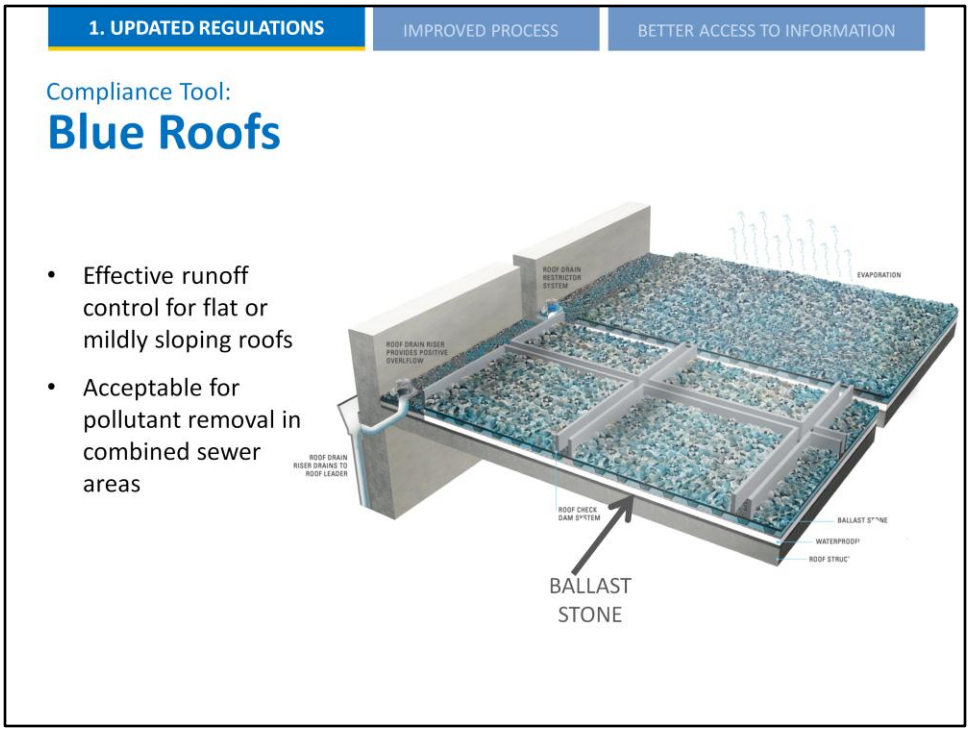
As noted above, rooftop isolation is eligible only in the combined sewer system. Philadelphia Water identified pollutant sources and determined that clean (i.e., non-vehicular) rooftops are not contributing significant pollutant sources compared to other impervious areas. However, rooftops are not completely clean, so the runoff must still meet the water quality release rate, which is calibrated to be treated at a treatment plant.




To provide applicants/designers with more options for demonstrating compliance with the Water Quality pollutant-reduction requirement, Philadelphia Water has included guidance on media filters in the new Manual. Media filters are structures or excavated areas containing a layer of sand, compost, organic material, peat, or other filter media and can be vegetated or non-vegetated.

Vegetated media filters can help comply with the Water Quality requirement when placed upstream of a non-infiltrating SMP. Non-vegetated media filters can meet the requirement when placed either upstream or downstream of a non-infiltrating SMP.

PWD will not certify the products but will provide a list of options that meet the performance requirement: Outflow of 15 mg/l of TSS.




Blue roofs are also known as controlled flow roof drain systems and are an effective practice for controlling runoff from buildings with flat or mildly sloped roof surfaces. Water is temporarily detained on the roof surface using rooftop check dams or roof drain restrictors. Outflow is controlled using orifices prior to discharge, which is typically directed to the building's storm drains, scuppers, or downspouts

Since blue roofs function through detention and slow release alone, they neither add nor remove contaminants from stormwater; however, in a combined sewer area, they are acceptable pollutant-reducing practices for non-infiltrating Water Quality compliance.

To date, about five or six blue roofs have been approved in Philadelphia. One example is the Cira South project, which has combination blue and green roof system.

1. UPDATED REGULATIONS | IMPROVED PROCESS | BETTER ACCESS TO INFORMATION

## July 2015 Requirements

| | Current | July 2015 |
|---|---|---|
| Water Quality Volume | 1.0” | 1.5” |
| Water Quality Rate | 0.24 cfs/acre | 0.05 cfs/acre |
| WQ Treatment: MS4 | 100% Volume Reducing | 100% Pollutant Reducing |
| WQ Treatment: Combined | 20% Volume Reducing | 100% Pollutant Reducing |
| Minimum Orifice Diameter | 3 inches | 1 inch (Traditional)<br>½ inch (Underdrain) |
| Surface Loading Ratio | 10:1 | 16:1 |
| Subsurface Loading Ratio | 5:1 | 8:1 |
| Bioretention Soil Volume Credit | None | 20% Void Space |
| Minimum Infiltration Rate | 0.5 in/hr | 0.4 in/hr |
| Disconnection Practices | ------ No Changes ------ | |

Note that these requirements will apply to sites differently, depending on the ability to infiltrate and location with combined versus separate system. Also note that the disconnection policies (green roofs, tree credits, pervious pavement, etc.) are not changing. Philadelphia Water wants to continue to promote these practices as they provide a number of triple bottom line (social, environmental, economic) benefits.

# Case Studies

Courtesy of Stantec and
Ruggiero Plante Land Design

Philadelphia Water was approached by the Building Industry Association (BIA) to develop case studies examining how projects that were designed pre-July 2015 under the old regulations would be designed to meet the new regulations. These case studies were developed by local engineering firms in collaboration with PWD.

1. UPDATED REGULATIONS | IMPROVED PROCESS | BETTER ACCESS TO INFORMATION

University of Pennsylvania Campus

## Pre-development

Lower Schuylkill River Watershed

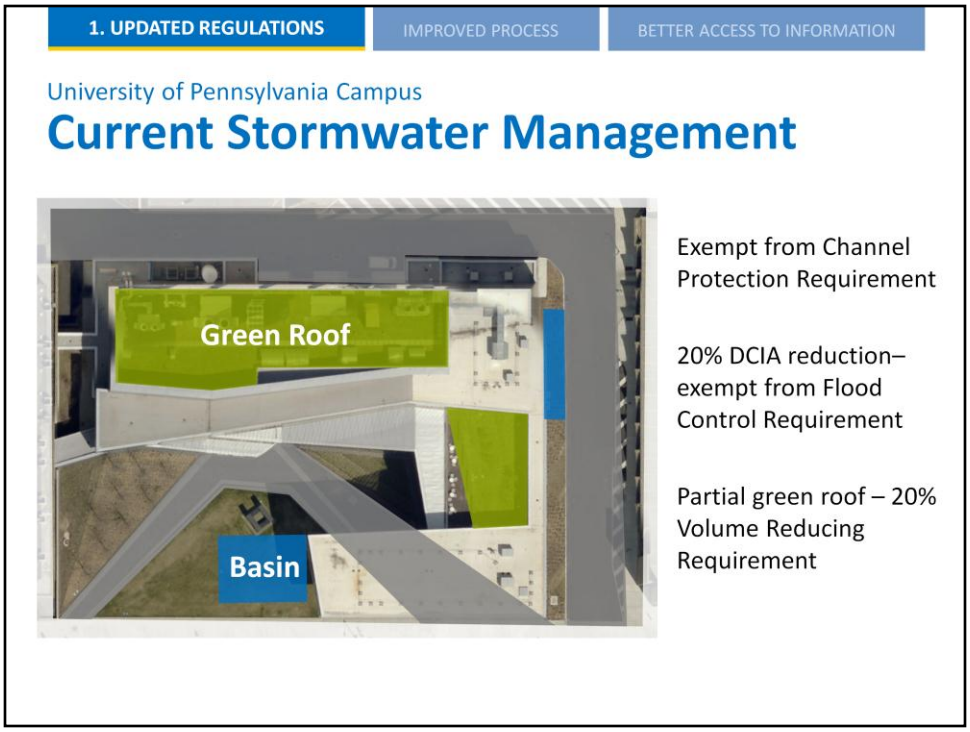
Redevelopment

Combined sewer area

90,000 $ft^2$ earth disturbance

Infiltration not feasible

The first site, on the campus of the University of Pennsylvania, was nearly two acres.




The original design included a green roof and lawn areas to qualify the project for an exemption from the flood control requirement by reducing post-construction DCIA by 20%. The partial green roof also qualified for the 20% volume reducing requirement. The remaining runoff was managed by two detention/slow-release basins (shown in blue).


Under the revised plan, the two subsurface detention basins remain the same but two proprietary filters were added to meet the 100% pollutant reducing requirement. A walkway was removed to decrease the impervious area to qualify for the flood control exemption. To save costs, the green roofs were eliminated and the runoff was isolated from the ground level impervious area, qualifying for rooftop runoff isolation.

This example is for illustrative purposes. Note that every project will be different and not all will have this level of flexibility.

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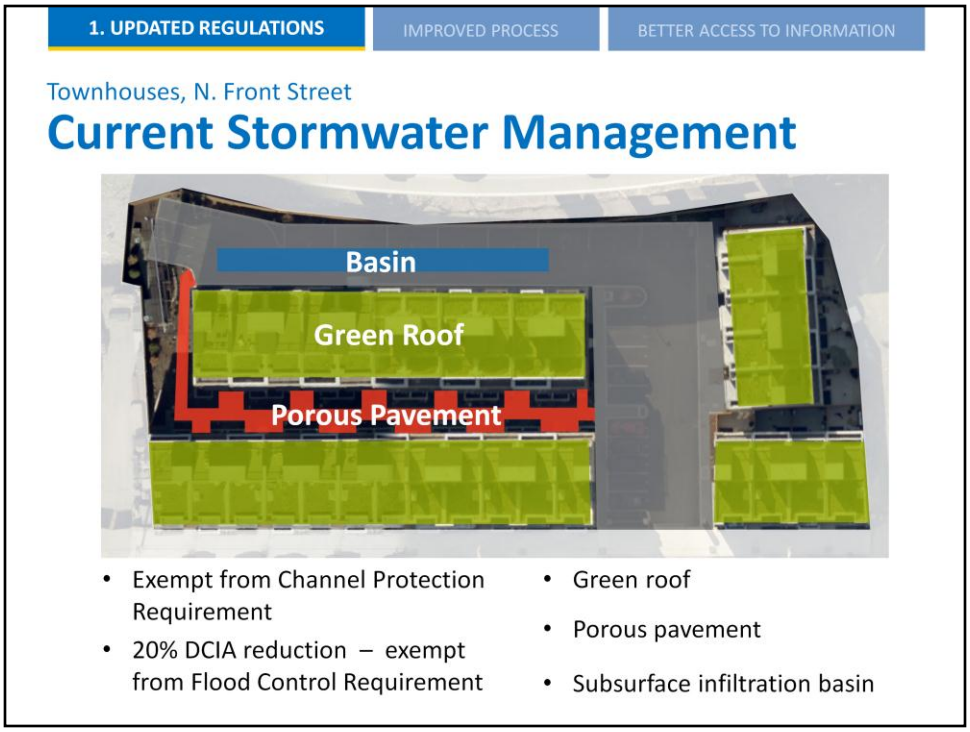
Townhouses, N. Front Street

## Pre-development

- Delaware Direct Watershed
- Redevelopment
- Combined sewer area
- 50,000 $ft^2$ earth disturbance
- Infiltration feasible

The second site was a townhouse development on North Front Street.

