



September 16, 2016

Tennessee Department of Environment and Conservation  
TN Division of Water Resources  
William R. Snodgrass Tennessee Tower  
312 Rosa L. Parks Avenue, 11<sup>th</sup> Floor  
Nashville, TN 37243

**RE: CITY OF OAK RIDGE MS4 ANNUAL REPORT – TNS088366**

Enclosed is the City of Oak Ridge MS4 Annual Report for fiscal year July 1, 2015 to June 30, 2016.

The Tennessee Department of Environment and Conservation issued Notice of Coverage to the City of Oak Ridge on March 23, 2014. The enclosed third year Annual Report covers the fiscal year of 2016.

The City of Oak Ridge has continued work on several milestones identified in the Notice of Intent (NOI) during the reporting period and are listed below:

- Adopted a new Stormwater Management Ordinance using the MTAS Model Stormwater Ordinance
- Reorganization of staff to provide a full time staff member for stormwater program support
- Continue to improve the existing City stormwater website for public education purposes
- Continue to monitor a citizen hot line phone number on the city website and respond to questions and concerns in a timely manner.
- Continue converting paper and computer files into GIS mapping of the stormwater system
- Continue to collect GPS information of streams and outfalls from the storm sewer system with over 120 stream miles mapped this year.

The stormwater team will continue to work toward meeting the yearly milestones and obtaining City funds to fully implement the program. The City is striving to develop a complete stormwater management program that will meet the needs of the citizens and create a cleaner environment that addresses water quality and quantity issues.

Thank you for your assistance working with us on the development of the program. Please contact Pat Fallon, Operations Division Manager at 865-425-1847 or [pfallon@oakridgetn.gov](mailto:pfallon@oakridgetn.gov) with any questions concerning this submittal.

Sincerely,

A handwritten signature in blue ink that reads "Mark S. Watson".

Mark S. Watson  
City Manager

Enclosure: Annual Report

cc: Shira McWaters, Public Works Director  
Pat Fallon, Operations Division Manager  
Amy Snyder, Civil Projects Specialist

# MS4 Annual Report FY-2016

City of Oak Ridge, Tennessee





Tennessee Department of Environment and Conservation  
Division of Water Resources

William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243  
1-888-891-8332 (TDEC)

**Municipal Separate Storm Sewer System (MS4) Annual Report**

**1. MS4 INFORMATION**

City of Oak Ridge TNS088366

Name of MS4 MS4 Permit Number

Pat Fallon pfallon@oakridgetn.gov

Name of Contact Person Email Address

865-425-1847

Telephone (including area code)

PO Box 1

Mailing Address

Oak Ridge TN 37831-0001

City State ZIP code

What is the current population of your MS4? 29,419

What is the reporting period for this annual report? From July 1, 2015 to June 30, 2016

**2. WATER QUALITY PRIORITIES (SECTION 3.1)**

A. Does your MS4 discharge into waters listed as impaired on TN's most current 303(d) list and/or according to the on-line GIS mapping tool?  Yes  No

B. If yes, please attach a list all impaired waters within your jurisdictional area. SEE ITEM 2B

C. Does your MS4's jurisdictional area contain any waterbodies where a TMDL has been approved for parameters other than pathogens, siltation and habitat alterations? If yes, please attach a list.

D. Does your MS4 discharge to any Exceptional TN Waters (ETWs) or Outstanding National Resource Waters (ONRWs)? If yes, please attach a list.  Yes  No  
See Item 2-C

E. Are you implementing additional specific provisions to ensure the continued integrity of ETWs or ONRWS located within your jurisdiction?  Yes  No

**3. PROTECTION OF STATE OR FEDERALLY LISTED SPECIES (SECTION 3.2.1 General Permit for Phase II MS4s)**

A. Are there any state or federally listed species within the MS4's jurisdiction?  Yes  No

B. Are any of the MS4 discharges or discharge-related activities likely to jeopardize any state or federally listed species?  Yes  No

C. Please attach any authorizations or determinations by U.S. Fish & Wildlife Service on the effect of the MS4 discharges on state or federally listed species.

**4. PUBLIC EDUCATION AND PUBLIC PARTICIPATION (SECTION 4.2.1 AND 4.2.2)**

A. Have you developed a Public Information and Education plan (PIE)?  Yes  No

B. Is your public education program targeting specific pollutants and sources of those pollutants, such as Hot Spots?  Yes  No

C. If yes, what are the specific causes, sources and/or pollutants addressed by your public education program? \_\_\_\_\_

## Municipal Separate Storm Sewer System (MS4) Annual Report

- D. Note specific successful outcome(s) (NOT tasks, events, publications) fully or partially attributable to your public education program during this reporting period. Stormwater website available for citizens to anonymously report problems or request additional information or inspections. Healthy Waters educational program with website was developed to enhance the public education component of the permit in conjunction with the Oak Ridge High School environmental classes taught by city staff members.
- E. Do you have an advisory committee or other body comprised of the public and other stakeholders that provides regular input on your stormwater program?  Yes  No
- F. How do you facilitate, advertise, and publicize public involvement and participation opportunities? City and Departmental websites, Facebook, Twitter, TNSA newsletter and Public Information radio spots, newspaper press releases and high school classroom bulletin boards
- G. Do you have a webpage dedicated to your stormwater program?  Yes  No  
If so, what is the link/URL: stormwater.oakridgetn.gov
- H. Are you tracking and maintaining records of public education, outreach, involvement and participation activities? Please attach a summary of these activities.  Yes  No  
See Attachment 4-H

### 5. ILLICIT DISCHARGE DETECTION AND ELIMINATION (SECTION 4.2.3)

- A. Have you completed a map of all outfalls and receiving waters of your storm sewer system?  Yes  No
- B. Have you completed a map of all storm drain pipes of storm sewer system?  Yes  No
- C. How many outfalls have you identified in your system? 46
- D. Have any of these outfalls been screened for dry weather discharges?  Yes  No
- F. What is your frequency for screening outfalls for illicit discharges? plan will be developed after all outfalls have been identified and potential hotspots are defined
- G. Do you have an ordinance that effectively prohibits illicit discharges?  Yes  No
- H. During this reporting period, how many illicit discharges/illegal connections have you discovered (or been reported to you)? 2
- I. Of those illicit discharges/illegal connections that have been discovered or reported, how many have been eliminated? 2

### 6. CONSTRUCTION SITE STORMWATER RUNOFF (SECTION 4.2.4)

- A. Do you have an ordinance or adopted policies stipulating:
- Erosion and sediment control requirements?  Yes  No
- Other construction waste control requirements?  Yes  No
- Requirement to submit construction plans for review?  Yes  No
- MS4 enforcement authority?  Yes  No
- B. How many active construction sites disturbing at least one acre were there in your jurisdiction this reporting period? 3
- C. How many of these active sites did you inspect this reporting period? 3
- D. On average, how many times each, or with what frequency, were these sites inspected (e.g., weekly, monthly, etc.)? minimum of twice weekly
- E. Do you prioritize certain construction sites for more frequent inspections?  Yes  No

## Municipal Separate Storm Sewer System (MS4) Annual Report

If Yes, based on what criteria? phase of construction and activities taking place

### 7. PERMANENT STORMWATER CONTROLS (SECTION 4.2.5)

A. Do you have an ordinance or other mechanism to require:

Site plan reviews of all new and re-development projects?  Yes  No

Maintenance of stormwater management controls?  Yes  No

Retrofitting of existing BMPs with green infrastructure BMPs?  Yes  No

B. What is the threshold for new/redevelopment stormwater plan review? (e.g., all projects, projects disturbing greater than one acre, etc.) All land disturbance activities

C. Have you implemented and enforced performance standards for permanent stormwater controls?  Yes  No

D. Do these performance standards go beyond the requirements found in Section 4.2.5.2 and require that pre-development hydrology be met for:

Flow volumes  Yes  No

Peak discharge rates  Yes  No

Discharge frequency  Yes  No

Flow duration  Yes  No

E. Please provide the URL/reference where all permanent stormwater management standards can be found.

stormwater@oakridgetn.gov

F. How many development and redevelopment project plans were reviewed for this reporting period? 9

G. How many development and redevelopment project plans were approved? 8

H. How many permanent stormwater management practices/facilities were inspected? 0

I. How many were found to have inadequate maintenance? 0

J. Of those, how many were notified and remedied within 30 days? (If window is different than 30 days, please specify) n/a

K. How many enforcement actions were taken that address inadequate maintenance? n/a

L. Do you use an electronic tool (e.g., GIS, database, spreadsheet) to track post-construction BMPs, inspections and maintenance?  Yes  No

M. Do all municipal departments and/or staff (as relevant) have access to this tracking system?  Yes  No

N. Has the MS4 developed a program to allow for incentive standards for redeveloped sites?  Yes  No

O. How many maintenance agreements has the MS4 approved during the reporting period? 0

### 8. CODES AND ORDINANCES REVIEW AND UPDATE (SECTION 4.2.5.3)

A. Is a completed copy of the EPA Water Quality Scorecard submitted with this report?  Yes  No

## Municipal Separate Storm Sewer System (MS4) Annual Report

- B. Include status of implementation of code, ordinance and/or policy revisions associated with permanent stormwater management. City ordinance specifies the most current editions of the TDEC "Erosion Prevention and Sediment Control Handbook" and the "Manual for Permanent Stormwater Management and Design Guidance Manual " must be followed.

