

# Developing a Municipal Downspout Disconnect and Green Infrastructure Program



## Introduction

Runoff from more frequent and higher intensity storms coupled with increased impervious surfaces are causing capacity problems at wastewater treatment plants. Nuisance flooding in roadways and basements is also a result of these storms and constraints on wastewater infrastructure capacity.

One solution that municipalities can use to address runoff is to implement residential downspout disconnect and green infrastructure programs. The result is cost savings for wastewater utilities and decreased combined sewer overflow and stormwater runoff in neighborhoods and local waterways.

## Why Encourage Downspout Disconnection and Green Infrastructure Installation?

Illicit sump pump, downspout, and other drain connections to sanitary sewer lines can overwhelm the capacity of treatment plants. By disconnecting unpermitted drains from the sanitary sewer, municipalities can reduce the volume of water unnecessarily sent to wastewater treatment plants and decrease energy costs and need for system improvements, which would be passed on to ratepayers.

Coupling a downspout disconnection with green infrastructure implementation can further strengthen community climate resiliency by: reducing localized flooding, decreasing polluted runoff into local waterways, retaining water for use by residents, and allowing water to percolate into the ground (see Figure 1). The purpose of installing green infrastructure is to retain residential runoff, that may have been previously entered the sanitary sewer system or directly discharged into waterways. Once water enters a green infrastructure installation, depending on the type of GI used, the water is slowly released back into local waterways, held for use—such as watering gardens—by the

resident, or allowed to percolate back into the groundwater.

Some municipalities are loathe to enforce disconnection of illegal connections of downspouts and sump pumps to the sanitary sewer system, in part, because people don't want the additional flows on their lots and are worried about basement flooding. Encouraging downspout disconnect without increasing green infrastructure to capture the runoff, the water that is diverted from the treatment plant into the storm sewer can result in an increase in flooding.

## Coupled Downspout Disconnection and Green Infrastructure Programs

Municipalities of all sizes can successfully design and implement a downspout disconnect and residential green infrastructure program. This guidance scales some of the practices and lessons learned from these cities down to guidance for smaller municipalities. Currently, such disconnect programs are primarily undertaken in large cities— see Case Studies (Appendix C) for municipal disconnect programs.

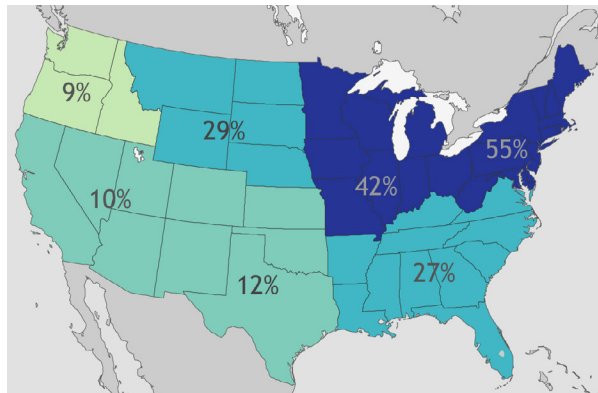
Inflow reduction and green infrastructure programs generally provide either financial or technical support – or both – to residents. In instances where the municipality has an existing ordinance prohibiting unpermitted connection to sanitary sewer lines, some municipalities have instituted an ‘amnesty period’ during which property owners could contact the city for assistance without any legal repercussions for illicit connections. This amnesty period should last at least 6-12 months to allow time for homeowners to learn about and participate in the program. Upon conclusion of the amnesty period, the municipality can then assess any fines that would normally be associated with an illicit sanitary sewer connection.