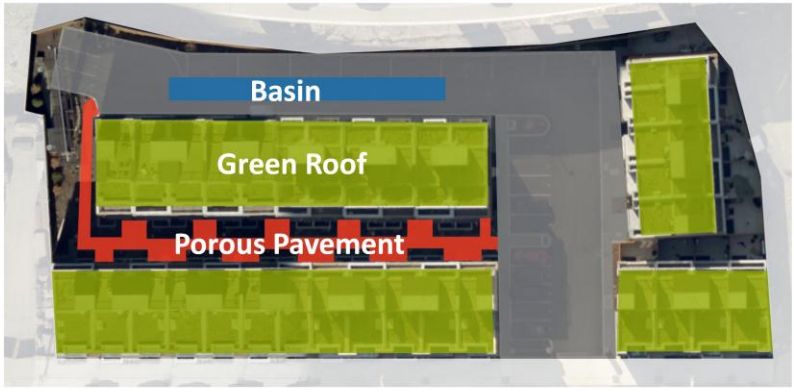



In the original design, the use of green roofs throughout the development yielded a 20% DCIA reduction, thus exempting the project from flood control requirements. Pervious pavement was used for the internal walkways and the driving lane and parking areas were managed by a subsurface infiltration basin.

1. UPDATED REGULATIONS | IMPROVED PROCESS | BETTER ACCESS TO INFORMATION

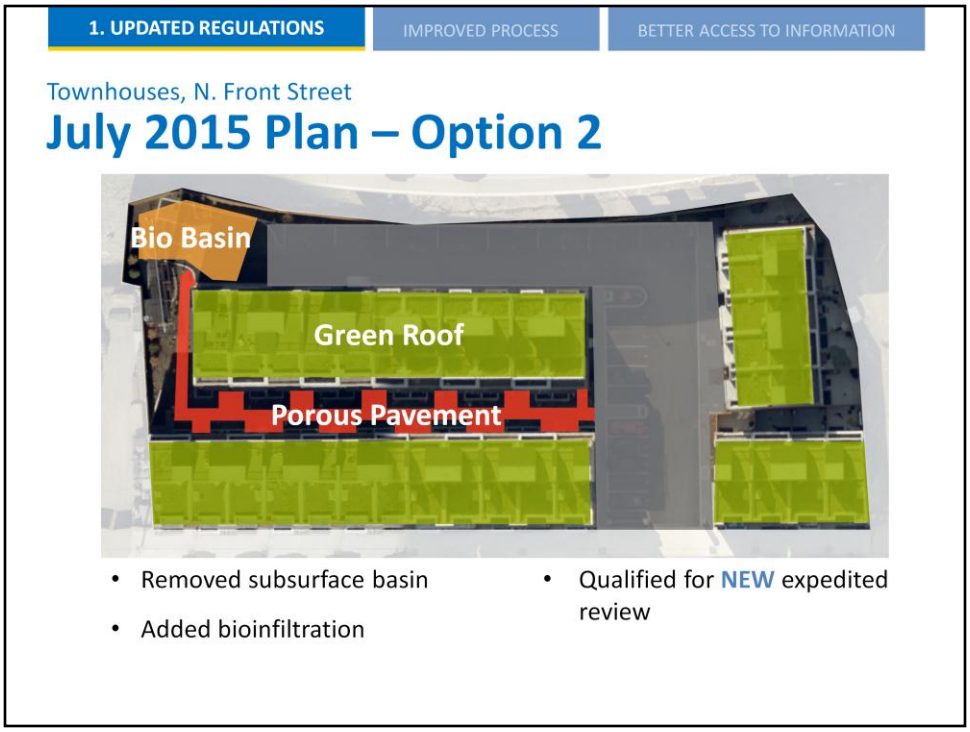
Townhouses, N. Front Street

## July 2015 Plan – Option 1




- Reduced subsurface basin footprint using higher loading ratio
- Less site excavation required

Under the revised plan, very little changes for this project. Utilizing the new loading ratios, the size of the subsurface infiltration basin was reduced. The green roofs and pervious pavement remain.

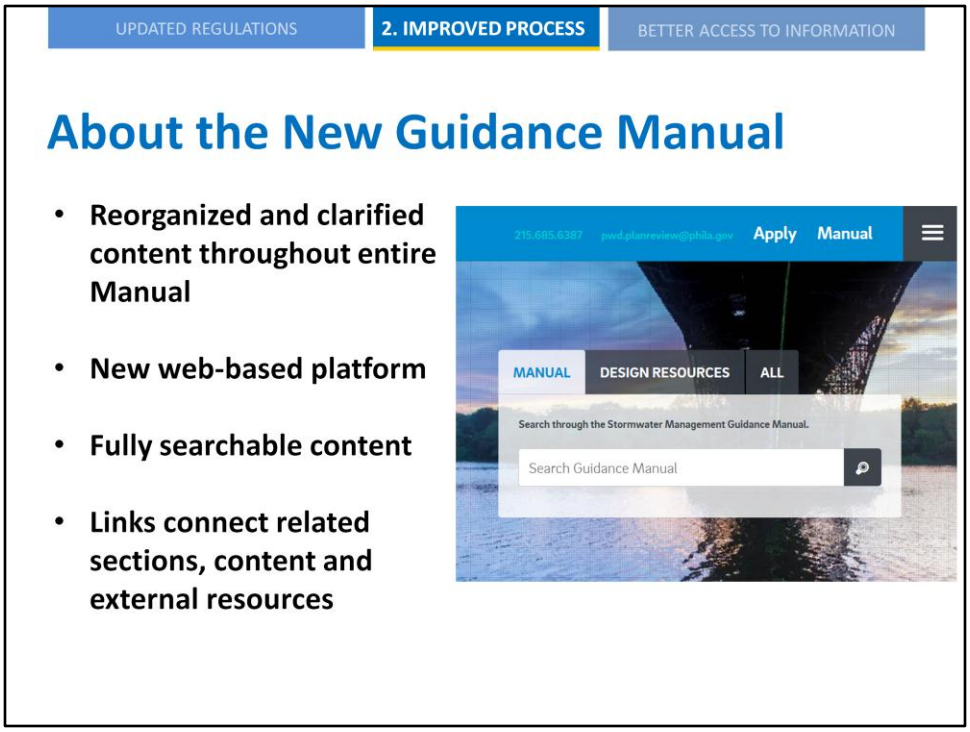



A second option was explored that eliminated the subsurface basin and added bioinfiltration. While this design resulted in three fewer parking spots it would now qualify for a new expedited review called Surface Green Review.

# Questions

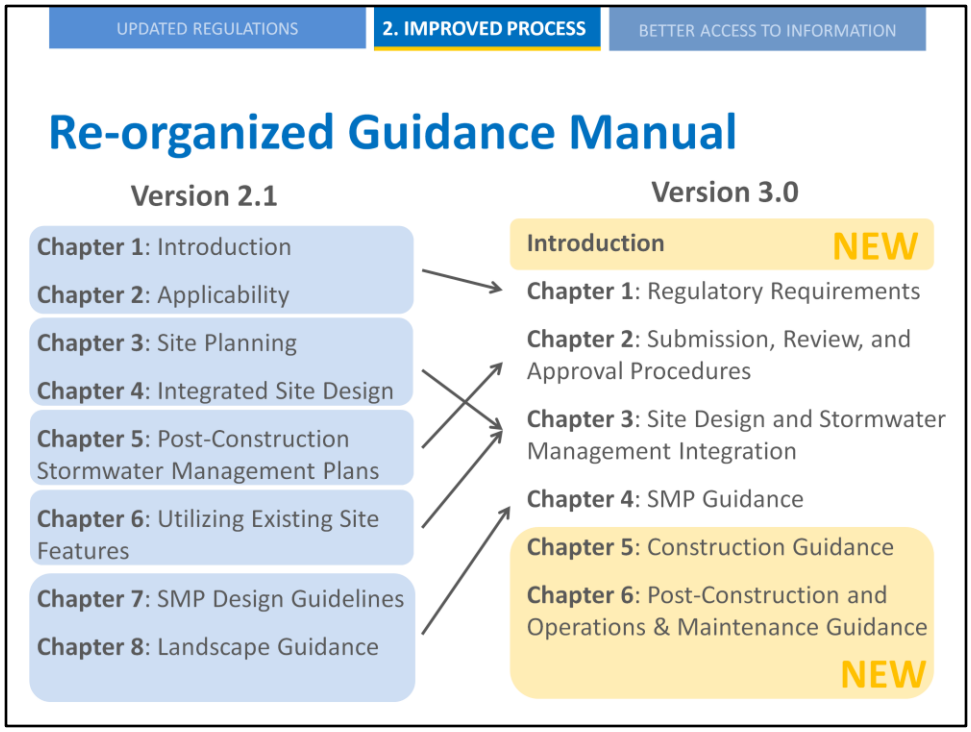
# Break


In addition to the technical changes to the Stormwater Regulations, we also spent a lot of time improving the Plan Review process. This section will focus on three major changes: improved guidance, expedited reviews and new tools & resources.



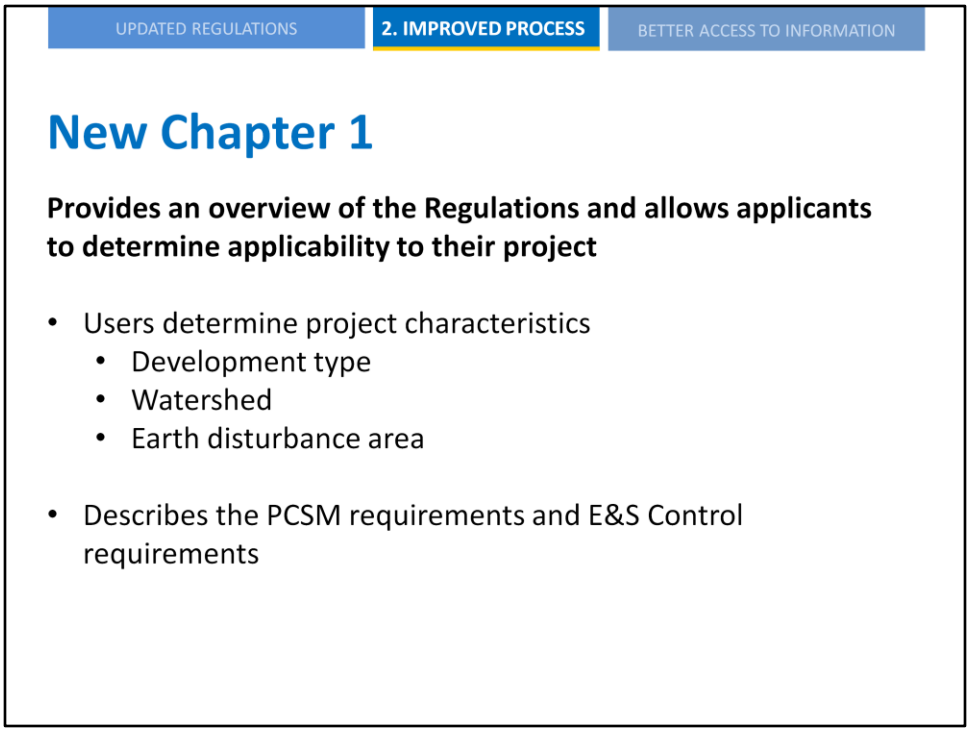

PWD originally anticipated making targeted revisions only to the Manual to accommodate the regulation updates and process enhancements. Once the revision process began, however, PWD realized a larger opportunity existed to re-organize and clarify content throughout the entire Manual, focusing on clarification of policies and process. In addition to updating content, significant attention was given to improving existing resources and guidance within the Manual in response to general feedback, user interviews and focus group suggestions.

As part of the new Stormwater Plan Review website, the Manual will presented as fully searchable website content. The web-based platform allows for easy linking between sections and chapters, and also allows readers to access external resources referenced within the Manual.