### 9. STORMWATER MANAGEMENT FOR MUNICIPAL OPERATIONS (SECTION 4.2.6)

- A. Have stormwater pollution prevention plans (or an equivalent plan) been developed for:
- |   |                              |  |
|---|------------------------------|--|
| All parks, ball fields and other recreational facilities            | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| All municipal turf grass/landscape management activities            | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| All municipal vehicle fueling, operation and maintenance activities | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| All municipal maintenance yards                                     | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| All municipal waste handling and disposal areas                     | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
- B. Are stormwater inspections conducted at these facilities?  Yes  No
1. If Yes, at what frequency are inspections conducted? \_\_\_\_\_
- C. Have standard operating procedures or BMPs been developed for all MS4 field activities? (e.g., road repairs, catch basin cleaning, landscape management, etc.)  Yes  No
- D. Do you have a prioritization system for storm sewer system and permanent BMP inspections?  Yes  No
- E. On average, how frequently are catch basins and other inline treatment systems inspected? before predicted storms and after significant rainfall events
- F. On average, how frequently are catch basins and other inline treatment systems cleaned out/maintained? as needed
- G. Do municipal employees in all relevant positions and departments receive comprehensive training on stormwater management?  Yes  No
- H. If yes, do you also provide regular updates and refreshers?  Yes  No
- If so, how frequently and/or under what circumstances? annually and/or in the event of any illicit discharge

### 10. STORMWATER MANAGEMENT PROGRAM UPDATE (SECTION 4.4)

- A. Describe any changes to the MS4 program during the reporting period including but not limited to:
- Changes adding (but not subtracting or replacing) components, controls or other requirements (Section 4.4.2.a). none
- Changes to replace an ineffective or unfeasible BMP (Section 4.4.2.b). none
- Information (e.g. additional acreage, outfalls, BMPs) on program area expansion based on annexation or newly urbanized areas. N/A
- Changes to the program as required by the division (Section 4.4.3). none

### 11. EVALUATING/MEASURING PROGRESS

## Municipal Separate Storm Sewer System (MS4) Annual Report

- A. What indicators do you use to evaluate the overall effectiveness of your Stormwater Management Program, how long have you been tracking them, and at what frequency? Note that these are not measurable goals for individual BMPs or tasks, but large-scale or long-term metrics for the overall program, such as in-stream macroinvertebrate community indices, measures of effective impervious cover in the watershed, indicators of in-stream hydrologic stability, etc.

| Indicator               | Began Tracking (year) | Frequency                     | Number of Locations |
|-------------------------|-----------------------|-------------------------------|---------------------|
| <i>Example: E. coli</i> | 2003                  | <i>Weekly April–September</i> | 20                  |

- B. Provide a summary of data (e.g., water quality information, performance data, modeling) collected in order to evaluate the performance of permanent stormwater controls installed throughout the system. This evaluation may include a comparison of current and past permanent stormwater control practices. The City has reached out to the Department of Energy to obtain the sampling and test results of streams that are currently monitored by that agency. Some data is being provided from one sampling point however all the information has yet to be cleared by the DOE headquarters for release to the City and there is no projected release date has been given from DOE at this time.

### 12. ENFORCEMENT (SECTION 4.5)

- A. Identify which of the following types of enforcement actions you used during the reporting period, indicate the number of actions, the minimum measure (e.g., construction, illicit discharge, permanent stormwater control) or note those for which you do not have authority:

| Action                | Construction | Permanent Stormwater Controls | Illicit Discharge | Authority?                              |  |
|-----------------------|--------------|-------------------------------|-------------------|---|--|
| Notice of violation   | # _____      | # _____                       | # _____           | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |
| Administrative fines  | # _____      | # _____                       | # _____           | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |
| Stop Work Orders      | # _____      | # _____                       | # _____           | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No            |
| Civil penalties       | # _____      | # _____                       | # _____           | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |
| Criminal actions      | # _____      | # _____                       | # _____           | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |
| Administrative orders | # _____      | # _____                       | # _____           | <input type="checkbox"/> Yes            | <input checked="" type="checkbox"/> No |
| Other _____           | # _____      | # _____                       | # _____           |   |  |

- B. Do you use an electronic tool (e.g., GIS, data base, spreadsheet) to track the locations, inspection results, and enforcement actions in your jurisdiction?  Yes  No

- C. What are the 3 most common types of violations documented during this reporting period? improperly installed BMP's, Improperly maintained BMP's, Failure to submit for grading permits

### 13. PROGRAM RESOURCES (OPTIONAL)

- A. What was your annual expenditure to implement the requirements of your MS4 NPDES permit and SWMP this past reporting period? \$115,000
- B. What is next year's budget for implementing the requirements of your MS4 NPDES permit and SWMP? \$200,000
- C. Do you have an independent financing mechanism for your stormwater program?  Yes  No

## Municipal Separate Storm Sewer System (MS4) Annual Report

D. If so, what is it/are they (e.g., stormwater fees), and what is the annual revenue derived from this mechanism?

Source: Amount \$

Source: Amount \$

E. How many full time employees does your municipality devote to the stormwater program (specifically for implementing the stormwater program vs. municipal employees with other primary responsibilities that dovetail with stormwater issues)? 1

F. Do you share program implementation responsibilities with any other entities?  Yes  No

| Entity | Activity/Task/Responsibility | Your Oversight/Accountability Mechanism |
|--------|------------------------------|---|
|--------|------------------------------|---|

G. Please attach a copy of your Organizational Chart

**SEE APPENDIX A**

### 14. CERTIFICATION

**This report must be signed by a ranking elected official or by a duly authorized representative of that person. See signatory requirements in sub-part 6.7.2 of the permit.**

*"I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury."*

Mark S. Watson, City Manager  
Printed Name and Title

  
Signature

9/19/16  
Date

**Annual reports must be submitted in accordance with the requirements of Section 5.4. (Reporting) of the permit. Annual reports must be submitted to the appropriate Environmental Field Office (EFO) by September 30 of each calendar year, as shown in the table below:**

| EFO          | Street Address                  | City         | Zip Code | Telephone      |
|--------------|---------------------------------|--------------|----------|----------------|
| Chattanooga  | 1301 Riverfront Pkwy, Suite 206 | Chattanooga  | 37402    | (423) 634-5745 |
| Columbia     | 1421 Hampshire Pike             | Columbia     | 38401    | (931) 380-3371 |
| Cookeville   | 1221 South Willow Ave.          | Cookeville   | 38506    | (931) 432-4015 |
| Jackson      | 1625 Hollywood Drive            | Jackson      | 38305    | (731) 512-1300 |
| Johnson City | 2305 Silverdale Road            | Johnson City | 37601    | (423) 854-5400 |
| Knoxville    | 3711 Middlebrook Pike           | Knoxville    | 37921    | (865) 594-6035 |
| Memphis      | 8383 Wolf Lake Drive            | Bartlett     | 38133    | (901) 371-3000 |
| Nashville    | 711 R S Gass Boulevard          | Nashville    | 37216    | (615) 687-7000 |

**Attachment 2-B**

| Waterbody ID             | Impacted Waterbody     | County            | CAUSE/TMDL Priority  | Pollutant Source  | Comments   |
|--------------------------|------------------------|-------------------|--|---|--|
| TN06010207<br>020 - 1000 | POPLAR CREEK           | Roane<br>Anderson | Nitrate+Nitrite M<br>Total Phosphorus M  | Municipal Point Source<br>Collection System Failure   | Stream is Category 5.<br>(One or more uses impaired.)  |
| TN06010207<br>020 - 1300 | MITCHELL BRANCH        | Anderson          | Hexavalent Chromium L<br>PCBs L<br>Physical Sbstrate Habitat Alterations L   | CERCLA site<br>Channelization   | Stream is Category 5. TMDLs for DOE sites should be done by EPA.   |
| TN06010207<br>026 - 0600 | BEAR CREEK             | Roane<br>Anderson | Nitrate+Nitrite M<br>Escherichia coli NA   | CERCLA site<br>Undetermined Source  | Category 5. EPA approved a pathogen TMDL for some of the known pollutants.   |
| TN06010207<br>026 - 1000 | EAST FORK POPLAR CREEK | Roane             | PCBs L<br>Mercury L<br>Escherichia coli NA<br>Loss of biological integrity due to diltation NA<br>Nitrate+Nitrite M<br>Total Phosphorus M                  | Industrial Point Source<br>Municipal Point Source<br>Contaminated Sediments<br>Collection System Failure<br>Urbanized High Density Area | Impacted by releases at DOE's Oak Ridge facilities (K-25, Y-12, ORNL). Fishing advisory due to mercury and PCBs. Bacterial levels are also elevated due to sources in the Oak Ridge area. Category 5. EPA approved siltation and pathogen TMDLs that address some of the known pollutants. EPA should develop the TMDL for DOE facilities. |
| TN06010207<br>026 - 2000 | EAST FORK POPLAR CREEK | Anderson<br>Roane | PCBs L<br>Mercury L<br>Escherichia coli NA<br>Loss of biological integrity due to siltation NA<br>Nutrients M<br>Other Anthropogenic Habitat Alterations M | Industrial Point Source<br>Contaminated Sediments<br>Urbanized High Density Area  | Same as previous segment. Category 5. EPA approved siltation and pathogen TMDLs that address some of the known pollutants. EPA should develop the TMDL for pollutants for DOE facilities.  |
| TN06010207<br>006 - 1000 | MELTON HILL RESERVOIR  | Anderson<br>Roane | PCBs NA<br>Chlordane NA  | Contaminated Sediment   | Fishing advisory due to PCBs and chlordane. Category 4a. EPA approved a PCB/chlordane TMDL for the known pollutants.   |
|                          |                        |                   |  |   |  |

| Waterbody ID              | Impacted Waterbody                                | County   | CAUSE/TMDL Priority  | Pollutant Source                                      | Comments  |
|---------------------------|---|----------|--|---|---|
| TN06010207<br>006T - 0900 | SCARBORO CREEK                                    | Anderson | Escherichia coli H   | Urbanized High Density Area                           | Stream is Category 5. (One or more uses impaired)   |
| TN06010207<br>006T - 1100 | ERNIES CREEK                                      | Anderson | Escherichia coli H   |   | Stream is Category 5. (One or more uses impaired)   |
| TN06010207<br>001 - 0100  | POPLAR CREEK<br>EMBAYMENT,<br>WATTS BAR RESERVOIR | Roane    | PCBs<br>Mercry   | L Industrial Point Source<br>L Contaminated Sediments | Fishing advisory due to PCBs and Mercury. DOE impacts. Stream is Category 5. EPA should produce TMDL for pollutants from DOE facilities.  |
| TN06010207<br>247 - 1000  | WHITEOAK CREEK                                    | Anderson | Cesium<br>Strontium<br>Biological integrity loss<br>due to undetermined<br>cause | NA<br>NA<br>L<br>CERCLA site                          | Category 4b for strontium and cesium. A TMDL would not be helpful as the CERCLA ROD is the enforceable control strategy here. Category 5 for unknown toxicity. TMDLs for pollutants originating from DOE facilities should be developed by EPA. |