### More Downpours for the Northeast

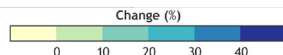
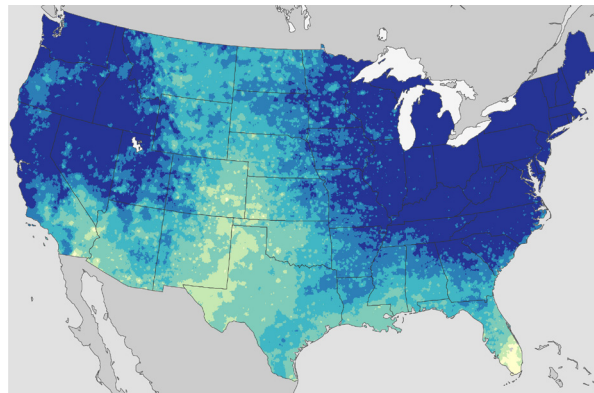
Public programs to disconnect downspouts from sanitary sewer lines and install green infrastructure will help municipalities adapt to a changing climate. According to NOAA<sup>1</sup>, “extreme precipitation events have grown more

frequent since the start of the twentieth century, and such events are likely to become even more frequent over the twenty-first.” This trend is seen strongly in the Northeastern United States, see the figures below<sup>2</sup>.