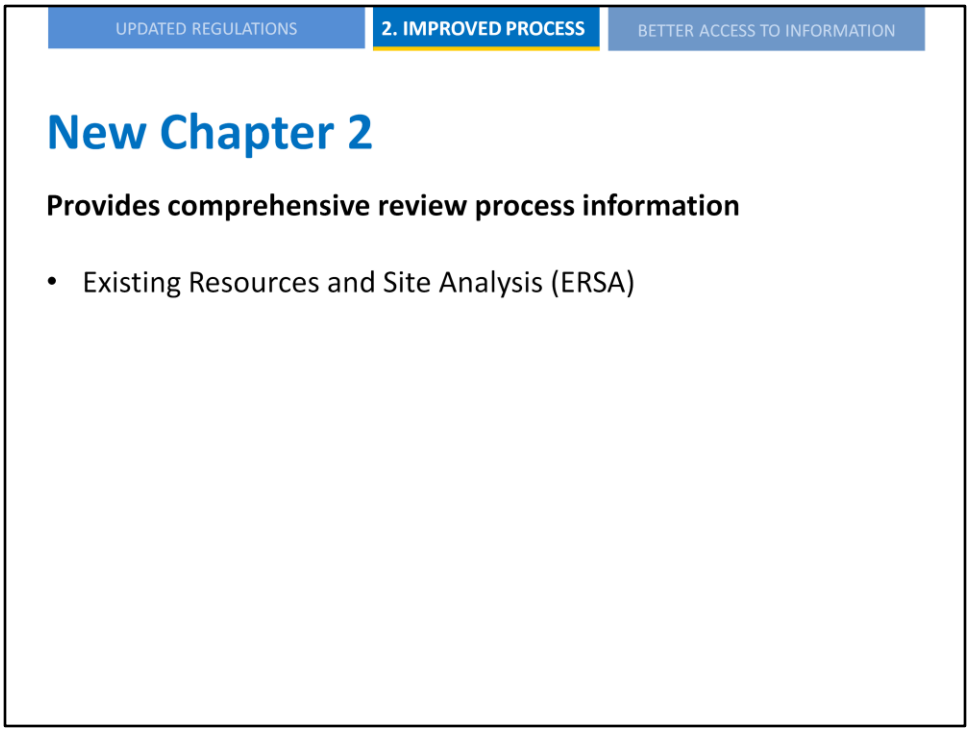



Chapters 1 and 2 from the Version 2.1 Manual were consolidated into the new Chapter 1, Regulatory Requirements. The information from Chapter 5 has been moved into the new Chapter 2, with greatly expanded content for all submission, review and approval procedures. Information from Chapters 3 , 4 and 6 were consolidated into the new Chapter 3, Site Design and Stormwater Management Integration. Stormwater management practices and related landscape guidance from Chapters 7 and 8 were consolidated into the new Chapter 4, SMP Guidance.

An Introduction, providing the regulatory context for Philadelphia's stormwater management program, and two new chapters (5 and 6) were added. Some of the construction and post-construction content contained in Chapters 5 and 6 did exist in the previous version of the Manual, but it was scattered throughout. These new dedicated chapters to Construction and Post-Construction activities includes more detailed guidance and has been geared toward contractors and property owners.




Chapter 1 identifies three factors that affect a project's applicability to the Stormwater Regulations. Section 1.1 provides detailed information for each factor (development type, watershed and earth disturbance), while Section 1.2 describes the requirements of the Stormwater Regulations. After reading the Chapter, an applicant will be able to determine which of these requirements must be met, and where they can go in Chapter 2 to understand submission procedures and submission package requirements.



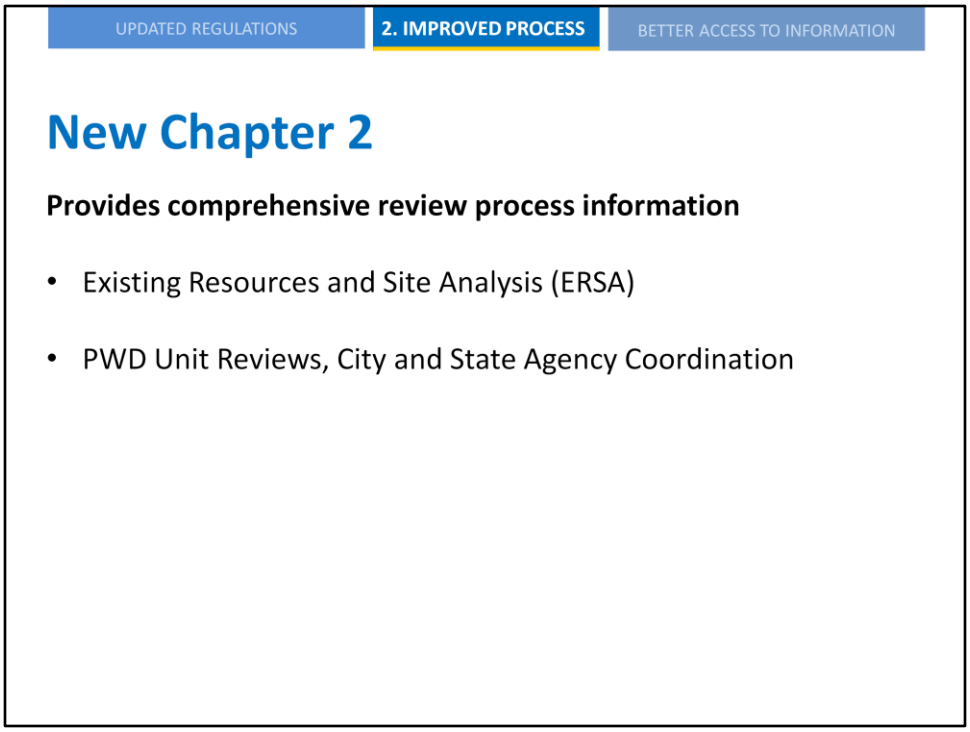

In Version 3.0, Chapter 2 represents a dedicated resource for all submission, review and approval procedures associated with Stormwater Plan Review. This chapter provides applicants with an understanding of how the applicable Stormwater Regulation requirements affect the submission and review process for his or her project.

Section 2.1 – Describes the ERSA Application and submission requirements

USER FEEDBACK:

*“Improve coordination within PWD.”*

—Focus Group Member




Stormwater Plan Review has heard consistent feedback regarding improvement to internal unit coordination. The revised Manual includes three sections on the broader development review process within PWD, the City, and at the State level.

Section 2.5 – Describes the PWD units involved in the permitting process, the types of permits and approvals issued by these units and how they may interact with the Stormwater Plan Review process

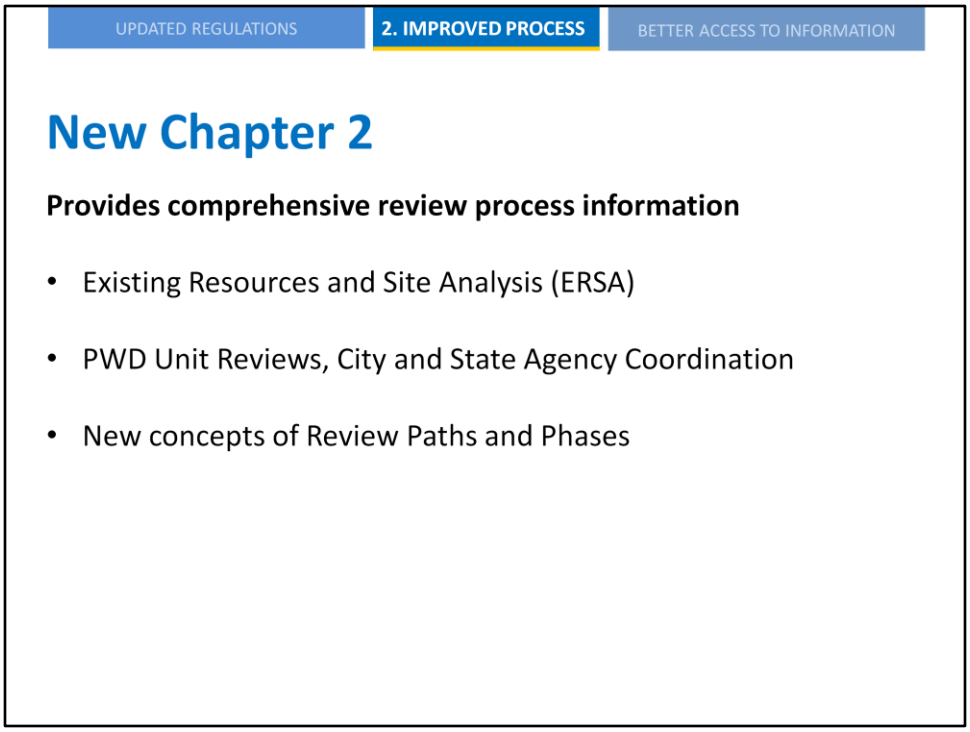
Section 2.6 – Describes PWD's interaction and coordination with other City departments that play a role in Philadelphia's development process.

Section 2.7 – Describes how PWD and PADEP coordinate the review and approval of development in the City.

USER FEEDBACK:

*“Need better checklists throughout the process. Need flow charts for what’s expected.”*

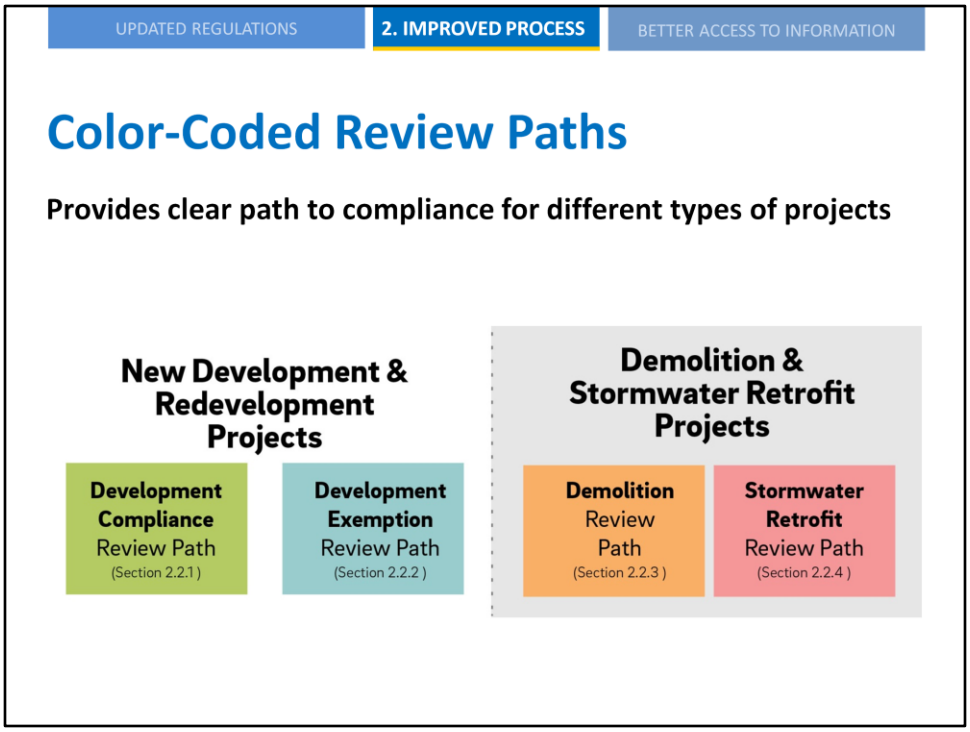
—Guidance Manual Interview




With the creation of a new chapter for submission, review and approval procedures, PWD clarified the types of reviews conducted by Stormwater Plan Review by establishing Review Paths and Review Phases.

Section 2.2 – Describes the four Review Paths that represent a series of submissions, reviews and approvals the applicant will navigate to demonstrate a project's compliance with, or exemption from, the Stormwater Regulations.