Attachment 2-D

**Municipal Separate Storm Sewer System (MS4) Annual Report**

D. Does your MS4 discharge to any Exceptional TN Waters (ETWs) or Outstanding National Resource Waters (ONRWs)?

If yes, please attach a list **Yes** No

| <u>Waterbody</u>                            | <u>Description</u>   | <u>Basis for Inclusion</u>                                |
|---|--|---|
| <b>Clinch River</b>                         | From Melton Hill Dam (river mile 23.1) to Pellissippi Parkway (river mile 43.7). | State Scenic River<br>(Class III Developed River Area)    |
| <b>Clinch River – Melton Hill Reservoir</b> | Clinch River from Melton Hill Dam to Pellissippi Parkway.                        | State Scenic River<br>(Class III - Developed River Area). |

## FY 2015/2016 Education Outreach Summary (Item 4-H)

### November 2015

- AmeriCorps Stormwater Team of Oak Ridge created a Facebook page to communicate events and share engaging posts about water quality, stormwater, recycling and the community.

### December 2015

- The AmeriCorps Stormwater Team of Oak Ridge partnered with Public Works and planted 55 native plants at the Broadway Avenue Rain Garden in Jackson Square. This rain garden also has permeable pavers that intercept and infiltrate stormwater runoff in the area by allowing water to seep through the cracks and into the ground instead of running off into the street. The rain gardens are a Stormwater Control Measure (SCM) that use native vegetation, geotextile fabric and soil to infiltrate and filter stormwater runoff.
- The AmeriCorps Stormwater Team of Oak Ridge launched the City of Oak Ridge (COR) Values program which helps government buildings become more sustainable. This program focuses on making recycling easier by providing recycling education and increasing recycling levels within the office community. The members used a progress tracker with different goal incentives to get the recycling program kicking in the Central Services Complex. Trash and recycling posters were created and placed above each respective bin in the central eating areas along with many different signs to help workers dispose of their trash correctly.
- The AmeriCorps Stormwater Team of Oak Ridge walked in the Oak Ridge Christmas Parade with a float for the Public Works office. The float was titled "Rudolph the Red-Nosed John Deere" and brought a lot of excitement to the children of the community.

### February 2016

- 50K Tree Day: This is a state-wide event effort to plant 50,000 trees in one hour throughout Tennessee on February 27th. The city of Oak Ridge, located between Anderson and Roane County was one of 92 counties across Tennessee participating in this event. In total over 6,000 volunteers participated statewide and successfully planted over 47,000 trees. Within the city of Oak Ridge over 120 volunteers joined the Healthy Waters Program to plant over 600 trees near Haw Ridge Park.

### March 2016

- The AmeriCorps Stormwater Team of Oak Ridge participated in this informative CAC AmeriCorps outreach event by tabling. Their goal was to inform people about upcoming CAC AmeriCorps openings, service sites, volunteer opportunities, and ways to get involved with the City of Oak Ridge Stormwater Management.
- Joined the Lower Clinch Watershed Council. Oak Ridge Stormwater Division Manager was elected as president. This organization works to promote and educate the public regarding the health and beauty of this stream from Norris Dam to Melton Lake Dam that flows through Anderson, Knox, Roane and Loudon Counties.

## April 2016

- The AmeriCorps Stormwater Team of Oak Ridge volunteered at the annual EarthFest at World's Fair Park by holding educational lessons every 15-20 minutes on the Enviroscape. This taught children about best management practices that can be implemented throughout different land uses in a city.
- The AmeriCorps Stormwater Team of Oak Ridge, as well as other AmeriCorps members, volunteers at River Rescue, hosted by Ijams Nature Center. River Rescue is a community-wide annual event that is focused on cleaning up nearly 40 different sites along the Tennessee River and associated creek tributaries. Around 1,000 community volunteers clean up trash, debris and other sources that may impair the local waterways in Knoxville.
- The Water Quality Forum, in cooperation with the AmeriCorps Stormwater Team of Oak Ridge, hosted a series of rain barrel workshop for members of the greater Knoxville community. Anybody was welcome to attend and the cost of registration was \$40 a barrel.

## May 2016

- The Healthy Waters Program and Keep Anderson County Beautiful collaborated for a community litter cleanup at Melton Lake Park in Oak Ridge to support the Great American Cleanup. The purpose of this event is to clean up litter to beautify the community and improve local water quality. This "Clean Your Block Party!" event had 44 community members who helped clean up around 335 pounds of litter throughout the park. Food was donated for the event by Food City and Bojangles.
- Adopt-A-Tree: This program was implemented after the 50K Tree Day to adopt trees and water them on a weekly basis mid-May through September. Watering the trees will help to make sure the seedlings grow into beautiful, mature trees that will provide clean air and water for the community for many years to come.
- The AmeriCorps Stormwater Team of Oak Ridge began restoring a riparian zone at Oak Ridge High School by planting 80 native oak trees. The Home Depot in Oak Ridge aided this project by donating compost.
- The Water Quality Forum, in cooperation with the AmeriCorps Stormwater Team of Oak Ridge, continued hosting rain barrel workshops.
- The AmeriCorps Stormwater Team of Oak Ridge attended and presented at the IECA Municipal Wet Weather Stormwater Conference in Nashville.

## June 2016

- The Water Quality Forum, in cooperation with the AmeriCorps Stormwater Team of Oak Ridge, continued hosting rain barrel workshops.
- The City of Oak Ridge, along with the AmeriCorps Stormwater Team of Oak Ridge began participating in a new Adopt-A-Creek program. The goal of this program is to reduce the amount of trash in and along our waterways by empowering the citizens of Oak Ridge to care for their environment and community.
- AmeriCorps members were given proclamations at the televised June City Council meeting honoring their service to the community and thanking them for their work in the stormwater program and teaching classes in the high school.

## Education Outreach Log FY 2016 (4-H)

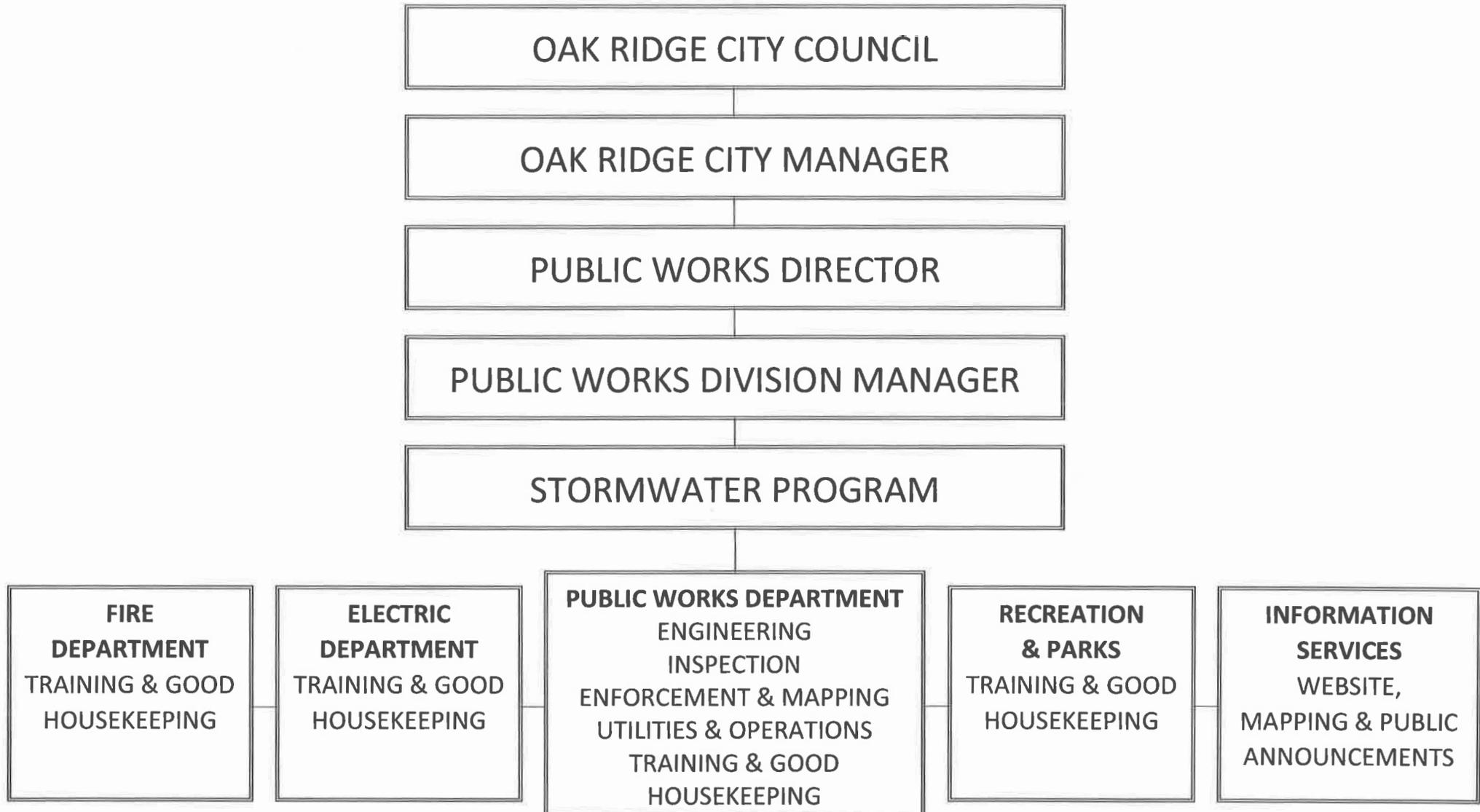
| Event                                      | Date                                | Type   | Nature of Outreach   | Number of Participants   | Outreach Locations                                  |
|--|-------------------------------------|--|--|--|---|
| Development Symposium Planning             | Ongoing                             | Public Involvement/ Participation                        | Acquire speakers and attendees for symposium, biweekly meetings, symposium planning  | 50   | Flyers at Home Depot and Community Development      |
| COR Values: Recycling                      | 2015-2016 AmeriCorps Year (ongoing) | Education Outreach                                       | AmeriCorps members started a recycling program in the CSC building to educate and encourage recycling; training, brochures, bins, rewards program                                      | 120  | Oak Ridge Central Services Complex<br>All Employees |
| ORHS biweekly lessons + service projects   | 2015-2016 school year               | Education outreach                                       | Working with 4 of Beth Adler's STEM classes  | 80   | Oak Ridge High School                               |
| Lower Clinch Watershed Council Rain Garden | 7/29/2015                           | Education outreach                                       | Tour of 4 rain gardens in the LCW with members of the community including EPA  | 30   | ORHS, OR Marina, Hardin Valley, Claxton Elementary  |
| TNSA East TN Regional Meeting              | 9/11/2015                           | Education outreach                                       | Regional meeting with members of other municipalities and private sector businesses  | 30   | City of Knoxville Chamber of Commerce Building      |
| UT Watershed Symposium                     | 9/15/2015                           |  | Full day event involving watershed presentations   |  | UTK Biosystems Engineering                          |
| Oak Ridge Community School                 | 9/15/2015, 9/22/2015, 9/29/2015     | Education Outreach and Public Involvement/ Participation | Educational presentation about the legacy contamination from the Oak Ridge Reservation and how residents can become involved in the cleanup decisions made by the Department of Energy | All four Oak Ridge Stormwater team members attended these sessions | Unitarian Universalist Church Conference Center     |
| Rock-Tenn Recycling Facility Tour          | 9/25/2015                           |  | Toured the facility and learned what can and cannot be recycled in   | 7  | Knoxville   |