**Observed recent change** in extreme precipitation, 1958-2016

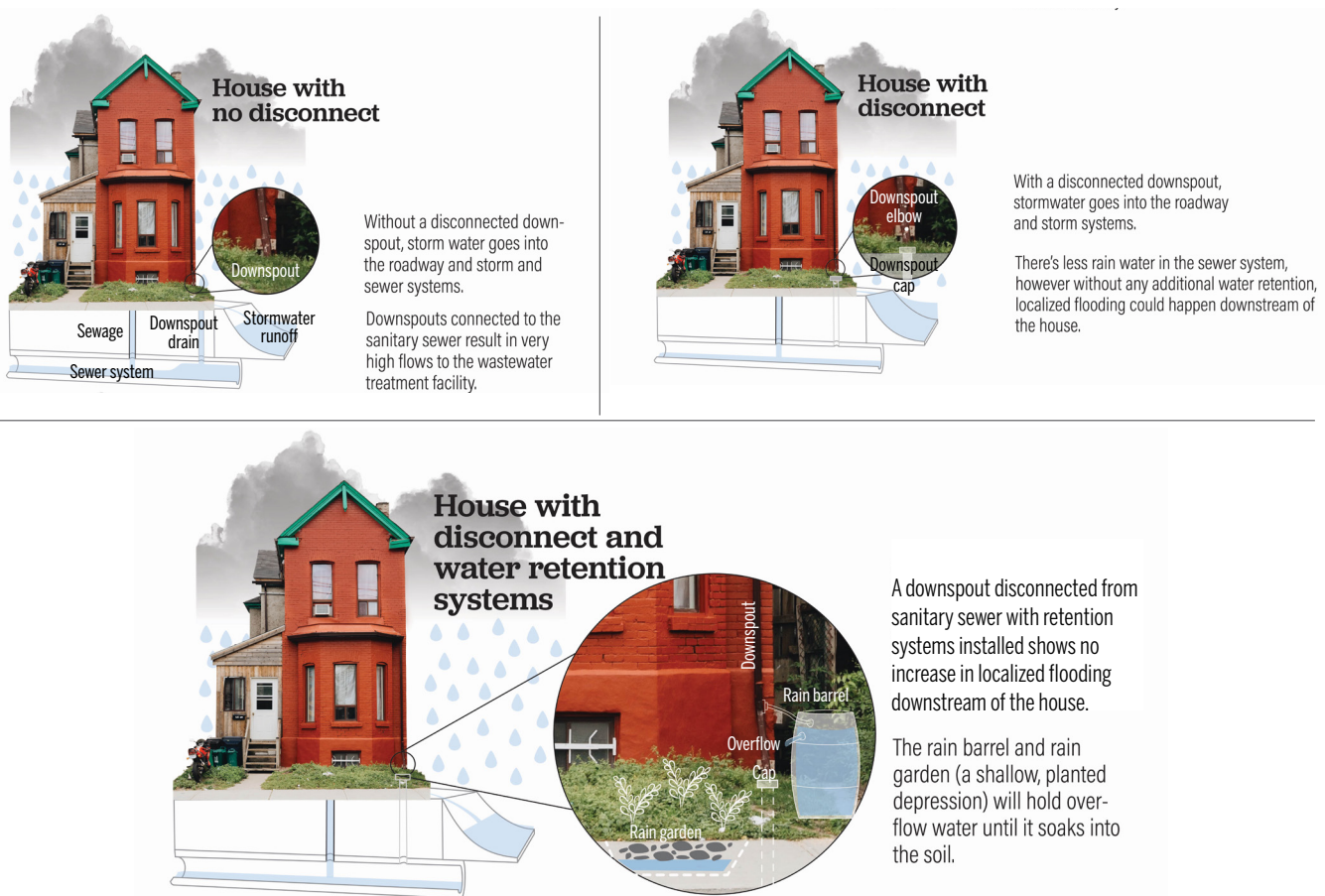


**Projected future change** in extreme precipitation by the late 21st century (higher emission)



<sup>1</sup> Scott, M. 2019 July 10. Prepare for more downpours: Heavy rain has increased across most of the United States, and is likely to increase further. NOAA Climate.gov. <https://www.climate.gov/news-features/featured-images/prepare-more-downpours-heavy-rain-has-increased-across-most-united-0>

<sup>2</sup> Image credit: NOAA Climate.gov Fourth National Climate Assessment

**Figure 1**

## Program Development Step-by-Step

### 1. Determine Baseline and Estimate Targets

Prior to designing a downspout disconnect/green infrastructure program, the community should first determine a baseline estimate of the number of properties with stormwater connections to the sanitary sewer. After this baseline has been established, the number can be used to create program milestones and goals, such as a target number of properties that will be disconnected from the sanitary sewer as a result of the program.

### 2. Determine Budget

The overall cost of a downspout disconnect/green infrastructure program will vary with the size, scope, and duration of program. However, even municipalities with limited budgets can create and implement an effective program. A program focused only on education/outreach/ providing technical documentation will be lower cost than a program that provides financial incentives or conducts inspections and installations, which would require dedicated staff (in-house or contracted).

### 3. Determine Program Structure and Administration

All programs should be developed with meaningful participation, input, and feedback from local stakeholders, and tailored to local needs and priorities. Program managers should consider and incorporate local environmental justice issues throughout the design and implementation, and should remain central to programmatic decisions<sup>3</sup>.

The municipality should first determine the structure of the program, including how the program will be administered, the program budget, the types of financial and technical support to be offered, and program goals.

Small and large-scale options are presented below, but municipalities may opt for a program that incorporates components from multiple categories. Program administration is a key component of the success of the initiative, and so the municipality should determine this framework early in the program design process.

#### “In-house” administration vs. contracted, or a little of both:

The municipality may opt to manage and administer the program in-house, or may choose to work with subcontractors/non-profits. For programs that focus primarily on education or strictly providing technical documentation (explained further below), it may be feasible for an existing municipal staff person to manage these efforts. If inspection and installation tasks are involved, the municipality may prefer to contract or partner with a local vendor or organization.

#### Voluntary vs compliance-based programs

Municipal administrators can determine whether the program will be voluntary, incentive-based, or if it will be tied to enforcement of existing ordinances regarding “illicit connections.” Some municipalities have local ordinances in place which prohibit unpermitted connections to the sanitary sewer, and use enforcement of this ordinance as a method to encourage residents to comply. If there is not a local ordinance in place, the municipality may consider the effectiveness of passing and enforcing such legislation.

