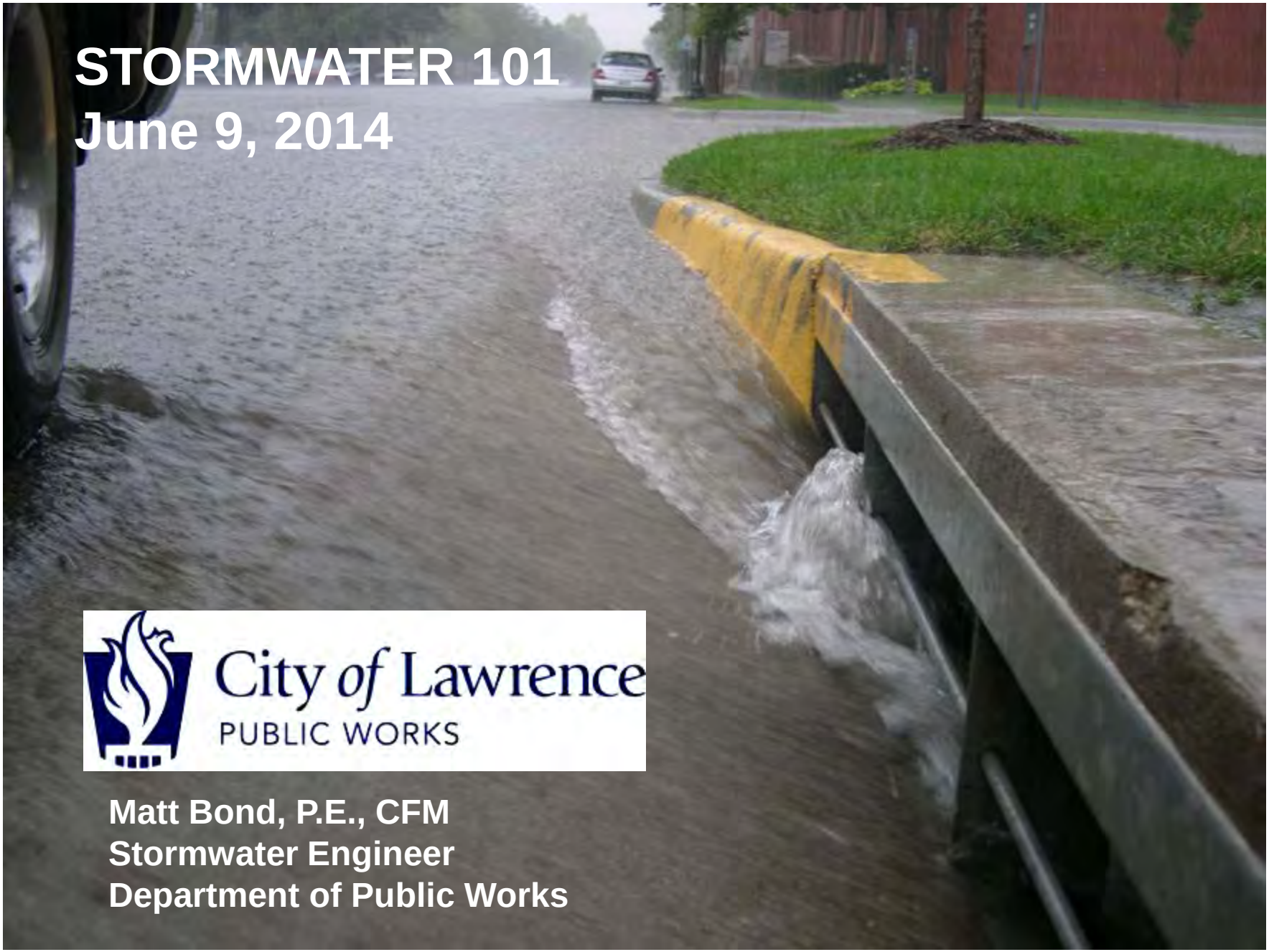