|   |                  |   |  |     |                                    |
|---|------------------|---|--|-----|------------------------------------|
|   |                  |   | order to effectively create a building wide recycling program  |     |                                    |
| Water Quality Forum Meeting                 | 10/7/2015        |   | attended presentation on conveyance remediation  | 20  | Ijams Nature Center                |
| ICMA Fellows Presentation                   | 10/13/2015       | Education Outreach                                      | Educated visitors from Indonesia and Malaysia on the Oak Ridge MS4 program                               | 8   | Oak Ridge Central Services Complex |
| Contractor Education                        | 10/16/2015       | Education Outreach                                      | Educating sub-contractors on the importance of maintaining/respective BMPs on a work site                | 20  | Various construction sites         |
| Hazardous Waste Disposal                    | 10/24/2015       |   | Household hazardous waste disposal for Anderson County   |     | Oak Ridge Central Services Complex |
| America Recycles Day                        | 11/7/2015        |   | Hosted by Keep Anderson County Beautiful (KACB)  | 37  | Anderson County                    |
| KACB Meeting                                | 11/10/2015       |   | Requested partnership for Healthy Waters Project within grant terms                                      | 15  | Board Member's home                |
| Wetland planting                            | 11/11/2015       | Education Outreach                                      | Worked with 1st graders to teach and plant wetland plants  | 100 | Glenwood Elementary                |
| TNSA Development Symposium                  | 11/18-11/19/2015 | Education Outreach                                      | Symposium focused on stormwater issues in the development community                                      | 350 | Knoxville Convention Center        |
| Planning Commission Presentation            | 12/1/2015        | Education Outreach                                      | Presentation on using stormwater control measures within the development community                       | 16  | COR Municipal Building             |
| Rain Garden Planting at Broadway & Towne Rd | 12/3/2015        | Education Outreach and Public Involvement/Participation | In cooperation with Knox County and Farragut, a demonstration rain garden was installed on City property | 8   | Historic Jackson Square area       |
| TNSA Regional Meeting                       | 12/4/2015        |   | Regional meeting with members of other municipalities and private sector businesses                      | 30  | TDOT                               |

|  |                                |  |  |     |  |
|--|--------------------------------|--|--|-----|--|
| TNSA Edu. Committee - Course Meeting                     | 1/5/2016                       | Education Outreach   | Discussed next steps in terms of facilitating education courses via TNSA   | 20  | TDEC Knoxville   |
| Watershed Restoration Workshop                           | 1/15/2016                      | Educational Outreach and Public Involvement/ Participation | Workshop on how to engage the public in watershed restoration projects in the community                                  | 30  | Wilson County Fairgrounds  |
| 50K Tree Day   | 2/27/2016                      | Educational Outreach and Public Involvement/ Participation | Planted 600 trees in one hour at Haw Ridge Park as part of the 50K trees planted in the state of Tennessee over one hour | 120 | Stormwater Team Facebook page, press release                         |
| Rain Barrel Workshops                                    | 4/9/2016, 5/21/2016, 6/18/2016 | Educational Workshop And Public Involvement/ Participation | Provide community members with rain barrels and inform them about the benefits   |     | Church of the Good Shepherd, Farragut Town Hall, Ijams Nature Center |
| Great American Cleanup                                   | 5/7/2016                       | Public Involvement/ Participation                          | Clean up Melton Park   | 40  | Facebook page, press release   |
| EPA Region 4 Municipal Wet weather Stormwater Conference | 5/16-5/17                      |  | Presented "Creative Ways to Meet MS4 Requirements on a Limited Budget"   |     | Nashville  |

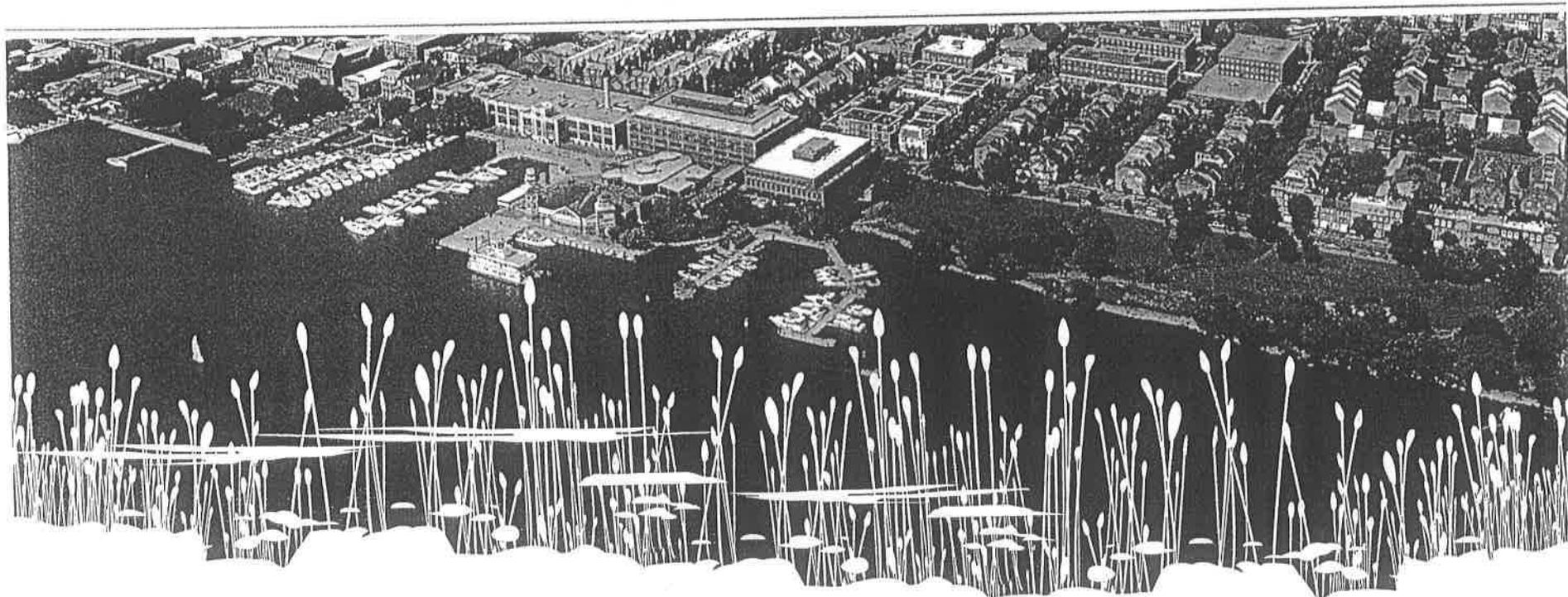
# OAK RIDGE STORMWATER ORGANIZATIONAL CHART

## ATTACHMENT 13-G



# WATERQUALITY SCORECARD

Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales



1 PROTECT NATURAL RESOURCES (INCLUDING TREES) AND OPEN SPACE

**Sensitive Natural Lands/Critical Area Protection**

QUESTION: Are development policies, regulations, and incentives in place to protect natural resource areas and critical habitat?

GOAL: Protect natural resource areas (e.g., forests, prairies) and critical habitat (e.g., conservation corridors, buffer zones, wildlife preserves) from future development.