<sup>3</sup> Guidance regarding environmental justice specifically for local governments can be found in the 2015 EPA Local Government Advisory Committee’s EJ Best Practices for Local Government, accessed here: [https://www.epa.gov/sites/production/files/2015-10/documents/2015\\_best\\_practices\\_for\\_local\\_government.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/2015_best_practices_for_local_government.pdf)

## Types of Resources Provided

### Technical support documentation

Technical support may include published guidance documents, “how to” instructions for disconnecting a sump pump or downspout and redirecting it onto a lawn or other permeable surface, and information about stormwater management practices such as rain barrels or rain gardens. The program manager should also consider which languages the technical support documentation should be provided in, and ensure that these documents are provided from the outset of the program. See the Appendix at the end of this document for examples of technical support documentation.

### Financial support

Financial support may include incentives such as grants, rebates, or water bill reductions provided to property owners. For both grants and rebates, the municipality should ensure that the appropriate legal documentation is in place so that they or their intermediaries (in the case of sub-contractors, grantees, etc.) can process payments, subsidies, and reimbursements.

- **Grant:** municipality provides services (either directly or through a representative organization/contractor) at no cost to the property owner.
- **Rebate:** property owner has work completed independently, and municipality provides reimbursement of varying amounts after verification that work has been completed
- **Bill (fee or other charge) reduction:** A one-time or recurring reduction on a stormwater utility fee or other water treatment charge on a ratepayers monthly bill. In some cases, municipalities will determine the amount of the bill reduction based upon how much of the stormwater generated by the property is treated on-site.

If the program offers grants or rebates for installations, staffing requirements may need to increase because the need for work must be verified as well as the completion of the work, along with tracking and disbursement of grant or rebate funds, and verification of

## Case Study

City of Olean  
Cattaraugus County population 13,711 (2017)  
Southern Tier on the Allegheny River

For decades, during storm events the City of Olean discharges untreated sewerage into the Allegheny River. In response to an Order of Consent by NYS DEC for violations of the State Pollutant Discharge Elimination System (SPDES) regulations, which threatened over \$100 million in fees, the City of Olean instituted a program to detect and remove illegal connections to their sanitary sewer system. To demonstrate the impact of stormwater connections to the sanitary system, one example they give in their outreach material is “a typical eight-inch sanitary sewer can handle domestic sewage from up to 225 homes; however, it takes only five sump pumps operating at full capacity to overload an eight-inch sanitary sewer.” Olean adopted a sewer use ordinance in 2016 (Olean City Code of Ordinances, Section 27-43 and 44), which states that no new inflows can be added and existing inflows must be disconnected when the property is sold. It also lays out an Enforcement Response Plan with penalties for those who fail to comply with a notice to disconnect an illegal connection. The City can also charge for the discharges up to a rate up to five times the normal sewage rate.

maintenance (as necessary).

For more information about incentives and examples of approaches used by other municipalities, see the USEPA’s Municipal Handbook on Green Infrastructure Incentives<sup>4</sup>.

### Determine Tracking Approach

It is important to carefully track program activities including the number of participating properties and outreach efforts. A digital tracking system that is compatible with GIS (such as an Excel spreadsheet) may be all you need, but depending on the complexity or the regulatory nature of the program, an approach that integrates easily with wastewater treatment plant or budget and accounting software might require another approach.

## 4. Determine Timeline

Identify how long the program will be in place, and create an outreach schedule and milestones. For example, create an outreach start date, determine the length of the “amnesty period,” and, if relevant, determine the end date for active outreach and program recruitment.

## 5. Determine Target Audience

Identify which properties in the community will be targeted for disconnection: single family residential, multi-family residential, commercial, etc.

Determine whether there will be geographic priorities areas – e.g., locations with a particularly high number of connected properties, neighborhoods with historic flooding problems, or other issues that may make certain geographic areas a higher priority for program participation. If there are financial incentives, consider whether all participants receive the same support or if funding will be scaled or tied to whether a property is located within a high priority area, if relevant and appropriate.

## 6. Structure your Outreach and Engagement Efforts

Prior to program launch, reach out to and meet with key community stakeholders and present at community meetings. Use these presentations and conversations as an opportunity to take community feedback prior to finalizing the program implementation plan. See model 12-month outreach plan in the appendix.