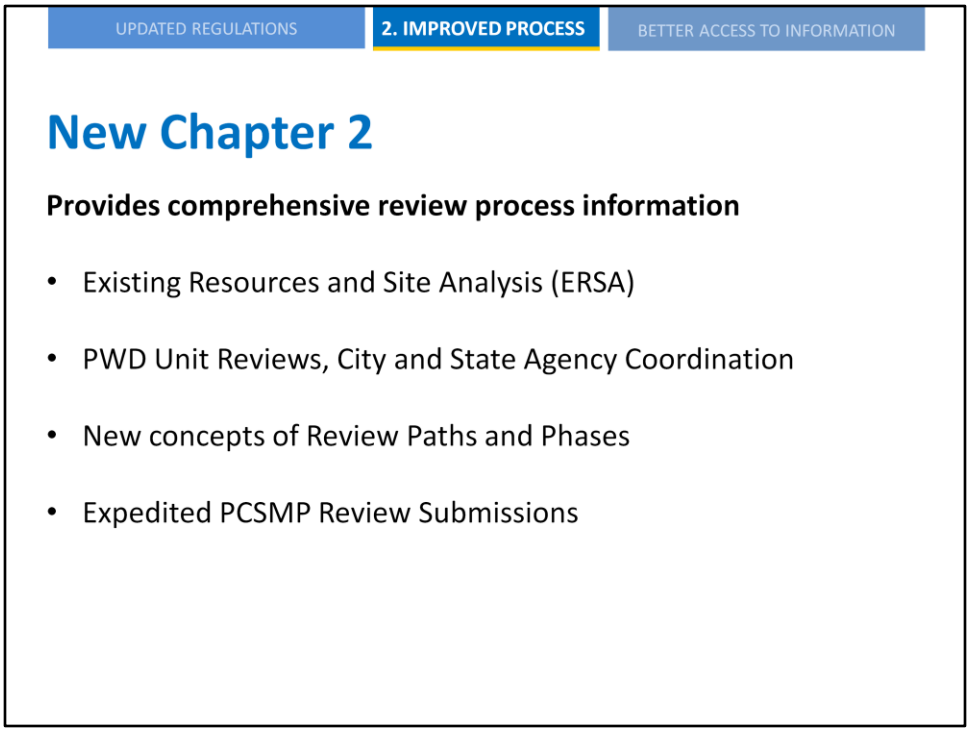
Section 2.3 – Describes the Review Phases within each Review Path, and identifies the submission requirements associated with each Phase.




Once a Review Path is determined using the information from Chapter 1 and Section 2.1, the applicant can quickly identify relevant information on submission and approval requirements based on the color-coded Review Paths. The color code is maintained throughout Chapter 2.

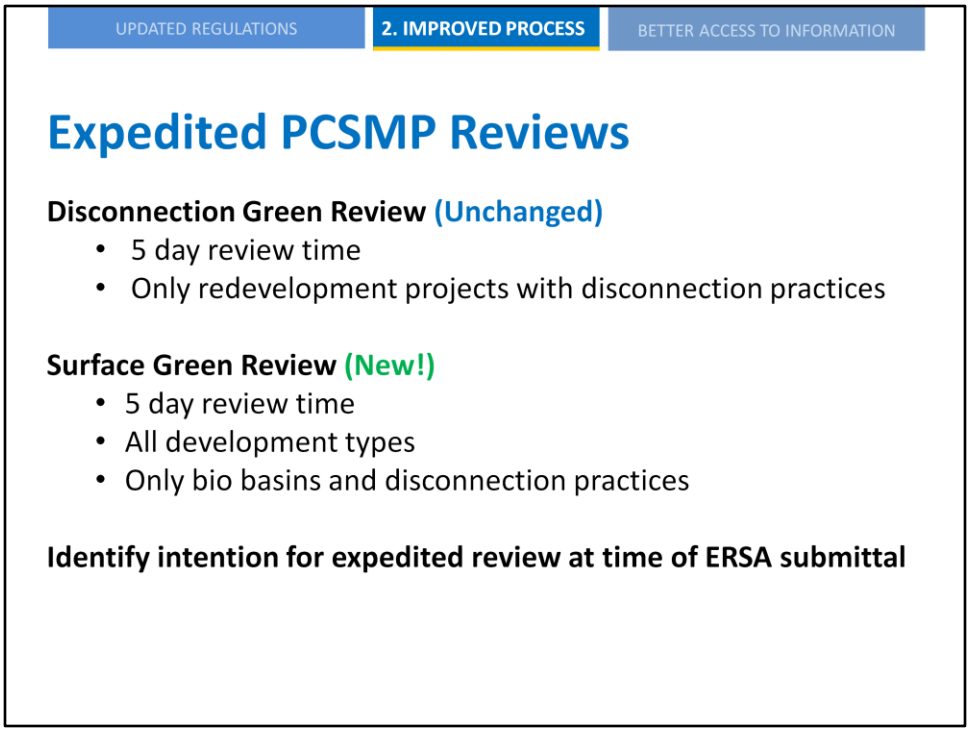

Each Review Path has specific, clearly identified review phases. The color code makes it easy to locate both the flow charts and related content within Chapter 2. In addition to these straightforward Review Path graphics, each Review Phase is also represented in a process flow chart within Section 2.3.


Review Phase Submission Checklists are included for each Review Path and assist applicants in compiling a complete submission package. These checklists are supplemented by Appendix E, Plan and Report Checklists, which provide itemized submittal requirements for plans and reports. By ensuring that plans and reports meet the requirements identified in these checklists, the applicant can streamline his or her project review.




The previous version of the Manual contained a brief paragraph summarizing the expedited Green Project Review. For the revised Manual, PWD created an entire section within Chapter 2 dedicated to discussing the submission process and submission requirements for expedited reviews.

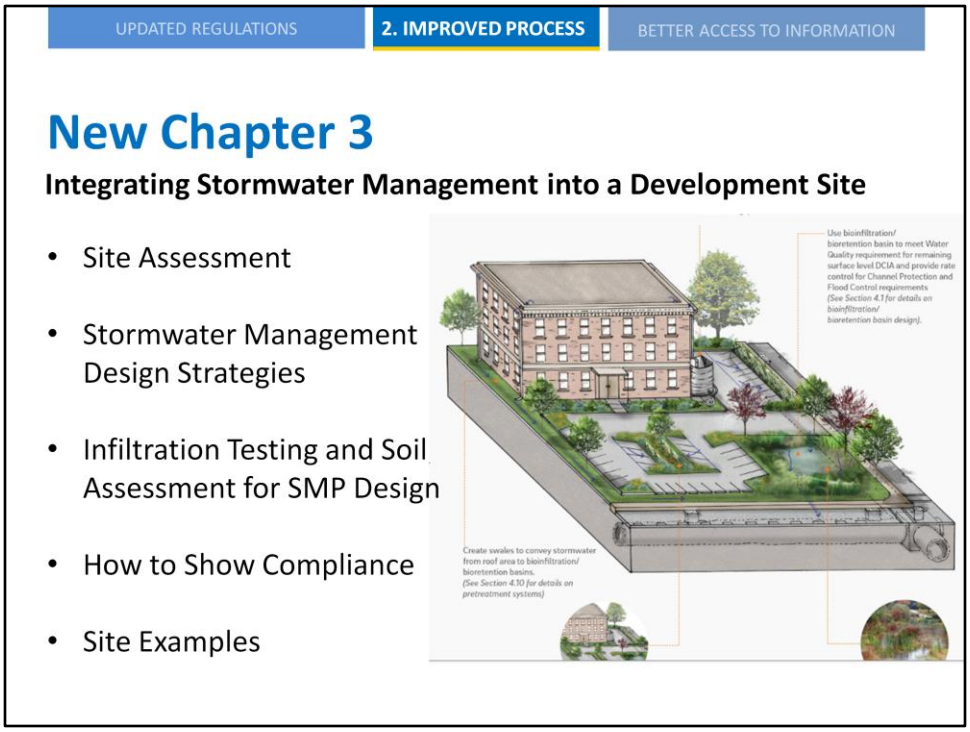
Section 2.4 – Describes Expedited Post-Construction Stormwater Management Plan Reviews and how to identify whether a project is eligible




The existing "Green Project Review" has received a new name that better reflects the type of practices eligible for the expedited review: "Disconnection Green Review."

In order to incentivize PWD's preferred stormwater management practices, a new expedited review was developed as part of the regulation update. The new "Surface Green Review" maintains the expedited 5 day review time, but expands the number of projects eligible for an expedited review. Surface Green Reviews are open to all development types that integrate bioinfiltration/bioretention basins and disconnection practices into the site design.

A new feature of the ERSA Application allows applicants to identify whether they intend to qualify for an expedited review.

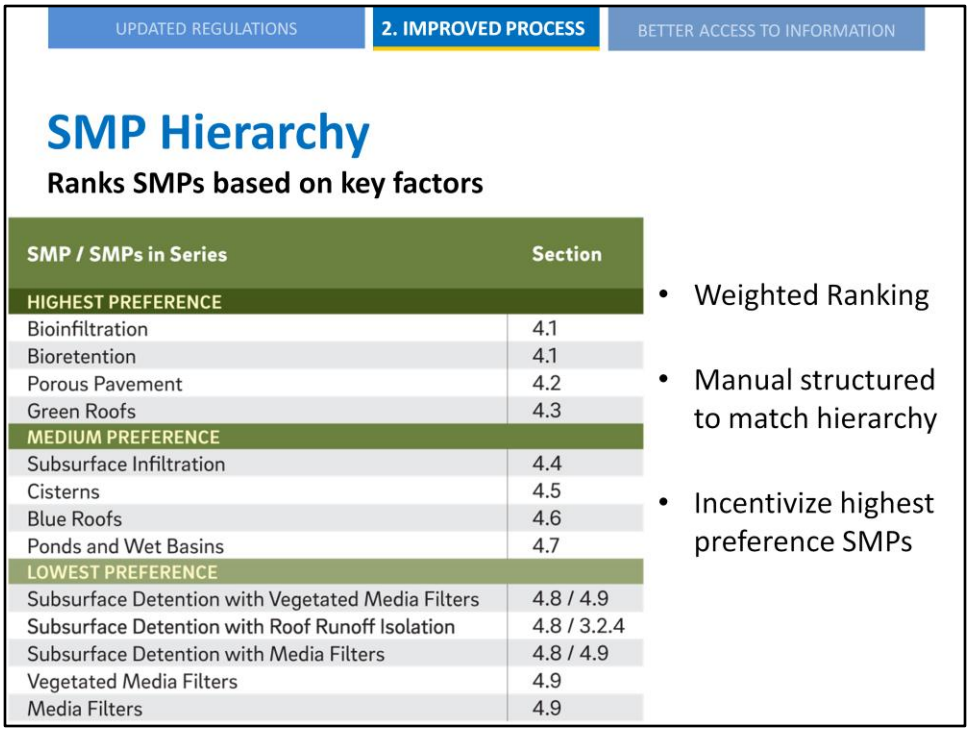



Chapter 3 guides the designer in successfully incorporating stormwater management into development site designs, while meeting the Stormwater Regulations. The chapter is organized to step designers through site assessment and an integrated design approach: non-structural design, disconnected impervious cover opportunities and finally, stormwater management practice selection, layout and design.

In addition, Chapter 3 includes comprehensive infiltration testing guidance – information that was previously located in an Appendix and deferred to PA DEP guidance. During the revision process, PWD heard that many users wanted this information accessible within the Manual, rather than referring them to external resources. As a result, PWD coordinated with PA DEP in developing robust infiltration testing guidance.

A new section provides step-by-step guidance on how to demonstrate compliance with the requirements of the Stormwater Regulations. PWD developed this section so that designers can ensure they have demonstrated compliance at the time of submission.

Lastly, Chapter 3 offers development site examples illustrating the stormwater management design strategies mentioned earlier in the Chapter.




Since the Stormwater Regulations went into effect in 2006, PWD has frequently heard requests from applicants to identify the types of stormwater management practices the department would like to see. As a result, PWD conducted an analysis using weighted ranking factors to establish an SMP Hierarchy. The ranking criteria considered factors important to the department, such as performance, as well as factors important to the development community, such as costs to install and maintain. A discussion of these factors is located in Section 3.2.4.

During the revision process, PWD structured the organization of Chapter 3 and Chapter 4 to reflect the SMP Hierarchy in an effort to promote the use of the most preferred SMPs.

PWD's most preferred practices include Bioinfiltration/Bioretention Basins, Porous Pavement and Green Roofs. These practices receive incentives to encourage their integration into site designs through expedited reviews and standardized design tools.