WHY: Protection of significant tracts of critical lands and wildlife habitat will aid in protecting and improving water quality by increasing infiltration and groundwater recharge, preventing erosion and contamination of ground water and surface water resources, and protecting sources of drinking water.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References   |
|--|-------------|------------------|------------------------------|
| <b>ADOPT PLANS/EDUCATE</b>   |             |                  |                              |
| Identify and map critical natural resource areas (e.g., steep slopes, wildlife habitat, forests, drinking water source areas).                                 | 1           |                  |                              |
| The local comprehensive plan contains a natural resource protection element with goals calling for preservation of identified critical natural resource areas. | 1           |                  |                              |
| Identify key natural resource areas for protection in jurisdiction's parks and open space plan.  | 1           | 1                | Parks / Greenways            |
| Assist landowners in identifying sensitive natural areas and laying out developments to avoid such areas.  | 1           |                  |                              |
| Local plans establish and enforce areas which are available for development and which lands are a priority for preservation.                                   | 1           | 1                | Greenbelt                    |
| <b>REMOVE BARRIERS:</b>  |             |                  |                              |
| Protection of sensitive natural areas and wildlife habitat qualifies for credit towards local open space dedication and set-aside requirements.                | 1           | 1                | Floodway, D.O.E. Reservation |
| <b>ADOPT INCENTIVES:</b>   |             |                  |                              |
| Provide financial support to or collaborate with land trusts to acquire critical natural areas.  | 1           |                  |                              |
| Establish a dedicated source of funding for open space acquisition and management (e.g., bond proceeds, sales tax).  | 2           |                  |                              |
| Adopt a transferable developments rights program to provide an incentive for landowners to preserve sensitive natural lands and wildlife habitat.              | 1           |                  |                              |

3  
PAGE TOTAL

◀ CARRY THIS SUBTOTAL TO NEXT PAGE = 3

1.A.2a

**Protection Of Water Bodies/Aquifers**

QUESTION: Are no-development buffer zones and other protective tools in place around wetlands, riparian areas, and floodplains that improve/protect water quality?

GOAL: Protect critical areas such as wetlands, floodplains, lakes, rivers, and estuaries with a mandatory no-development buffer.

WHY: The use of these practices will reduce pollutant loads and hydrologic alterations to water bodies.

| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References  |
|---|-------------|------------------|---|
| <b>ADOPT PLANS/EDUCATE:</b>   |             |                  |   |
| Identify and map critical water resource areas.   | 1           |                  | In progress   |
| The local comprehensive plan contains a water quality protection element with goals calling for protection of identified water bodies and other water resource areas such as wetlands.  | 1           | 1                | Stormwater ordinance - section 14-505(12) and zoning 9.05(v)(b)(c)                                    |
| Identify key critical water resource areas for protection in jurisdiction's parks and open space plan.  | 1           | 1                | Zoning ordinance - section 9.05(v)(b)(c)<br>Env. open space   |
| Cooperate in developing regional approaches to watershed protection and stormwater management.  | 1           | 1                | TN Stormwater Association, Lower Clinch Watershed Council, <del>the</del> Joining Water Quality Forum |
| <b>REMOVE BARRIERS:</b>   |             |                  |   |
| Wetlands and other water bodies and buffer areas qualify for credit against local open space dedication/set-aside regulations.  | 1           |                  |   |
| <b>ADOPT INCENTIVES:</b>  |             |                  |   |
| Protected water bodies and buffer areas qualify for twice the credit (or more) against open space requirements set by the municipality.   | 1           |                  |   |
| Restoration of degraded riparian/wetland areas qualifies for additional open space credit within the local municipal system.  | 1           |                  |   |
| Transfer of density from protected riparian areas/buffers to upland portions of development sites.  | 1           |                  |   |
| <b>ENACT REGULATIONS:</b>   |             |                  |   |
| Riparian and wetland buffer areas required by local land use regulations<br><ul style="list-style-type: none"> <li>· Buffer is at least 50 feet (as measured from the top of bank) = 1 point</li> <li>· Buffer is at least 100 feet (as measured from the top of bank) = 2 points</li> <li>· Buffer is greater than 100 feet (as measured from the top of bank) = 3 points</li> </ul> | 1 to 3      | 1                | National Standards<br>Stormwater ordinance - section 14-505(12)(b)                                    |
| Critical water resource areas cannot be counted in calculating allowable density on a site (e.g., on a 200-acre site with 50 acres of wetlands, only 150 acres can be used to calculate density under zone district regulations, and only those 150 acres may be developed).  | 1           |                  |   |

FY 2017

4  
PAGE TOTAL

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▼ CARRY THIS SUBTOTAL TO NEXT PAGE

+ 6

= 10

1.A.2h

### Protection Of Water Bodies/Aquifers

QUESTION: Does the community have protection measures for source water protection areas through land use controls and stewardship activities?

GOAL: Protect source water areas from current or potential sources of contamination.

WHY: These practices will help safeguard community health, reduce the risk of water supply contamination, and potentially reduce water treatment costs.

| Implementation Tools and Policies  | Pts. Avail.       | Pts. Rec. or N/A | Notes and Local References   |
|--|-------------------|------------------|--|
| <b>ADOPT PLANS/EDUCATE</b>   |                   |                  |  |
| Local land use plans identify aquifer recharge/source water areas and recommend protective measures.   | 1                 |                  |  |
| Require that all stormwater inlets carry a notice regarding discharge to receiving waters.   | 1                 | 1                | Standard construction requirements + details - section 8.01 (B)(4) |
| Map and publish wellhead and aquifer recharge areas to alert developers to potential restrictions.   | 1                 | N/A              |  |
| <b>ADOPT INCENTIVES</b>  |                   |                  |  |
| Identification of drinking water source protection and aquifer recharge areas with a dedicated funding source in place to purchase and protect such areas. | 1                 | N/A              |  |
| Protection of critical water source areas qualifies for additional credit towards local open space requirements.   | 1                 |                  |  |
| <b>ENACT REGULATIONS</b>   |                   |                  |  |
| Adopt well-head protection regulations/zones to prevent incompatible development and uses.   | 1                 | N/A              |  |
| Adopt aquifer protection regulations/zones to prevent incompatible development and uses.   | 2                 |                  |  |
|  | <b>1</b>          |                  |  |
|  | <b>PAGE TOTAL</b> |                  |  |

SUBTOTAL FROM PREVIOUS PAGE

▼ CARRY THIS SUBTOTAL TO NEXT PAGE

+ 14

= 15



| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A  | Notes and Local References                                     |
|---|-------------|---|--|
| ENACT REGULATIONS   |             |   |  |
| Require permits before removing trees on proposed development or redevelopment sites. Provide fines and/or stop-work authority for permit violations. | 1           | 1   | Stormwater ordinance section 14-503<br>Land disturbance permit |
| Set minimum tree preservation standards for new development sites.  | 1           | 1   | Landscape + design ordinance - section 13.02(c)                |
| Require site plans or stormwater plans to include tree preservation.  | 1           | 1   | Landscape + design ordinance - <sup>section</sup> 13.02(c)     |
| Require/allow tree replacement off-site for infill sites.   | 1           |   |  |
| 3<br>PAGE TOTAL   |             | SUBTOTAL FROM PREVIOUS PAGE      ▼ CARRY THIS SUBTOTAL TO NEXT PAGE<br>+ 19      = 22 |  |

## Resources

- Planner's Guide to Wetland Buffers for Local Governments, Environmental Law Institute: [http://www.elistore.org/reports\\_detail.asp?ID=11272](http://www.elistore.org/reports_detail.asp?ID=11272)
- Mertes, James D. and James R. Hall. Park, Recreation, Open Space and Greenway Guidelines. National Recreation and Park Association, 1996.
- Center for Watershed Protection guidance on aquatic buffers: [http://www.cwp.org/Resource\\_Library/Restoration\\_and\\_Watershed\\_Stewardship/perviousarea.htm](http://www.cwp.org/Resource_Library/Restoration_and_Watershed_Stewardship/perviousarea.htm)
- "Protecting Stream and River Corridors: Creating Effective Local Riparian Buffer Ordinances," Carl Vinson Institute of Government, The University of Georgia: [http://www.rivercenter.uga.edu/publications/pdf/riparian\\_buffer\\_guidebook.pdf](http://www.rivercenter.uga.edu/publications/pdf/riparian_buffer_guidebook.pdf)
- No Adverse Impact Floodplain Management, Association of State Floodplain Managers: <http://www.floods.org/index.asp?menuID=349&firstlevelmenuID=187&siteID=1>
- Riparian Toolbox: Model Regulations and Legal Issues, Long Island Sound Study: <http://www.longislandsoundstudy.net/riparian/legal.htm>
- Model Ordinances to Protect Local Resources: Aquatic Buffers, U.S. EPA: <http://www.epa.gov/owow/nps/ordinance/osm1.htm>
- Duerksen, Christopher and Cara Snyder. Nature-Friendly Communities: Habitat Protection and Land Use Planning. Island Press, 2005.
- City Trees: Sustainability Guidelines and Best Practices: <http://www.treetrust.org/pdf/community-forestry-city-trees-bonestroo.pdf>
- Guide to Setting Urban Tree Canopy Goals, American Forests: <http://www.americanforests.org/resources/urbanforests/treedeficit.php>
- Urban Forestry Manual, Center for Watershed Protection: <http://www.cwp.org/forestry/part3forestrymanual.pdf> (pg. 69))
- Duerksen, Christopher and Suzanne Richman, "Tree Conservation Ordinances." American Planning Association. 1993: Planning Advisory Service Report No. 446.
- Duerksen, Christopher, Mowery, M. and McGlyn M. "Tree Preservation." Zoning Practice. July 2006: American Planning Association, Volume 23 Number 7.
- "Trees for green streets: An illustrated guide," Portland Metro: <http://www.metro-region.org/index.cfm/go/by.web/id=26337>
- *Tree Preservation Information Guide, Portland, Oregon*: <http://www.sustainableportland.org/shared/cfm/image.cfm?id=72545>
- Storm Water Pollution Prevention Plan (SWPPP) Guide, U.S. EPA: <http://cfpub.epa.gov/npdes/stormwater/swppp.cfm>
- Center for Urban Forest Research, U.S. Forest Service: <http://www.fs.fed.us/psw/programs/cufr/>
- Urban Forest Policy and Management, U.S. Forest Service: <http://www.fs.fed.us/psw/programs/cufr/research/studies.php?TopicID=1>
- Plants for Stormwater Design Volume II, Great River Greening: [http://www.greatrivergreening.org/\\_downloads/PSD%20II%20Sample.PDF](http://www.greatrivergreening.org/_downloads/PSD%20II%20Sample.PDF)