### Examples of Outreach Materials and Guidance Documents

–should include program point of contact information:

- Web content, and a link to this page should be added to the municipality’s website
- Door-hanger style flier with information about the program
- One-page flier describing program for use at public events
- How-To/DIY Info Sheets with step-by-step instructions and photos for disconnecting sump pump or downspout – this should be posted online and available in hard copy for distribution at events

## Conclusion

Disconnected downspouts are an important piece of living in a community watershed, because when implemented correctly they will benefit sewer systems and, on smaller scales, home gardens. Municipalities can easily develop downspout programs through the series of steps outlined in this document.

<sup>4</sup> USEPA’s Municipal Handbook on Green Infrastructure Incentives. [https://www.epa.gov/sites/production/files/2015-10/documents/gi\\_munichandbook\\_incentives.pdf](https://www.epa.gov/sites/production/files/2015-10/documents/gi_munichandbook_incentives.pdf)

## Appendix A

### Technical Support Resources

#### Performing Disconnections

Disconnecting residential downspouts can be done by a professional plumber or by a home owner with simple tools and materials.

- <https://www.lcbp.org/water-environment/water-quality/stormwater/how-to-redirect-a-downspout/>
- <https://www.southhadley.org/DocumentCenter/View/810/Downspout-Disconnections-PDF?bidId=>

#### Residential Green Infrastructure Guidance

Below is information about some of the most common and useful green infrastructure practices. Prior to installing any of the practices listed below, property owners should ensure that all necessary permits and permissions are obtained. More information can be found through the Chesapeake Stormwater Network: <https://chesapeakestormwater.net/training-library/stormwater-bmps/>

#### Rain Barrels and Cisterns

Rain barrels and cisterns can be used to collect rainwater from rooftops, which can be used later to water gardens or other nearby vegetation. Rain Barrels/Cisterns Should...

- Be sized appropriately for roof area draining into barrel:
  - [https://www.lid-stormwater.net/raincist\\_sizing.htm](https://www.lid-stormwater.net/raincist_sizing.htm)
  - <https://www.montgomerycountymd.gov/DEP/Resources/Files/PostersPamphlets/rain-barrels-and-cisterns.pdf>
- Have screened openings to prevent mosquitoes/other bugs from breeding in the water, non-toxic mosquito “dunks” can also be used.
- Have an ‘overflow’ outlet or mechanism to direct excess water (after the barrel is full) away from foundation of building.
- Be located near vegetation/other permeable surface for ease of emptying (and can use a soaker hose).
- Be located ‘upslope’ from whatever resident would be watering

– most rain barrels are gravity-fed and so the water pressure is not that great

- Be disconnected from the downspout when temperatures are below freezing

#### Rain Gardens

Rain Gardens are sunken gardens that intercept stormwater runoff from a downspout, drain, or nearby impervious areas. A rain barrel and rain garden can be connected to the same downspout; in this case, the overflow or excess water from the rain barrel is routed into the rain garden. Do It Yourself installation/project guides:

- <https://www.montgomerycountymd.gov/DEP/Resources/Files/PostersPamphlets/raingardens.pdf>
- <http://www.stormwater.allianceforthebay.org/take-action/installations/rain-gardens>
- NEMO (also has a link to a mobile app)- <http://nemo.uconn.edu/raingardens/>
- [http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr\\_20028271.pdf](http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20028271.pdf)
- Anne Arundel County Watershed Stewards Academy - <http://aawsa.org/wsa-rainscaping-manual-2/>

#### Dry Wells

In some cases, dry wells may be a better fit than rain gardens. Dry wells function similarly to rain gardens in that they collect and infiltrate stormwater coming off a roof. Instead of water being routed into a vegetated area, dry wells collect excess water underground in a tank, which then allows the water to infiltrate into the ground slowly. Dry wells, like rain gardens, may or may not be suitable for DIY installations due to technical and design requirements.