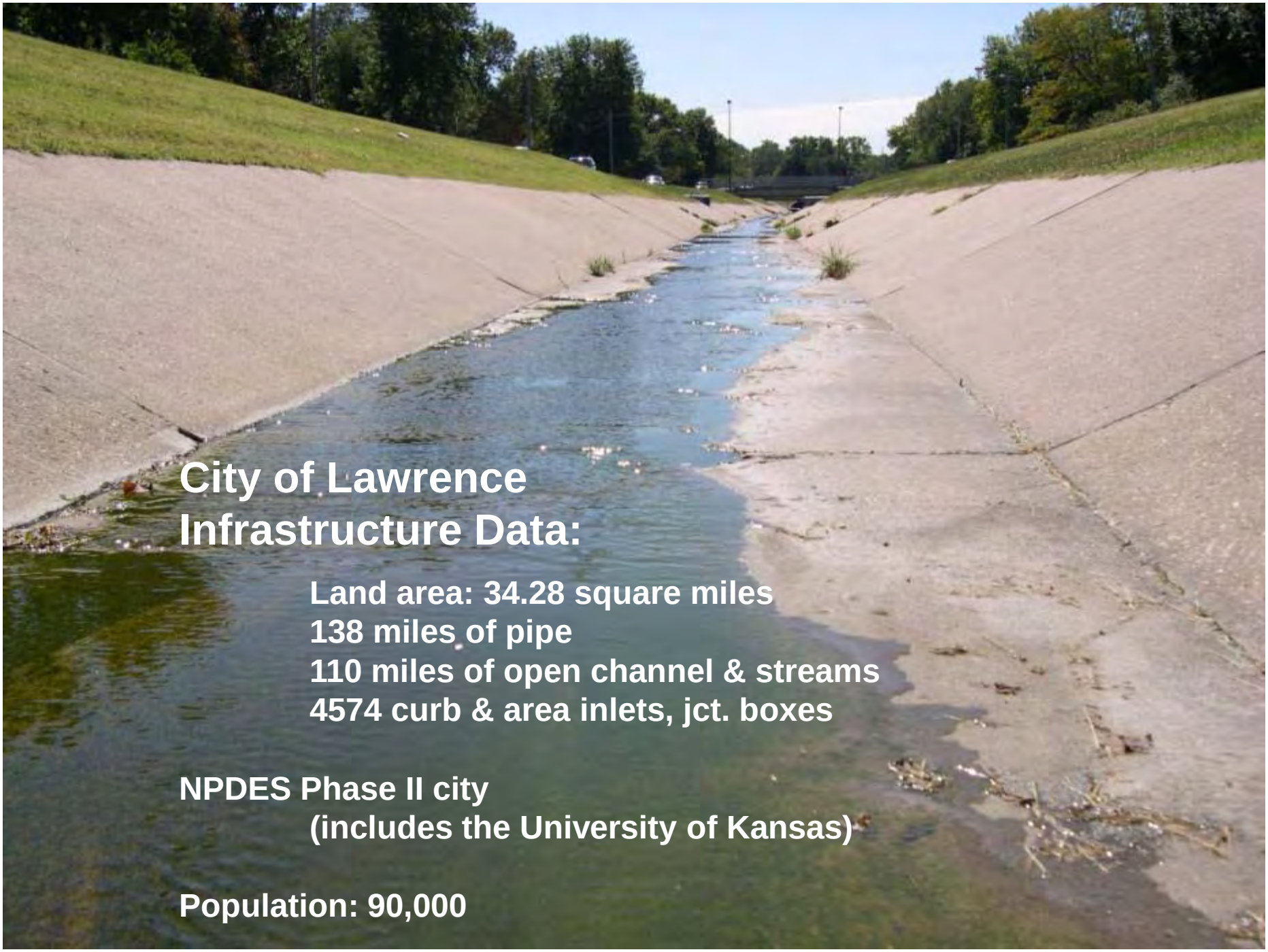