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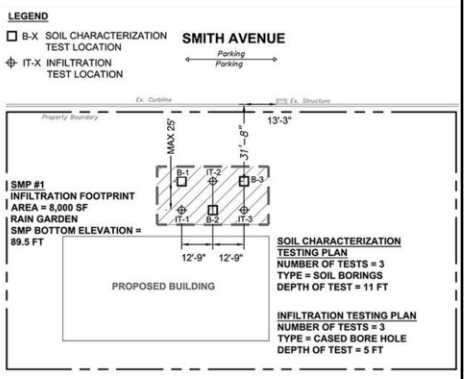
# Infiltration Testing

**Revisions to Infiltration Testing and Enhanced Guidance**

- Reduce minimum infiltration rate from 0.5 inches per hour to 0.4 inches per hour
- New Documented Procedure for Cased Borehole Infiltration Method
- Example soil characterization and infiltration testing plan
- Standard Infiltration Testing Log in Appendix

**Testing Location Plan**

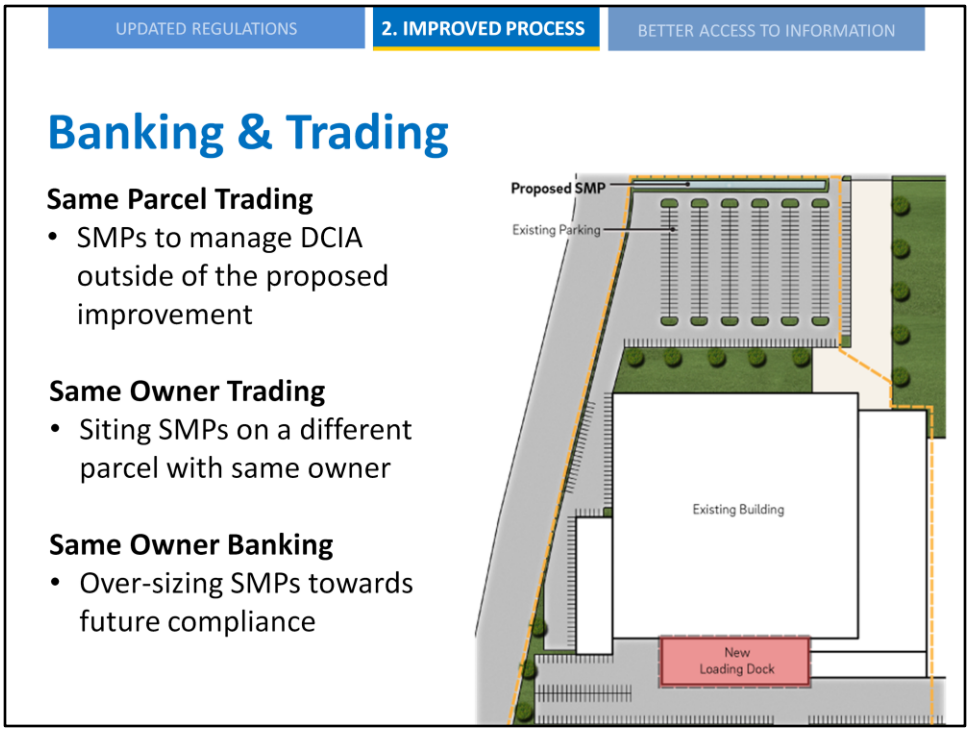



Section 3.3 provides detailed and enhanced infiltration testing guidance with the goal of reducing the number of times the applicant must return to the field for more testing. By reducing the allowable minimum infiltration rate, more areas will now be eligible for PWD's preferred infiltrating SMPs.

During the revision process, PWD expanded the available testing methods to include Cased Borehole. The Cased Borehole method allows applicants to perform testing in confined or constrained environments. However, use of the Double-Ring Infiltrometer testing method is encouraged as this is still the preferred testing method by PWD. The percolation test was removed and is no longer acceptable testing method.

The new Manual includes an example soil characterization and infiltration testing plan which can be used by applicants as a guide when preparing for geotechnical investigation at the site.

The Infiltration Testing Log provided in Appendix H is required to be completed and submitted as part of the PCSMP submittal. The log provides Stormwater Plan Review staff with a standard format to review testing results, which highlights critical information to facilitate the review process.




Since the Stormwater Regulations went into effect in 2006, stormwater banking and trading approaches have been integrated into sites on a case by case basis. PWD recognizes that flexibility in the location of SMPs can help severely constrained sites better comply with the stormwater management requirements. To better facilitate this, Stormwater Banking and Trading is now addressed in the Manual, illustrating three different approaches. If an applicant intends to utilize a stormwater banking or trading approach as part of their compliance strategy, it must be proposed to PWD as part of the Conceptual Review Phase.

The image shown illustrates Same Parcel Trading. Existing constraints on-site precluded management in the area of the new loading dock. Instead, runoff from an existing undisturbed parking lot at the top of the site is managed. The management trade is happening within the same parcel, but an area outside of the project's limit of disturbance is managed.

Same Owner Trading has been used infrequently in the past, but works best when the parcels are located within a close proximity to each other. Same Owner Banking is especially suited to large institutional campuses where master plan for development is implemented over a period of time.

USER FEEDBACK:

> *Interpretation of guidelines and requirements is a challenge.*

—Focus Group Attendee

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## New Chapter 4

**SMP guidance and design requirements in standardized format**

- Advantages, Limitations, and Design Considerations
- Design Standards – Clarified Requirements vs. Recommendations
- Construction and Maintenance Guidance
- SMP One-Sheets, Renderings, and Standard Details

An example of a green roof in Philadelphia

Chapter 4 includes guidance on stormwater management practice design and was revised using a standardized format. Composed of nine SMPS and three sections on SMP features (pretreatment, inlet controls and outlet controls), Chapter 4 discusses the advantages and limitations associated with each SMP and SMP feature, while providing a series of recommendations in the "Design Considerations" section.

Having heard consistent feedback on improving the distinction between design recommendations and design requirements, PWD focused on identifying requirements in the Design and Material Standards sections. Furthermore, the design requirements are sited using numbered bullets in order to streamline referencing and discussion during reviews.

As with the previous Manual version, Chapter 4 includes construction and maintenance guidance specific to each SMP and SMP feature.

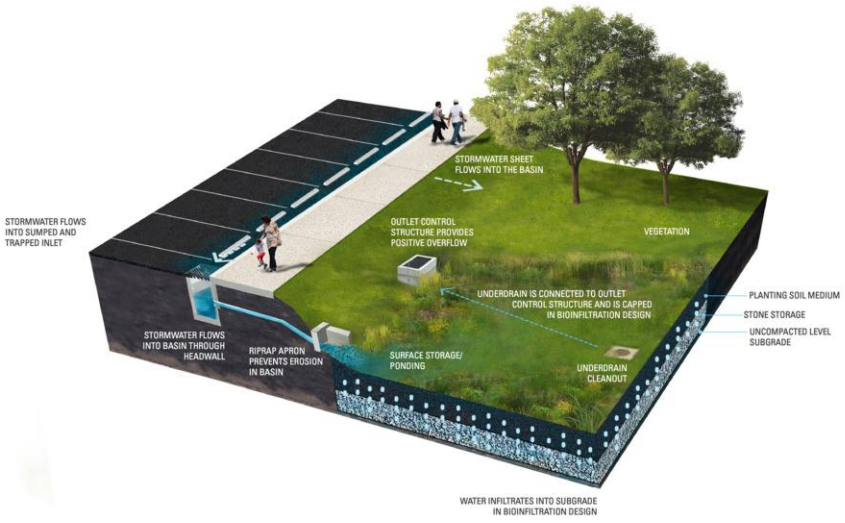
New resources were developed to complement the design guidance presented in this chapter. These include SMP One-Sheets, isometric renderings illustrating typical features and standard details for PWD's most preferred SMPs.

# New SMP One-Sheets



As part of the revised Manual, SMP One-Sheets were developed to highlight development and compliance attributes in a simple format as a resource for members of the development community. Easily downloadable from the website, these cut sheets can be brought to meetings with clients to facilitate discussions on SMP selection and design.

# Bioinfiltration/Bioretention Rendering




Renderings are provided for each SMP to show components and also help applicants to visualize how SMPs could look on their site.

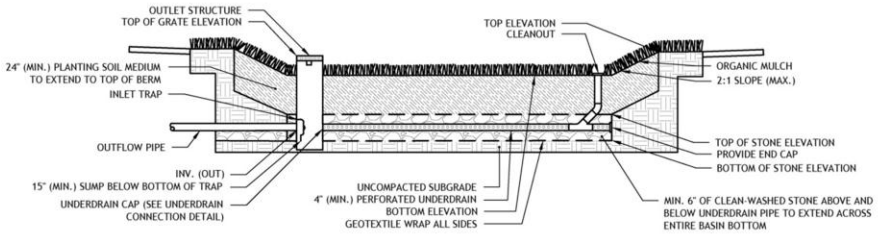
USER FEEDBACK:

*“It goes to standard details and standard comments. Make the process as standard as possible.”*

—Focus Group Member

# Standard Details

DATE: July 01, 2015 **BIOINFILTRATION/BIORETENTION BASIN DETAIL** **FIGURE ___**




Standard details were developed for PWD's most preferred SMPs in the hierarchy, including Bioinfiltration/Bioretention, Porous Pavement, and Green Roofs. A standard detail for Subsurface Infiltration was also developed as this is a frequently used SMP. All the standard details are available for download in both CAD and .pdf formats.

A new feature of the Bioinfiltration/Bioretention Basin Detail is the inclusion of an underdrain within the stone section beneath the soil storage. This modification to bio-basin design comes as a result of what PWD has learned from it's capital stormwater infrastructure program, where PWD has been installing and maintaining these types of SMPs. The inclusion of an underdrain ensures that the bio system can be easily retrofitted from an infiltrating system to a slow release system. For systems able to infiltrate, the underdrain remains capped. Where infiltration is not feasible, or should an infiltrating system lose functionality over time, a hole can be drilled in the capped underdrain converting the basin to a slow release system.

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# Water Quality Bio Basin Sizing Table

**Represents the minimum design requirements**

- In combination with Standard Detail, ensures Water Quality compliance
- Credits soil storage volume
- Option to postpone infiltration testing

| DCIA Drainage Area Range ($ft^2$) | Maximum DCIA Loading Ratio | Underdrain Orifice Diameter (inches) |
|---|---|---|
| 0 - 17,000 | 16:1 | 1/2 |
| 17,000 - 24,000 | 16:1 | 5/8 |
| 24,000 - 33,000 | 16:1 | 3/4 |
| 33,000 - 43,560 | 16:1 | 7/8 |

In order to facilitate and incentivize the use of Bioinfiltration/Bioretention basins, PWD developed a Water Quality Bio Basin Sizing Table that can be used in conjunction with the standard detail to meet the Water Quality storage and rate requirements. Similar to the Bioinfiltration/Bioretention standard detail, this table was developed based on the implementation of PWD's public green stormwater infrastructure projects.

The sizing table is applicable to an infiltration or slow release system, whereas a hole can be drilled in the capped underdrain based on the diameter size provided in the table. When used in combination with the standard detail, applicants have the option to postpone infiltrating testing until construction.

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## New Chapter 5

**Comprehensive construction guidance**

- Overview construction inspection process
- Common E&S and SMP construction issues
- Required construction documentation

An example of infiltration area protection during construction in Philadelphia

In the revised Manual, Chapter 5 is dedicated to construction guidance and provides information on what to expect from PWD during active construction. This chapter provides a general overview of the construction inspection process, from the pre-construction meeting to the final inspection at the completion of construction on-site. It includes discussion on common construction issues associated with Erosion and Sediment Controls and SMPs. Chapter 5 also includes detailed information about the required construction documentation to be submitted to PWD as part of project close-out.