- <https://www.phrc.psu.edu/assets/docs/Publications/Dry-Well-Design.pdf>

## Checklists

### Recommended first steps

- Create guidance documents (print and digital) for property owners encouraging the disconnection of downspouts and other drains from the sanitary sewer. Documents should be posted on municipal websites, along with program point of contact
- Conduct a 12-month outreach and education initiative with the goal of reaching every property owner in the municipality to inform them of:
  - the downspout disconnect program and municipally-provided resources,
  - the amnesty/compliance period, and
  - the date after which the municipality may begin assessing fines.
- Implement an amnesty period (12 months) in which property owners can voluntarily disconnect drains. After the conclusion of the amnesty period, municipal officials can assess fines to properties that have not complied.
- Determine if the municipality has regulations regarding unpermitted connection to sanitary sewer lines. If not, may consider developing that, possibly in the form of an ordinance
  - DEC model ordinance:
    - [https://www.dec.ny.gov/docs/water\\_pdf/modelseweruselaw.pdf](https://www.dec.ny.gov/docs/water_pdf/modelseweruselaw.pdf)
  - Town of Amherst, NY general Sewer Use Requirements:
    - <https://ecode360.com/13279678>

### Key Questions: Program Oversight and Management

- Program Administration
  - Who will administer the program?
  - What languages will documents need to be provided in?
  - If technical assistance is provided, who will do the work?
    - If a contractor will be completing this work, does the municipality have the necessary legal structure in place for them to do so (to work on private property, to disburse funds on behalf of the municipality, etc.)?
  - If there are grants/rebates, who will handle tracking and disbursement of funds?
  - If technical or financial assistance is provided, how will the need for work and the completion of the work be verified?
    - Will there be any time of maintenance required and is inspection of maintenance tasks required?
- Have program managers met with local community and business leaders to gather and incorporate feedback about the program?
- If there is an “amnesty period,” ensure that any local ordinances allow for temporary non-enforcement
- How will program progress and milestone achievements be tracked? A digital tracking system for participating properties should be created, ideally in Excel or another format that is compatible with GIS.

## Appendix B

### Sample 12-Month Outreach Strategy

Below is an outline for an example 12-month outreach strategy for a municipal downspout disconnect program.

Date	Activity	Target Audience	Partner Organizations	Expected Outcomes/Follow up
Month 1	Present at community meeting about Downspout Disconnect Program	Interested stakeholders	N/A	Introduce effort and receive feedback from residents
Month 1	Post announcement on neighborhood listserv/relevant social media with same content as community meeting presentation	For residents who did not attend meeting; or for permanent record of program	N/A	Increase reach of program information and receive feedback from residents
Month 1	Table/outreach at a local festival or event	Event attendees	Festival organizers	Face-to-face outreach/engagement
Month 2	Include flier/info sheet about Downspout Disconnect Program, including participation instructions and contact information, in water bill/with e-bills	All ratepayers	Wastewater Facility	Notify all affected residents of program
Month 2	Present at community meeting with updates regarding program, inform residents program began		N/A	Official program kick-off
Month 2	Table/Outreach at public event, (I.E. farmer's market, street festival)	Event attendees	Event staff	Face-to-face interaction with community in a casual setting – residents can ask questions
Month 2	Listsrv/social media post calling for program participation	All residents	N/A	Increase participation in program
Month 3	Include program flier and participation information in water bill	All ratepayers	Wastewater Facility	Notify all affected residents of program
Month 4	Announcement on local radio reminding property owners to participate	Property owners	N/A	Increase participation in program
Month 5	Door-knocking with door hanger flier	Properties within high priority area that have not yet participated in program	None and/or local watershed groups	Increased participation in priority areas
Month 6	Provide participation update at community meeting	Event attendees	Group holding the meeting	Increase participation and program visibility
Month 7	Social media post with photo/video of participating property	All residents	Participating property owners	Increase participation and program visibility
Month 8	Social media/listsrv announcement with current participation rates/gallons diverted	All residents	N/A	Increase participation and program visibility
Month 9	Neighborhood walking tour	All residents	Participating property owners	Peer-to-peer education/recruitment as property owners communicate with other residents regarding their experience with the program
Month 10	Social media post with photo of participating property	All residents	Participating property owners	Increase participation and program visibility
Month 11	Table/Outreach at public event, (I.E. farmer's market, street festival)	Event attendees	Event staff	Face-to-face interaction with community in a casual setting – residents can ask questions
Month 12	Provide year-end report both online and in water bills with participation information and update on program status (e.g., fines will now be assessed)	Rate payers and all residents	N/A	Inform home owners about potential fines and program visibility