STORMWATER 101
June 9, 2014

City of Lawrence
PUBLIC WORKS

Matt Bond, P.E., CFM
Stormwater Engineer
Department of Public Works


Stormwater Utility
Capital Improvements
Storm Sewer Maintenance
Review of Development
Pollution Prevention



City of Lawrence Infrastructure Data:

Land area: 34.28 square miles
138 miles of pipe
110 miles of open channel & streams
4574 curb & area inlets, jct. boxes

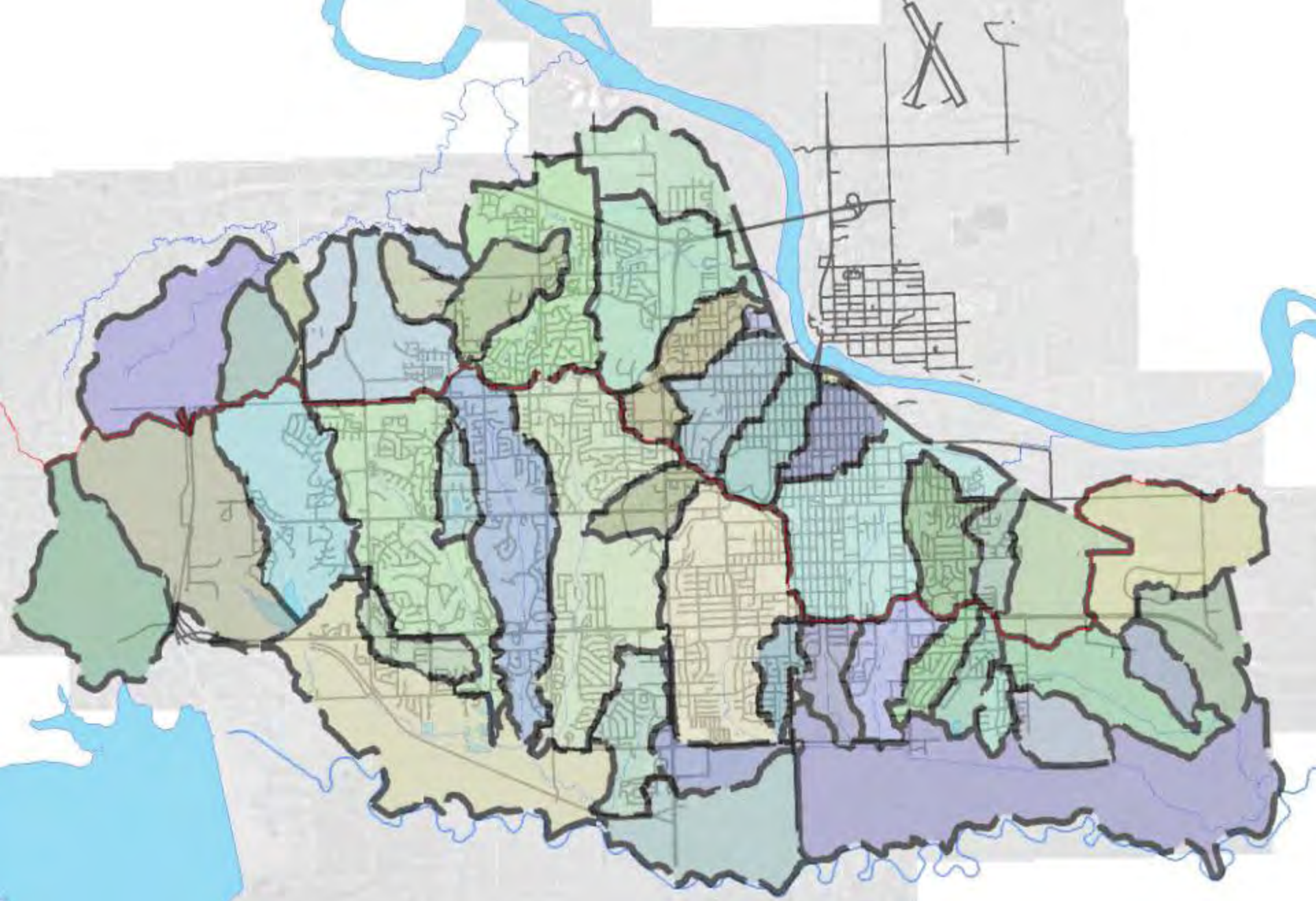
NPDES Phase II city
(includes the University of Kansas)