## Case Studies

- Alachua County, Florida's land conservation and acquisition program, *Alachua County Forever*, has conserved over 17,000 acres of environmentally sensitive land: <http://www.alachuacounty.us/government/depts/epd/land/files/forms.aspx>
- Baltimore County, Maryland's Master Plan 2010 designates land management areas that include agricultural preservation areas and resource preservation areas: <http://www.baltimorecountymd.gov/Agencies/planning/masterplanning/smartgrowth.html>
- King County, Washington's Greenprint Project is an open space and resource conservation strategy that focuses on land acquisition, restoration projects, regulatory changes and protection within the urban growth boundary: <http://dnr.metrokc.gov/wlr/greenprint/about.htm>
- The Pennsylvania Horticultural Society's *Philadelphia Green* program revitalizes and maintains abandoned land and public spaces by partnering with government, businesses and the community: <http://www.pennsylvaniahorticulturalsociety.org/phlgreen/about.html>
- Chicago, Illinois's Open Space Impact Fee Ordinance charges a fee associated with residential development building permits and spends the funds on acquisition of neighborhood open space in the same area where development occurs: [http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Buildings%2FContent&deptMainCategoryOID=-536901233&entityName=Buildings&topChannelName=Dept&contentOID=536988877&contentTypeName=COC\\_EDITORIAL](http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?blockName=Buildings%2FContent&deptMainCategoryOID=-536901233&entityName=Buildings&topChannelName=Dept&contentOID=536988877&contentTypeName=COC_EDITORIAL)
- Lenexa, Kansas's Watershed Management Plan includes erosion and sediment control, stream buffers, subwatershed protection and

## 2 PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL

### 2.A SUPPORT INFILL AND REDEVELOPMENT

**2.A.1** **QUESTION:** Are policy incentives in place to direct development to previously developed areas?

**GOAL:** Municipalities implement a range of policies and tools to direct development to specific areas.

**WHY:** Municipalities can realize a significant reduction in regional runoff if they take advantage of underused properties, such as infill, brownfield, or greyfield sites. Redeveloping already degraded sites such as abandoned shopping centers or underutilized parking lots rather than paving greenfield sites for new development can dramatically reduce total impervious area while allowing communities to experience the benefits and opportunities associated with growth.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References |
|--|-------------|------------------|----------------------------|
| <b>ADOPT PLANS/EDUCATE</b>   |             |                  |                            |
| Local plans identify potential brownfield and greyfield sites, and support their redevelopment.  | 1           |                  |                            |
| Capital improvement plans include infrastructure improvements (water, sewer, road, sidewalk, etc. upgrades) for identified brownfield and greyfield sites. | 1           |                  |                            |
| Educate lending and financial institutions about benefits and local priorities of directing development to existing areas.                                 | 1           |                  |                            |
| Conduct outreach to the community to ensure support for local forms and patterns of development.   | 1           |                  |                            |
| <b>REMOVE BARRIERS</b>   |             |                  |                            |
| Establish a brownfields program to remove uncertainty regarding cleanup and liability issues.  | 1           |                  |                            |
| <b>ADDT INCENTIVES</b>   |             |                  |                            |
| Provide incentives such as density bonuses and accelerated permitting for brownfield and greyfield sites.  | 1           |                  |                            |
| Adopt funding mechanisms for remediating/redeveloping brownfield and greyfield sites.  | 1           |                  |                            |
| Streamline permitting procedures to facilitate infill and brownfield redevelopment plan review.  | 1           |                  |                            |
| Establish tax increment financing (TIF) districts to encourage redevelopment.  | 1           |                  |                            |
| <b>ENACT REGULATIONS</b>   |             |                  |                            |
| In local codes, ordinances, and policies, the municipality differentiates between greenfield and infill development.                                       | 1           |                  |                            |

PAGE TOTAL

◀ CARRY THIS SUBTOTAL TO NEXT PAGE

= 0

| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A                   | Notes and Local References                           |
|---|-------------|------------------------------------|--|
| Technical information and analysis on the effectiveness of various treatment systems are readily available to developers. Local governments have determined which systems work best for their soil conditions and topography and have made this information available to the development community. | 1           | 1                                  | County gov't has compiled this technical information |
| Allow a wide variety of housing types and sizes within infill areas and reduced minimum lot sizes.  | 1           |                                    |  |
| <b>ADOPT INCENTIVES:</b>  |             |                                    |  |
| Increase development densities and allowable height in infill areas.  | 1           |                                    |  |
| Reduce impact fees for infill development based on less demand for new infrastructure.  | 1           |                                    |  |
| Create development incentives for green roofs (e.g., increased floor area ratio [FAR] bonus, additional building height).   | 1           |                                    |  |
| Include provision in stormwater management requirement that reduces on-site management requirements for projects that decrease total imperviousness on previously developed sites.  | 1           | 1                                  | stormwater ordinance - section 14-505(7)(d)          |
| <b>ENACT REGULATIONS:</b>   |             |                                    |  |
| Zoning and land development regulations implement urban service areas/ urban growth boundary policies by restricting development in outlying areas.   | 1           | 1                                  | yes  |
| Adopt adequate public facility and concurrency ordinances that require adequate public infrastructure to be available when development comes on line (e.g., water, sewer, roads).   | 1           | 1                                  | yes  |
| Adopt large-lot/agricultural zoning (e.g., 1 unit/160 acres) on fringe of city to restrict inappropriate greenfield development.  | 1           |                                    |  |
| Enact transitional compatibility standards to ensure that new denser infill development is compatible with existing neighborhoods/adjacent development.   | 1           |                                    |  |
| 4<br>PAGE TOTAL   |             | + SUBTOTAL FROM PREVIOUS PAGE<br>5 | = CARRY THIS SUBTOTAL TO NEXT PAGE<br>9              |

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A                   | Notes and Local References   |
|--|-------------|------------------------------------|--|
| ENACT REGULATIONS:   |             |                                    |  |
| Zoning code requires a minimum mix of uses and minimum density in designated mixed-use and transit-oriented development areas. | 1           | 1                                  |  |
| Auto-oriented uses and drive-throughs are restricted or prohibited in mixed-use and transit-oriented development areas.        | 1           |                                    |  |
| 1<br>PAGE TOTAL  |             | + SUBTOTAL FROM PREVIOUS PAGE<br>9 | = 10 (TOTAL POINTS AVAILABLE: 45)<br><br>▼ Total score for SECTION 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL |

This section has been reviewed and scored by

Pat Fallon

Department name Public Works

Signee 

### 3 DESIGN COMPLETE, SMART STREETS THAT REDUCE OVERALL IMPERVIOUSNESS

#### 3.A STREET DESIGN

3.A.1

QUESTION: Do local street design standards and engineering practices encourage streets to be no wider than necessary to move traffic effectively?

Do street designs vary according to:

- street type (arterial streets, collector streets, neighborhood streets) and
- urban context (urban core, transit station area, suburban center, general suburban, rural)?

Do policies allow narrow neighborhood streets designed to slow traffic and create safer conditions for pedestrians and bicyclists?

GOAL: Appropriate street widths allow narrower lanes for certain street types, thereby reducing overall imperviousness.

WHY: The width of travel lanes, parking lanes and sidewalks should be tailored to the urban setting. Where appropriate, narrowing travel lane width to 10-11 feet, rather than the standard 12-13 feet, can significantly reduce the total amount of impervious surfaces. Such streets can also substantially improve conditions for walking, biking, and using transit, which reduces automobile use and overall demand for parking spaces.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References                    |
|--|-------------|------------------|---|
| <b>ADOPT PLANS/EDUCATE:</b>  |             |                  |   |
| Comprehensive plan/transportation plan emphasizes alternative modes of transportation (walking, biking, and transit) to reduce vehicle miles traveled and width and prominence of roads/streets.           | 1           | 1                | Bicycle + Pedestrian Plan                     |
| Comprehensive/transportation plan calls for distributing traffic across several parallel streets, reducing the need for high capacity streets with wide rights-of-way.                                     | 1           |                  |   |
| Comprehensive/transportation planning process brings emergency response and other local government departments (e.g., public works, utilities) to the table early in the process to discuss street design. | 1           | 1                |   |
| Adopt formal bicycle/pedestrian master plan.   | 1           |                  |   |
| Create "safe routes to school" programs or other pedestrian/bike safety initiatives.   | 1           | 1                |   |
| Make consistent improvements to walking/biking conditions or develop a formal bicycle/pedestrian master plan.  | 1           |                  |   |
| <b>REMOVE BARRIERS:</b>  |             |                  |   |
| Comprehensive plan endorses context-sensitive street design with narrower streets in appropriate locations.  | 1           |                  |   |
| Improve pedestrian crossing at intersections to encourage walking.   | 1           | 1                |   |
| Consolidate utilities in street right-of-way to improve sidewalk design and function.  | 1           | 1                |   |
|  |             | <b>5</b>         |   |
|  |             | PAGE TOTAL       | ← CARRY THIS SUBTOTAL TO NEXT PAGE = <u>5</u> |