## Appendix C, Case Studies

### Program Comparison

Program Name/ Location	Website	Practices	Incentive	Key Points
Sump Pump and Roof Drain Grants Sterling, IL	<a href="http://ci.sterling.il.us/sumppumpgrantcfm.cfm">http://ci.sterling.il.us/sumppumpgrantcfm.cfm</a>	Sump pump and downspout disconnection	\$400 maximum rebate for sump pump and downspout disconnection	Program is targeted to keep ratepayer costs in check, and address sewer overflows
Sump Pump Amnesty Program Revere, MA	<a href="https://www.revere.org/news/post/city-sump-pump-amnesty-program">https://www.revere.org/news/post/city-sump-pump-amnesty-program</a>	Sump pump disconnection from sanitary sewer	City pays for disconnection for limited time	After “amnesty period” homeowner is responsible for all associated costs of disconnection
“Illegal Connections” Muncie, IN	<a href="https://www.munciesanitary.org/illegal-connections">https://www.munciesanitary.org/illegal-connections</a>	Sump pump and downspout disconnection – encourages rain gardens	None – outreach only	No financial incentives offered, but city provides guidance for disconnection and encourages rain gardens, etc.
Illegal Connection Inspection Program Lower Merion, PA	<a href="http://www.lowermerion.org/home/showdocument?id=5451">http://www.lowermerion.org/home/showdocument?id=5451</a>	Sump pump disconnection	Program provides a grace period for businesses and homeowners to correct illegal drainage connections	Uses volume of water figures to draw attention to scale of problem  Emphasizes that illegal connections increase costs to ratepayers
Downspout Disconnect Program Clark County, WA	<a href="https://www.clark.wa.gov/public-works/downspout-disconnect-program">https://www.clark.wa.gov/public-works/downspout-disconnect-program</a>	Sump pump and downspout disconnection and BMPs	County provides technical assistance, but no financial assistance	Provides very good technical information in ‘How To’ handout, including important things to consider about a property’s suitability for disconnection
Find It, Fix It Greenwood, IN	<a href="http://www.greenwood.in.gov/subtopic/index.php?topicid=103&amp;structureid=13#navJump">http://www.greenwood.in.gov/subtopic/index.php?topicid=103&amp;structureid=13#navJump</a>	Sump pump and downspout disconnection	Free inspection and discount on bill	City is not requiring inspections, but is paying for them.
Downspout Disconnection Louisville, KY	<a href="http://www.louisvillemsd.org/DownspoutDisconnection">http://www.louisvillemsd.org/DownspoutDisconnection</a>	Downspout disconnection, encourages rain barrels and other BMPs	\$100 reimbursement per downspout that is disconnected	City conducts an initial site visit and inspection to determine property eligibility and to provide guidance
Downspout Disconnection Program Columbia City, IN	<a href="http://columbiacity.net/wp-content/uploads/2016/04/revised_Downspout-Disconnection-Program.pdf">http://columbiacity.net/wp-content/uploads/2016/04/revised_Downspout-Disconnection-Program.pdf</a>	Downspout disconnection and rain barrels	Free downspout disconnection, City has a separate rain barrel rebate program	Provides an example of homeowner agreement with legal language regarding working on private property

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