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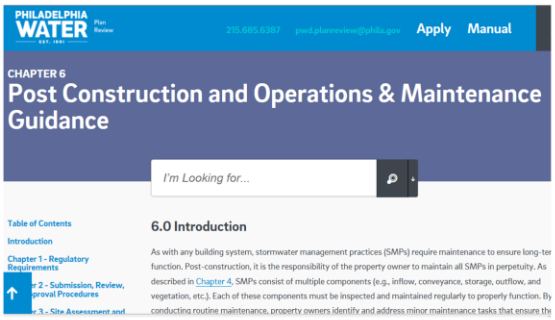
# New Chapter 6

**Post-construction guidance for property owners**

- Operation and maintenance, and inspection requirements for the property owner
- PWD inspections and enforcement process
- Stormwater Credits Program




As noted previously, there was limited information in the previous Manual regarding post-construction guidance. Chapter 6 was developed as resource for property owners as well as design professionals and developers. PWD inspectors continue to verify performance after construction, and this chapter provides an overview of the post-construction inspection process as well as PWD's enforcement program. In addition to describing typical maintenance activities for property owners, Chapter 6 includes a discussion of the stormwater billing credit opportunities available to projects that meet the requirements of the Stormwater Regulations.

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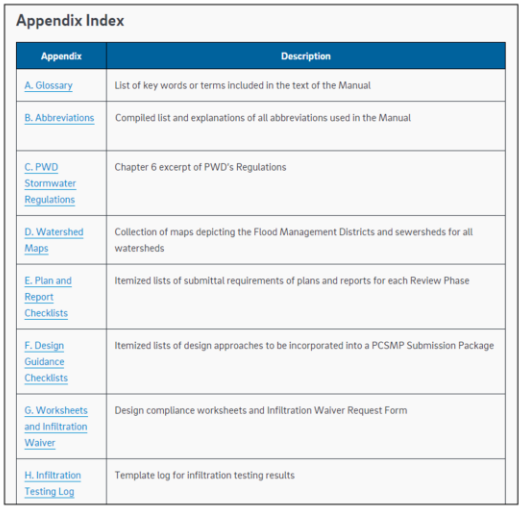
# New Appendices

- Plan, Report and Submission Package Checklists
- Updated Design Guidance Checklist
- Updated Design Compliance Worksheets
- Infiltration Testing Log
- Record Drawing Sample



Appendix Index

| Appendix | Description |
|---|---|
| A. Glossary | List of key words or terms included in the text of the Manual |
| B. Abbreviations | Compiled list and explanations of all abbreviations used in the Manual |
| C. PWD Stormwater Regulations | Chapter 6 excerpt of PWD's Regulations |
| D. Watershed Maps | Collection of maps depicting the Flood Management Districts and sewersheds for all watersheds |
| E. Plan and Report Checklists | Itemized lists of submittal requirements of plans and reports for each Review Phase |
| F. Design Guidance Checklists | Itemized lists of design approaches to be incorporated into a PCSMP Submission Package |
| G. Worksheets and Infiltration Waiver | Design compliance worksheets and Infiltration Waiver Request Form |
| H. Infiltration Testing Log | Template log for infiltration testing results |

In addition to the Glossary, Abbreviations, Regulations and Watershed Maps presented in the previous Manual, the revised Appendices include several new resources: downloadable checklists, worksheets, infiltration testing log and sample record drawings.

Appendix E: Plan and Report Checklists – Provides detailed and itemized lists of plan and report requirements.

Appendix F: Design Guidance Checklists – Previously known as the "Reviewer Guidelines," these checklists are used by Stormwater Plan Review staff during their review of the PCSMP submission. The checklists should be used by applicants to ensure their submissions demonstrate compliance.

Appendix G: Worksheets and Infiltration Waiver – Includes the updated PCSMP design worksheets in a single workbook, downloadable in Excel and PDF formats. The Infiltration Waiver is also available for download.

Appendix H: Infiltration Testing Log – Required format for presenting the results of infiltration testing, downloadable in Excel and PDF formats.

Appendix K: Record Drawing Sample – Identifies the typical features to be included in a record drawing submission.

USER FEEDBACK:

*“Reviews vary based on reviewer experience and interpretation.”*

—Focus Group Member

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- Plan, Report and Submission Package Checklists
- **Updated Design Guidance Checklist**
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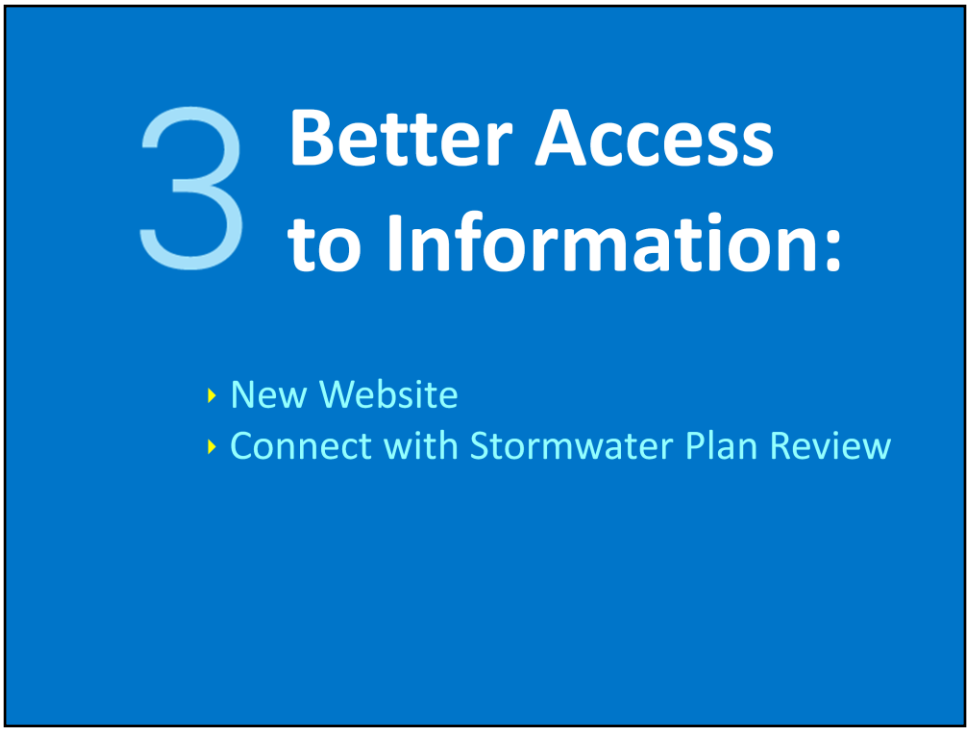
PWD strives to ensure all projects are reviewed the same, regardless of the assigned reviewer. An updated Design Guidance Checklist is provided in the Appendix, and is also used by PWD staff when reviewing PCSMP submissions.

# Questions

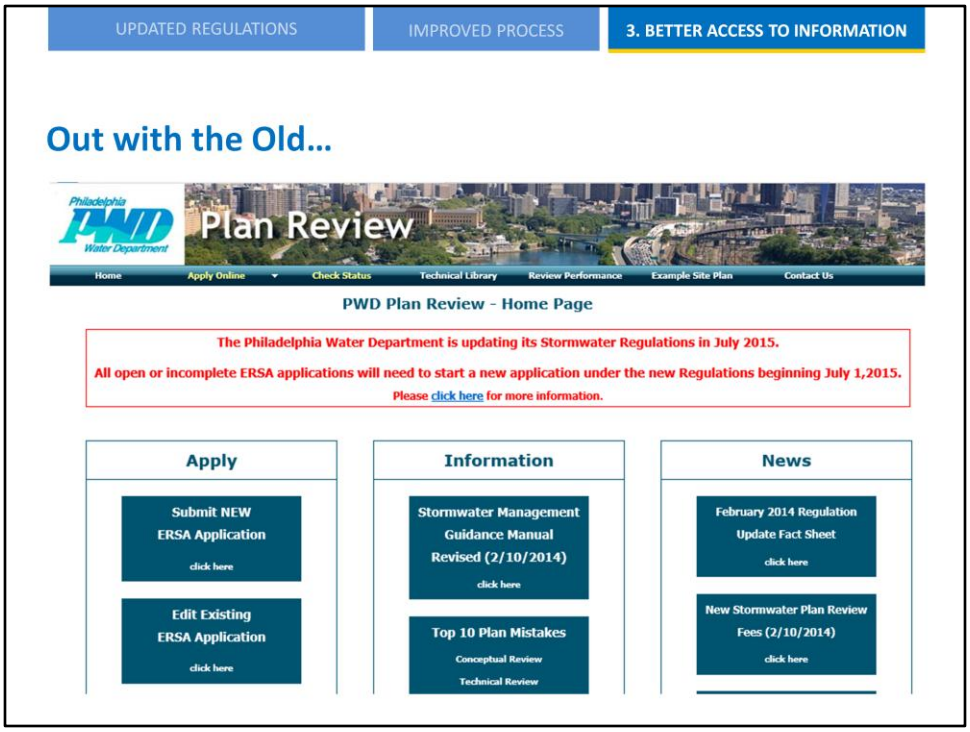



Philadelphia Water has spent a lot of time working through the Plan Review process and making sure that we had good resources for the Development Community. A major goal of the project was to make sure that we provided clear access to the information and resources that were developed. One of the ways we did that was through implementing a new website.

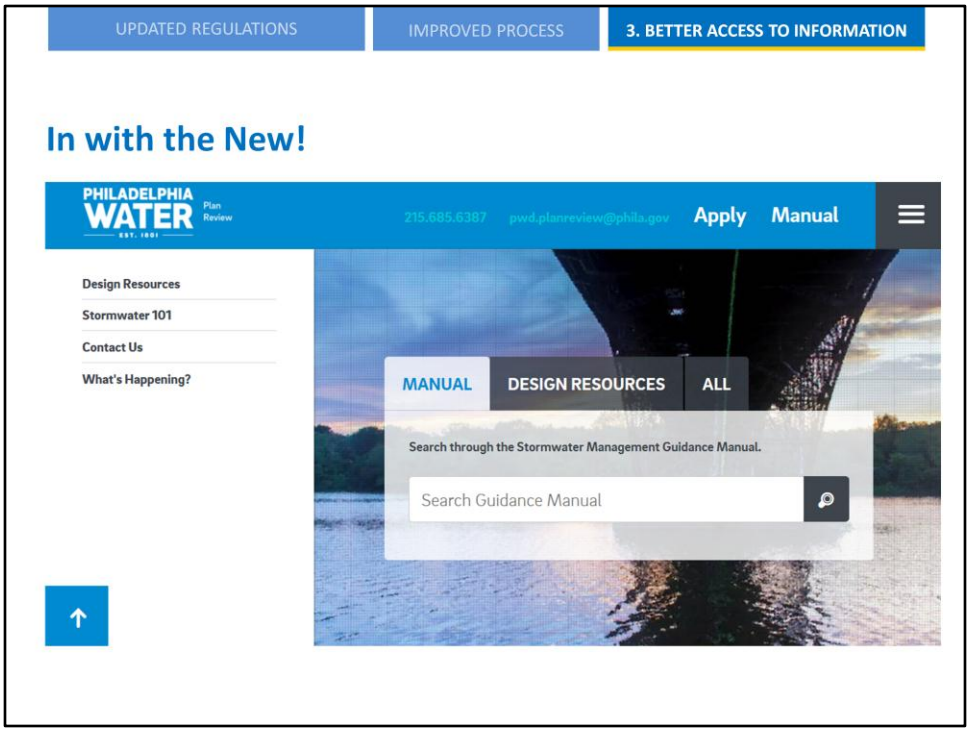
USER FEEDBACK:

*"Website needs to be improved and online submittal made more user-friendly."*

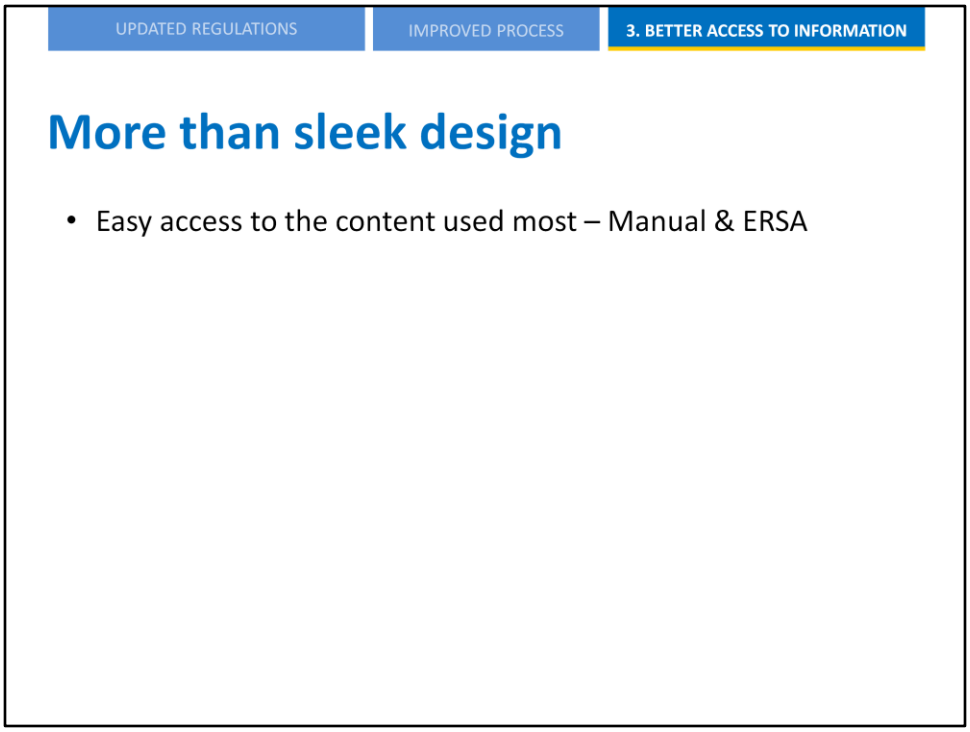
—Focus Group Attendee



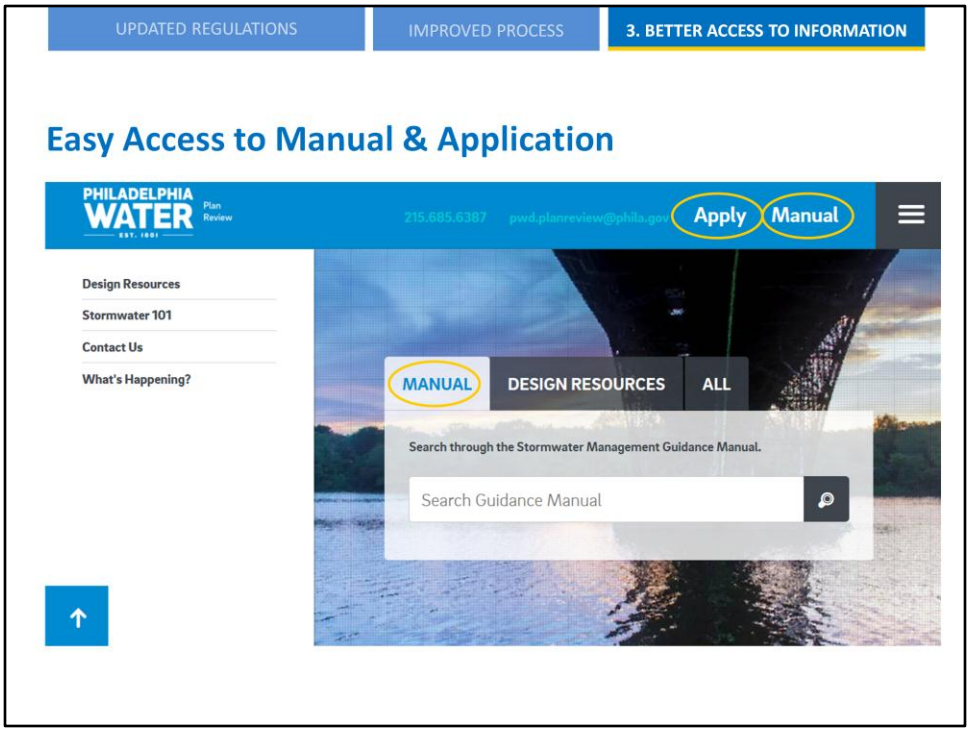

This is the old website; it was developed at the same time Philadelphia Water instituted the stormwater regulations. It has been updated slightly over the years, but not much.




This is the homepage of the new website, which will be officially launched on July 1 when the regulations go into effect.




The changes to the website were more than just a graphic update. We put a lot of thought into what information is needed on the web and how people can navigate to it. The Manual and ERSA are the most frequently used content, so both are easily accessed from the homepage.




First off, we know that people come to the site for 2 main reasons – to access the manual and complete and ERSA application. So these tools are right up front on the home page.

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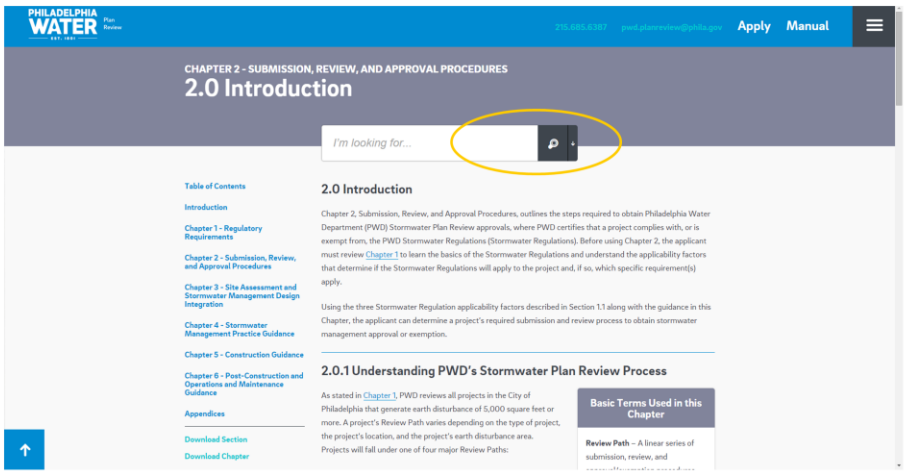
## Online Manual



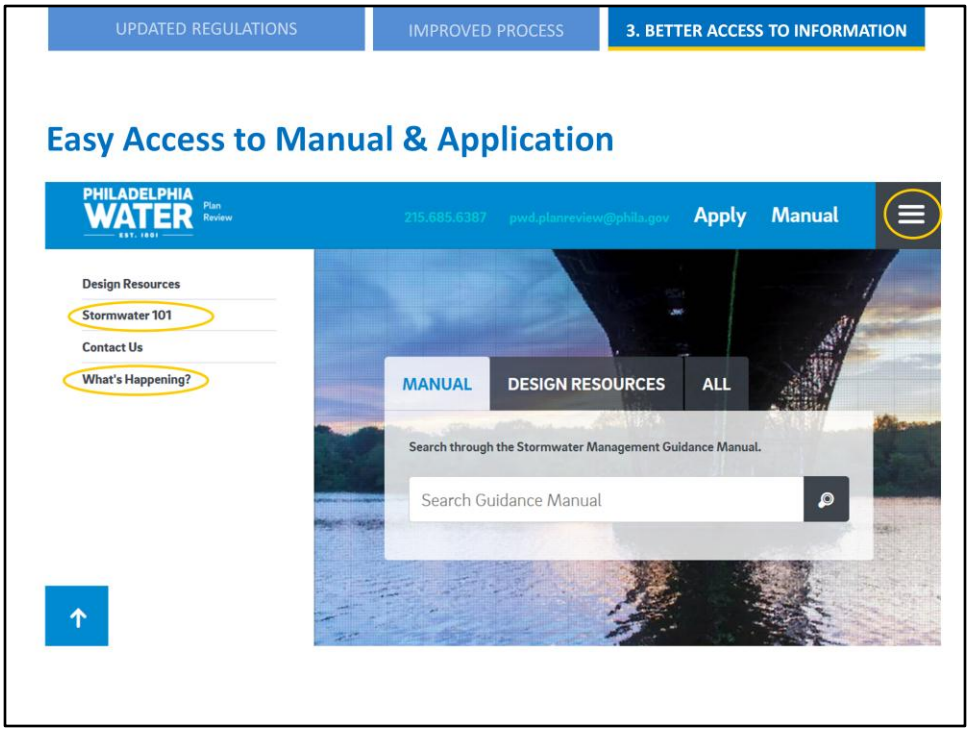

The manual is entirely online. This adds a significant level of functionality. Instead of downloading the manual to you computer and paging through like a book, you can search the manual directly on the website and you can easily link  between chapters and sections. Users can still download the manual from the website if they'd like and they have the option to download an individual section or chapter.

UPDATED REGULATIONS | IMPROVED PROCESS | **3. BETTER ACCESS TO INFORMATION**

## More than sleek design

- Easy access to the content used most – Manual & ERSA
- New content
  - Stormwater Management Background
  - Plan Review Process
  - Plan Review News

We added important new content. One of the things we heard through our focus groups is that we need information that introduces people to the concept of stormwater management and the Plan Review process. The Stormwater 101 page will be a good place to direct clients who don't have as much familiarity with the process in Philadelphia.




In addition to the Stormwater 101, the “What’s Happening/News” page will present the most up-to-date information related to the Stormwater Regulations and Plan Review process.

UPDATED REGULATIONS | IMPROVED PROCESS | **3. BETTER ACCESS TO INFORMATION**

# More than sleek design

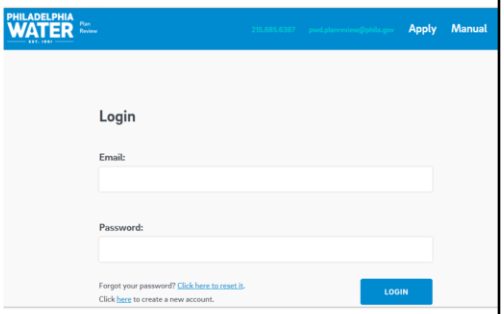
- Easy access to the content used most – Manual & ERSA
- New content
  - Stormwater Management Background
  - Plan Review Process
  - Plan Review News
- Redesigned ERSA Application

We made significant changes to the ERSA application.

UPDATED REGULATIONS | IMPROVED PROCESS | **3. BETTER ACCESS TO INFORMATION**

# ERSA Form

- Track multiple projects through one log-in
- Address book keeps data clean
- Conditional logic minimizes questions




First, we added a log-in feature where you can create an account. This will let one engineer track multiple projects because they will be tied to that log-in. Also, having an account/address book keeps the data clean so company names and addresses stay consistent. This is a benefit to Philadelphia Water and benefits the user because information will not have to be re-entered. Companies can decide whether they'd like to create a log-in for the company or for each staff member working on an application.

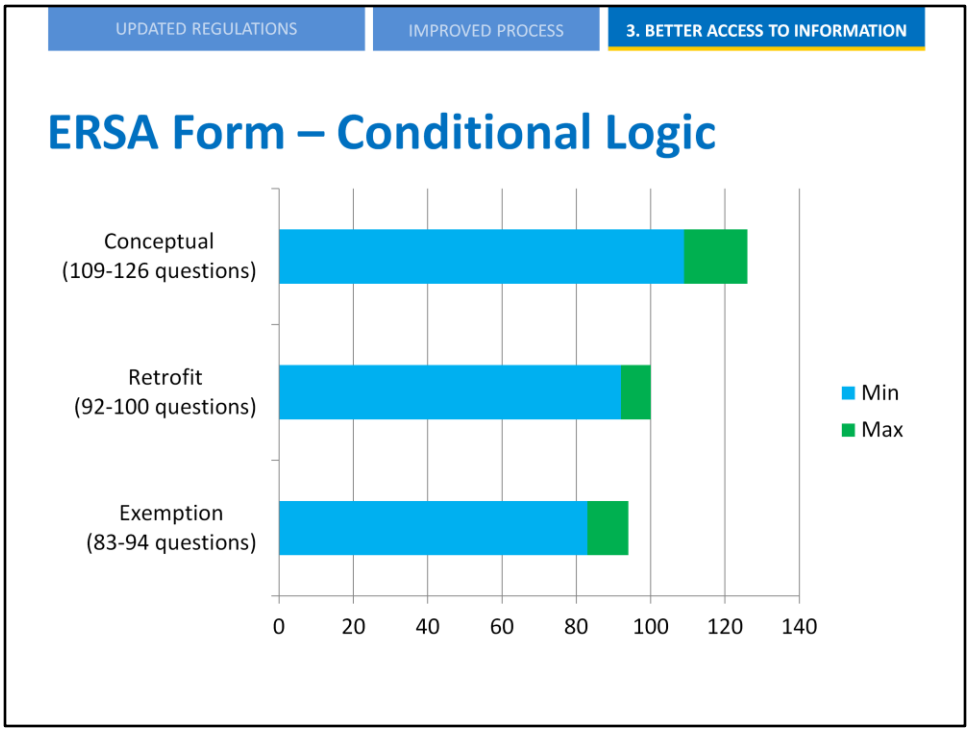
The last significant change is the ERSA form itself. We added conditional logic and aligned the form with the new Review Paths so you are only asked questions that are relevant to a type of project.