**3.A.2** QUESTION: Are shared driveways, reduced driveway widths, two-track driveways, and rear garages and alleys encouraged for all single-family developments?  
 GOAL: Encourage alternative forms and decreased dimensions of residential driveways and parking areas.  
 WHY: Off-street parking and driveways contribute significantly to the impervious areas on a residential lot. Reducing such dimensions can minimize the amount of stormwater runoff from a site.

| REMOVE BARRIERS:   |        |   |                                     |
|--|--------|---|-------------------------------------|
| Allow developments that utilize shared driveways and rear-loaded garages to permit overnight parking in driveways and on-street.   | 1      | 1 | Zoning ordinance - section 11.01(d) |
| Development code prohibits homeowner covenants forbidding overnight parking in driveways, on-street overnight parking, and shared driveways.   | 1      |   |                                     |
| ADOPT INCENTIVES:  |        |   |                                     |
| Allow developments with narrow driveways and rear-loaded garages to reduce number of parking spaces for guests.  | 1      | 1 | Zoning ordinance - section 11.01(d) |
| Zoning/subdivision regulations require minimum number of connections between new project and surrounding developments and neighborhoods.   | 1      |   |                                     |
| ENACT REGULATIONS:   |        |   |                                     |
| Shared driveways are permitted or required for single-family residential developments.   | 1      | 1 | Zoning ordinance - section 11.01(d) |
| Minimum widths for single-family driveways reduced to 9 feet.  | 1      |   |                                     |
| Two-track driveways are allowed by technical street/subdivision specifications.  | 1      |   |                                     |
| Single-family residential developments encouraged/required to be designed with minimum percentage of alley-accessible, rear-loading garages.<br>• Alleys/garages encouraged = 1 points<br>• Alleys/garages required = 2 points | 1 to 2 | 1 | Zoning ordinance - section 11.01(d) |

4  
 PAGE TOTAL

SUBTOTAL FROM PREVIOUS PAGE + 7 = 11  
 ▼ CARRY THIS SUBTOTAL TO NEXT PAGE

QUESTION: Do regulations and policies promote use of pervious materials for all paving areas, including alleys, streets, sidewalks, crosswalks, driveways, and parking lots?

GOAL: Build and retrofit these surfaces with pervious materials to reduce stormwater runoff and its negative impacts.

NOTE: While eliminating sidewalks or placing sidewalks on only one side of the road can reduce impervious cover, this strategy is typically most appropriate for rural areas. However, other effective strategies can achieve the same runoff reductions that will not limit residents' options for recreation and transportation.

WHY: Streets, sidewalks, and other hard surfaces contribute a large portion to a municipality's total imperviousness. Making these impervious surfaces more permeable protects water quality, reduces flooding, and can recharge groundwater.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References   |
|--|-------------|------------------|--|
| <b>ADOPT PLANS/EDUCATE:</b>  |             |                  |  |
| Sponsor/approve pilot programs to determine appropriate pervious materials for different paving areas (e.g., permeable concrete for sidewalks, permeable pavers for driveways), as well as process for installation and maintenance. | 1           | 1                | Stormwater ordinance section 14(50)(8) (permeable pavers for parking lots/sidewalks) |
| Pilot project results incorporated into standard practice for all new paved areas and retrofits of existing paved surfaces.  | 1           |                  |  |
| Adopt policy to replace impervious materials with pervious materials where practical.  | 1           |                  |  |
| <b>REMOVE BARRIERS:</b>  |             |                  |  |
| Technical street specifications allow pervious paving materials in appropriate circumstances (e.g., not allowed over aquifer recharge areas).  | 1           |                  |  |
| <b>ADOPT INCENTIVES:</b>   |             |                  |  |
| Create formal program offering incentives (e.g., cost sharing, reduction in street widths/parking requirements, assistance with maintenance) to property owners who utilize pervious pavement elements.                              | 1           |                  |  |
| <b>ENACT REGULATIONS:</b>  |             |                  |  |
| Adopt requirement that some percentage of parking lots, alleys, or roads in a development utilize pervious materials.  | 1           |                  |  |
| Development approvals that allow/require use of pervious materials include requirements for continuing maintenance/cleaning of pervious surfaces.  | 1           |                  |  |

1  
PAGE TOTAL

SUBTOTAL FROM PREVIOUS PAGE

+ 14

▼ Total score for SECTION 3: DESIGN COMPLETE, SMART STREETS THAT REDUCE OVERALL IMPERVIOUSNESS

= 15 (TOTAL POINTS AVAILABLE: 50)

This section has been reviewed and scored by

Pat Fallon

Department name Public works

Signee

Pat Fallon

- North Carolina Department of Environment and Natural Resources offers guidance to developers on eliminating curbs and gutters, including siting and design considerations, maintenance concerns, effectiveness and cost considerations: <http://www.p2pays.org/ref/41/40403.pdf>
- New York City requires street trees for every 25 feet of street frontage of a zoning lot: [http://www.nyc.gov/html/dcp/pdf/street\\_tree\\_planting/tree\\_adopted\\_cc\\_043008.pdf](http://www.nyc.gov/html/dcp/pdf/street_tree_planting/tree_adopted_cc_043008.pdf), page 8.
- Seattle Public Utilities' Natural Drainage System projects redesign residential streets to include vegetated drainage systems that use swales, wetlands, trees and other natural features to treat pollutants and minimize the speed and volume of road runoff: [http://www.seattle.gov/util/About\\_SPU/Drainage\\_&\\_Sewer\\_System/Natural\\_Drainage\\_Systems/](http://www.seattle.gov/util/About_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/)

| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References |
|---|-------------|------------------|----------------------------|
| Create parking districts to finance/construct centralized parking lots/ structures as shared parking facilities to reduce on-site parking.  | 1           |                  |                            |
| <b>ENACT REGULATIONS:</b>   |             |                  |                            |
| Revise parking regulations to reduce minimums below standard ITE (Institute of Transportation Engineers) requirements based on analysis of local developments and actual parking demand/experience.                         | 2           |                  |                            |
| Charge developers for every space beyond parking minimums to offset environmental impacts.  | 1           |                  |                            |
| Enact parking standards that allow credit for adjacent on-street parking.   | 1           |                  |                            |
| Create zones with reduced parking requirements (e.g., transit overlay districts, mixed-use activity centers, multi-modal districts).  | 1           |                  |                            |
| Waive all parking minimums in downtown and other locations that are pedestrian-oriented and/or have good transit access.  | 1           |                  |                            |
| Adopt parking standards that reduce requirements based on sliding scale tied to degree of walkability/transit access locations (20% reduction in areas well served by bus, 30% reduction in areas served by rail stations). | 1           |                  |                            |
| Require shared parking agreements where appropriate complementary uses exist.   | 1           |                  |                            |
| Adopt maximum parking caps (e.g., 125% above minimum) for multi-family and commercial developments.   | 2           |                  |                            |
| Reduce minimum parking space size based on analysis of average vehicle size in jurisdiction.  | 1           |                  |                            |

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## 4.C MINIMIZE STORMWATER FROM PARKING LOTS

4.C.1

QUESTION: Are there requirements for landscaping designed to minimize stormwater in parking lots?

GOAL: Require substantial landscaping to help reduce runoff.

WHY: Parking lots generate a large amount of impervious cover. Requiring landscaping reduces the environmental impact of parking and can provide additional community benefits by providing shade and, if appropriately placed, creating natural barriers between pedestrians and cars.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References                        |
|--|-------------|------------------|---|
| <b>ADPT. PLANS/EDUCATE:</b>  |             |                  |   |
| Comprehensive plan calls for landscaping in parking lots to help reduce stormwater runoff.   | 1           | 1                | landscape + design standards - section 13.02(e)   |
| <b>REMOVE BARRIERS:</b>  |             |                  |   |
| Allow alternative or innovative landscaping solutions that provide stormwater management functions to count towards perimeter or other landscaping requirements.   | 1           |                  |   |
| <b>ADPT. INCENTIVES:</b>   |             |                  |   |
| Parking lot landscaping and green roofs on parking structures credited towards meeting local stormwater management requirements.   | 1           |                  |   |
| Give additional landscaping credit for preservation of large, mature trees within parking lots.  | 1           |                  |   |
| Do not count parking structures with green roofs against the allowable floor area ratio of a site.   | 1           |                  |   |
| <b>ENACT REGULATIONS:</b>  |             |                  |   |
| Adopt parking lot landscape regulations that require provision of trees, minimum percent of parking lot interior area to be landscaped (e.g., 10%), and minimum sized landscaping areas (e.g., minimum of 25 square feet for island planting areas). | 1           | 1                | landscaping + design standards - section 13.02(e) |
| In parking lot landscaping regulations, specify the types and sizes of shrubs and trees most appropriate for controlling/reducing stormwater runoff.   | 1           |                  |   |
| Adopt standards requiring a minimum area of the parking lot to drain into landscaped areas.  | 1           |                  |   |
| Require the management of runoff from parking lots through green infrastructure practices, including trees, vegetated islands, swales, rain gardens, or other approaches.  | 1           |                  |   |