UPDATED REGULATIONS | IMPROVED PROCESS | **3. BETTER ACCESS TO INFORMATION**

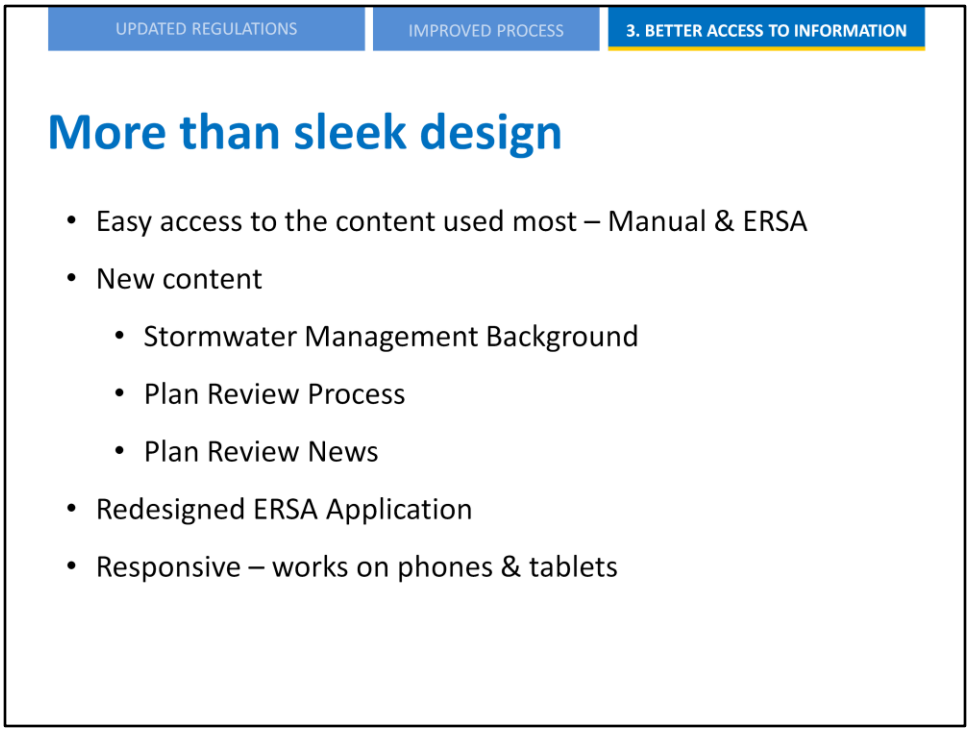
# ERSA Form – Conditional Logic

- **Old Form:** 118 fixed questions that every project answered
- **New Form:** Questions that don't apply don't appear
- **Two levels of logic:**
  - Project Type- Three key questions determine review path (conceptual, retrofit or exempt).
    - Development Type
    - Watershed
    - Total Earth Disturbance
  - Follow Up Questions
    - "If yes, please describe"

Logic is built into the ERSA form in two ways. First, there are three questions that determine your review path: earth disturbance; watershed; and development type. Then the number of follow up questions users are prompted to answer are based on project type.




This graph shows the approximate number of questions per review path.




The new website is responsive, meaning that it works just as well on phones and tablets, automatically adjusting the sizing of each page. We think users might want to use these mobile devices for quick reference or to show a client some of the resources available online.

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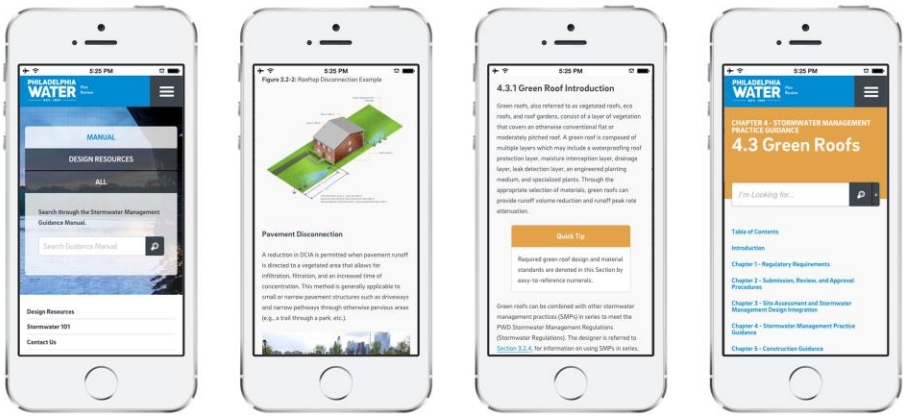
# Responsive Design - Adaptable to Mobile Devices



# Web Demonstration

All features will be live July 1, 2015

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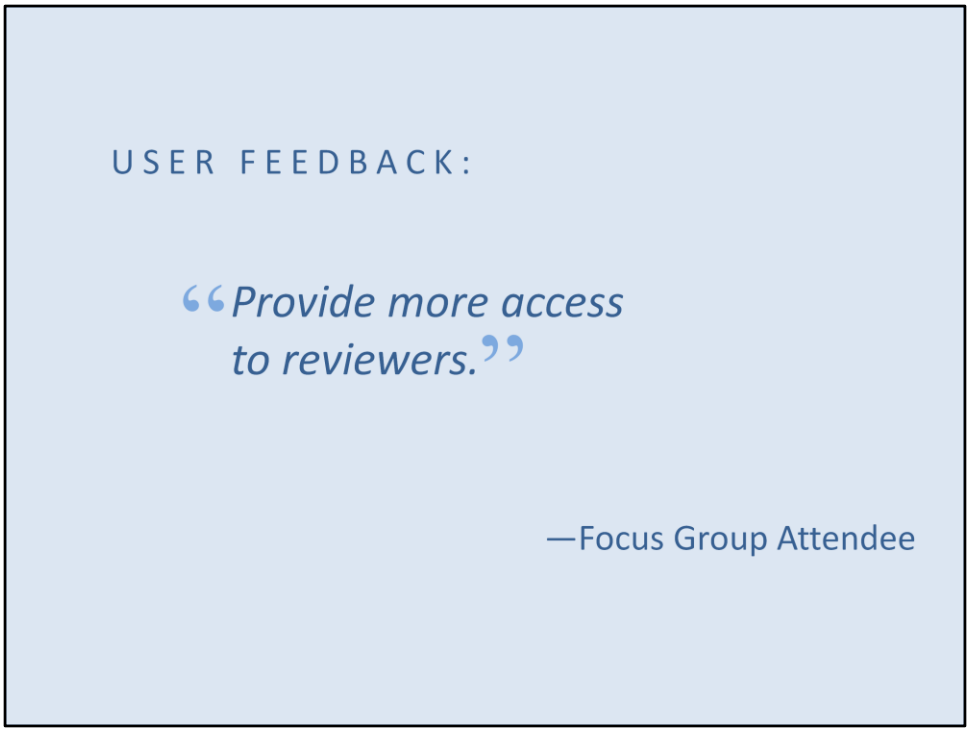
## More than sleek design

- Easy access to the content used most – Manual & ERSA
- New content
  - Stormwater Management Background
  - Plan Review Process
  - Plan Review News
- Redesigned ERSA Application
- Responsive – works on phones & tablets
- Multiple ways to connect with Plan Review staff

Lastly, we wanted to make sure people know how to get in touch with the Stormwater Plan Review unit if they have a question. We added our contact information to the top of the new website so it is always accessible.




Since the beginning of the Plan Review program we've heard that the development community would like more access to reviewers.

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## Connect with Plan Review

- Continuing walk-in hours on Tuesdays 11:00-1:00
  - Questions about a project or regulation changes
- Voluntary pre-application meetings by appointment
- Email from reviewer once project has been assigned
- Online comment form
- Contact Plan Review staff with questions (215) 685-6387 or pwd.planreview@phila.gov

Access to information is not just about the website. It's also about getting in touch with Plan Review. Philadelphia Water wants to make sure that the development community understands that we are accessible. Stormwater walk-in hours are continuing, an online comment form has been added to the website, people can make pre-application meetings by appointment if they would like, and staff is available by phone or email.

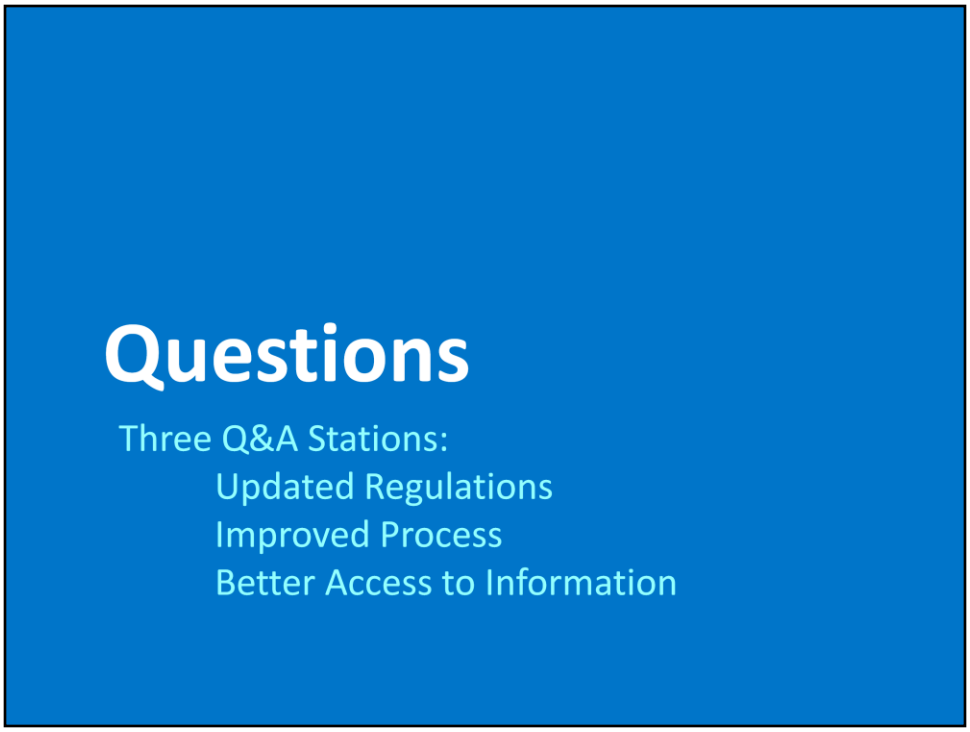
# Upcoming Outreach

- July 1, 2015 roll out of updated regulations, website, and guidance manual
- Information Sessions, 8:30-11:00, MSB, 16th Floor
  - Friday, June 19
  - Tuesday, June 23
  - Tuesday, June 30
  - Thursday, July 9
  - Thursday, July 16
- www.phillywatersheds.org/stormwaterregulations

## Top 5 Takeaways

1. Goals of the regulatory changes:
    - More water
    - Slower water
    - Cleaner water
2. New expedited “Surface Green Review”
3. Online, fully searchable guidance manual & smart ERSA form
4. New guidance on construction and O&M
5. More access to reviewers (and PWD in general)

Here are some of the top 5 key points to remember from today’s presentation.




We are going to break up into three different sections (technical changes, process changes, access to information) in case you have questions you want to ask in a smaller setting. Thank you very much for coming.