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## Resources

- “Parking Spaces/Community Places: Finding the Balance through Smart Growth Solutions” (pg. 14, 18-19, 21), U.S. EPA Development, Community and Environment Division: <http://www.epa.gov/piedpage/pdf/EPAParkingSpaces06.pdf>
- “Shared Parking, Second Edition,” Urban Land Institute: [www.uli.org/bookstore/](http://www.uli.org/bookstore/)
- “Developing Parking Policies to Support Smart Growth in Local Jurisdictions: Best Practices,” Metropolitan Transportation Commission: [http://www.mtc.ca.gov/planning/smart\\_growth/parking\\_study/April07/bestpractice\\_042307.pdf](http://www.mtc.ca.gov/planning/smart_growth/parking_study/April07/bestpractice_042307.pdf)
- “Driving Urban Environments: Smart Growth Parking Best Practices,” Maryland Governor’s Office of Smart Growth: <http://www.smartgrowth.state.md.us/pdf/Final%20Parking%20Paper.pdf>
- “Design Principles for Parking Lots,” Tennessee Valley Authority Economic Development: <http://www.tvaed.com/sustainable/parking.htm>
- Efficient Parking Strategies, Centralina Council of Governments and Catawba Regional Council of Governments: [http://www.epa.gov/region4/airqualitytoolkit/9\\_CaseStudies/SEQL.%20-%20Efficient%20Parking%20Strategies.pdf](http://www.epa.gov/region4/airqualitytoolkit/9_CaseStudies/SEQL.%20-%20Efficient%20Parking%20Strategies.pdf)
- “Parking Management: Strategies, Evaluation and Planning,” Victoria Transport Policy Institute: [http://www.vtpi.org/park\\_man.pdf](http://www.vtpi.org/park_man.pdf)
- “Smart Growth Alternatives to Minimum Parking Requirements,” *Proceedings from the 2nd Urban Street Symposium*, July 28-30, 2003: [http://transtoolkit.mapc.org/Parking/Referenced\\_pdfs/Forinash\\_SmartGrowthParkingAlternatives.pdf](http://transtoolkit.mapc.org/Parking/Referenced_pdfs/Forinash_SmartGrowthParkingAlternatives.pdf)
- “Flexible Parking Standards,” Georgia Quality Growth Partnership: <http://www.dca.state.ga.us/toolkit/ToolDetail.asp?GetTool=17>
- “Multifunctional Landscaping: Putting Your Parking Lot Design Requirements to Work for Water Quality,” University of Illinois Extension: <http://urbanext.illinois.edu/acr/LGIEN2002-0017.html>
- “Low-Impact Parking Lot Design Reduces Runoff and Pollutant Loads,” *Journal of Water Resources Planning and Management*, 2001: <http://cedb.asce.org/cgi/WWWdisplay.cgi?0101775>
- “Managing Stormwater for Urban Sustainability Using Trees and Structural Soils,” Virginia Polytechnic Institute and State University:

<http://www.cnr.vt.edu/urbanforestry/stormwater/Resources/TreesAndStructuralSoilsManual.pdf>

## Case Studies

- San Mateo County, California’s “Sustainable Green Streets and Parking Lots Design Guidebook” provides policy guidance and design and construction details, including site layout strategies, green infrastructure design guidelines and case studies for both streets and parking lots: [http://www.flowstobay.org/ms\\_sustainable\\_streets.php](http://www.flowstobay.org/ms_sustainable_streets.php)
- Minneapolis, Minnesota’s zoning code includes regulations to support pedestrian-oriented off-street parking, including parking maximums, shared parking allowances, pedestrian-overlay districts with reduced parking requirements, replacing off-street parking spaces with bicycle racks, and more: <http://www.ci.minneapolis.mn.us/rtrezoning/tod-haiwatha-09.asp>
- Boston Metropolitan Area Planning Council gives detailed guidance for reducing parking demand and developing parking requirements based on local factors such as access to transit, expected demographics, auto ownership rates and access to destinations and transit service: <http://transtoolkit.mapc.org/Parking/Strategies/flexiblerequirements.htm>
- San Diego, California’s Community Parking District Program helps older commercial districts collect revenue and implement parking plans to construct public parking facilities, make public transit enhancements, and maximize off-street parking inventory: <http://www.sandiego.gov/economic-development/business-assistance/small-business/pmd.shtml>
- Placer County, California enacted an In-Lieu Parking Fee that allows developments within specific parking districts to pay a fee in lieu of complying with off-street parking standards. The collected fees are then used to construct new public parking spaces within the same parking district: <http://www.placer.ca.gov/Departments/Works/TahPkgngStudy/DraftParkingFeeOrdinance.aspx>
- Minnesota’s Urban Small Sites Best Management Practice Manual provides drawings, design guidelines and plant lists for impervious surface reduction in parking lot design: [http://km.fao.org/uploads/media/Impervious\\_surface\\_reduction\\_parking\\_lot\\_desing.pdf](http://km.fao.org/uploads/media/Impervious_surface_reduction_parking_lot_desing.pdf)
- The retrofit of Our Lady Gate of Heaven Parish parking lot in Chicago, Illinois included a large swale that absorbs 100,000 gallons of runoff per year, reducing flooding in the parking lot and in nearby streets and properties. This U.S. EPA-funded project continues to be monitored for

# 5 ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS

## 5.A GREEN INFRASTRUCTURE PRACTICES

5.A.1

QUESTION: Are green infrastructure practices encouraged as legal and preferred for managing stormwater runoff?

GOAL: Make all types of green infrastructure allowed and legal and remove all impediments to using green infrastructure (including for stormwater requirements), such as limits on infiltration in rights-of-way, permit challenges for green roofs, safety issues with permeable pavements, restrictions on the use of cisterns and rain barrels, and other such unnecessary barriers.

WHY: Green infrastructure approaches are more effective and cost efficient than conventional stormwater management practices in many instances, and provide other substantial community benefits.

| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References   |
|--|-------------|------------------|--|
| <b>ADOPT PLANS/EDUCATE:</b>  |             |                  |  |
| Inform the public, through education and outreach programs, that green infrastructure practices can manage stormwater runoff on their property.  | 1           | 1                | City rain gardens installed + maintained<br>Education provided via signage |
| Create a green infrastructure workshop or training program for internal and external reviewers to ensure that the stakeholders who use this tool will have the ability to understand and use it effectively.   | 1           |                  | Possible for FY2017  |
| <b>REMOVE BARRIERS:</b>  |             |                  |  |
| Development and other codes encourage and allow property owners to adopt home-based green infrastructure practices, such as rain gardens, rain barrels, and other rainwater harvesting practices.  | 1           | 1                | No restrictions  |
| Review and change, where necessary, building codes or other local regulations to ensure that all local government departments/agencies have coordinated with one another to ensure that green infrastructure implementation is legal, e.g. remove restrictions on downspout disconnection. | 1           |                  |  |
| <b>ADOPT INCENTIVES:</b>   |             |                  |  |
| Credit green infrastructure practices towards required controls for stormwater runoff.   | 1           |                  |  |
| Establish a "Green Tape" expedited review program for applications that include green infrastructure practices.  | 1           |                  |  |
| Reduce stormwater utility rates based on the use of green infrastructure practices.  | 1           |                  |  |

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**5.A.2** QUESTION: Do stormwater management plan reviews take place early in the development review process?

GOAL: Incorporate stormwater plan comments and review into the early stages of development review/site plan review and approval, preferably at pre-application meetings with developers.

WHY: Pre-site plan review is an effective tool for discussing with developers alternative approaches for meeting stormwater requirements. This will incorporate green infrastructure techniques into new projects at early design stages, well before construction begins.

| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References |
|---|-------------|------------------|----------------------------|
| <b>ADOPT PLANS/EDUCATE:</b>   |             |                  |                            |
| Encourage/require a pre-site plan meeting with developers to discuss stormwater management and green infrastructure approaches.<br>· Voluntary = 1 point<br>· Mandatory = 2 points                    | 1 to 2      | 2                |                            |
| Include landscape architects in design and review of stormwater management plans.   | 1           |                  |                            |
| <b>ADOPT INCENTIVES:</b>  |             |                  |                            |
| Provide accelerated review of projects where developer attended a pre-application meeting.  | 1           |                  |                            |
| <b>ENACT REGULATIONS:</b>   |             |                  |                            |
| Preliminary stormwater plan review occurs contemporaneously with preliminary site plan review and before any development approvals.   | 1           | 1                |                            |
| Development applications must include preliminary/conceptual stormwater management plans that incorporate green infrastructure elements and describe how stormwater management standards will be met. | 1           |                  |                            |

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**5.A.4** **QUESTION:** Are provisions available to meet stormwater requirements in other ways, such as off-site management within the same sewershed or "payment in lieu" of programs, to the extent that on-site alternatives are not technically feasible?

**GOAL:** Allow off-site management of runoff while still holding developers responsible for meeting stormwater management goals.

**WHY:** In some cases, it is impracticable or infeasible to treat all or even some of the stormwater runoff on site. In such instances, alternative means should be provided through contribution to off-site mitigation projects or off-site stormwater management facilities (preferably green infrastructure facilities).

| Implementation Tools and Policies   | Pts. Avail. | Pts. Rec. or N/A |
|---|-------------|------------------|
| For infill and redevelopment areas, off-site green stormwater management plans should be developed in cooperation between local government and landowners/developers. Allowing off-site management of stormwater runoff requires sewershed designation within the local government to ensure that true mitigation is possible and realize the equal stormwater management and water quality benefits through off-site management. | 2           |                  |
| Retrofit projects that will utilize green infrastructure stormwater management techniques should be identified and prioritized within the sewershed.  | 1           |                  |
| Amend stormwater management regulations and development codes as necessary to allow off-site stormwater management, especially for infill and redevelopment areas.  | 1           |                  |
| Establish system that allows/requires payment-in-lieu fees for off-site stormwater management facilities. Fees should be set sufficiently high as to cover the true cost of off-site management. Consider limitations on amount of off-site management allowed (more for infill areas, less for greenfield sites).  | 1           |                  |

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| Implementation Tools and Policies  | Pts. Avail. | Pts. Rec. or N/A | Notes and Local References |
|--|-------------|------------------|----------------------------|
| Inspections of construction sites occur at for at least 25% of permitted projects to ensure proper installation of approved practices.   | 1           | 1                |                            |
| Require conservation/green infrastructure bond/escrow in zoning/subdivision ordinances to ensure installation/maintenance of green infrastructure storm water management facilities. | 1           |                  |                            |

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▼ Total score for SECTION 5: GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS

= 9 (TOTAL POINTS AVAILABLE: 39)

This section has been reviewed and scored by

PAT FALLON

Department name PUBLIC WORKS

Signee 