Population: 90,000


Kansas River


Wakarusa River

21 Kansas River + 25 Wakarusa River = 46 total sub basins in City Limits

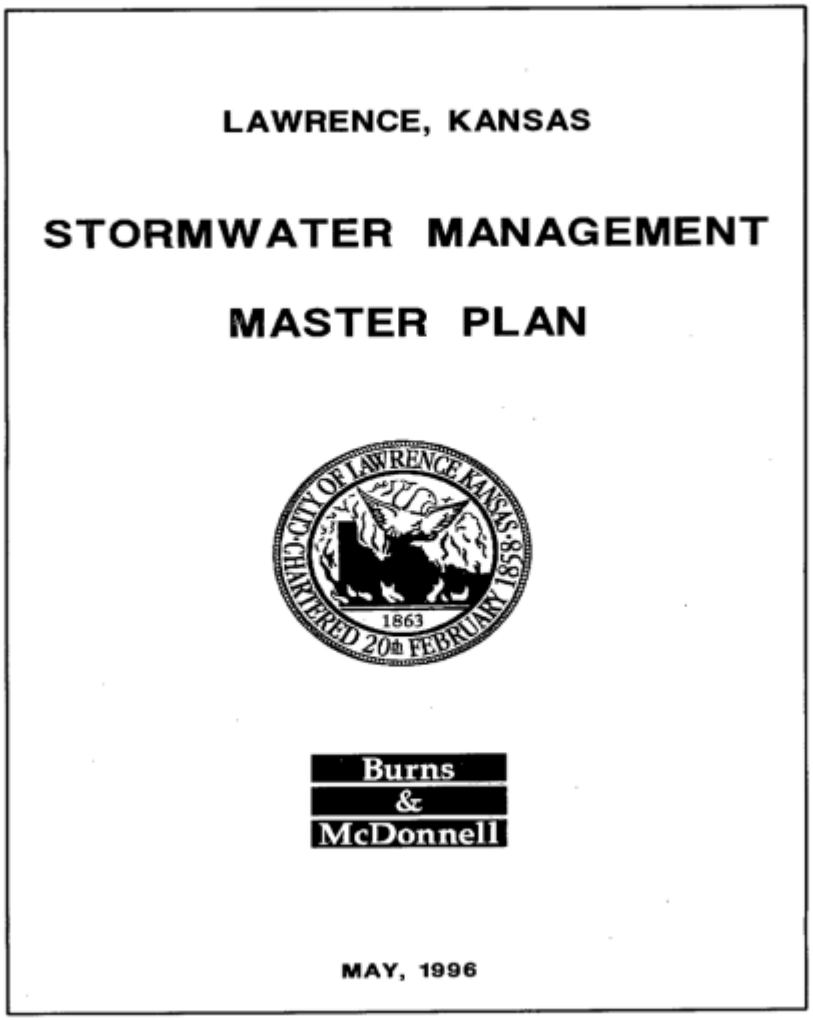


21 Kansas River + 25 Wakarusa River = 46 total sub basins in City Limits

Stormwater Utility Employees

- Stormwater Engineer
- Stormwater Quality Technician
- Administrative Assistant
- Field Crew Supervisor
  - Field Crew (6)

CAPITOL IMPROVEMENTS



LAWRENCE, KANSAS

STORMWATER MANAGEMENT

MASTER PLAN

CITY OF LAWRENCE KANSAS CHARTERED 20th FEBRUARY 1858 1863

Burns & McDonnell

MAY, 1996


13th and Oregon
15th Street
Naismith Drive
Massachusetts
19th Street
21st, Stewart to Naismith
Haskell Avenue
Iowa Street
21st, Kentucky to Barker Ct
23rd Street
N


13th & Oregon Stormwater Project
NORTH
E 12th St
E 13th St
E 14th St
E 15th St
Pennsylvania St
Delaware St
Oregon St
New Jersey St
Garfield St
Haskell Ave
Almira Ave
A
B
C
D
E
F
G
H
I

***A* - BEFORE**

(Parnell Park – looking North)

***A* - AFTER**
(Parnell Park – looking North)

***B* - BEFORE**

15th Street (looking North)

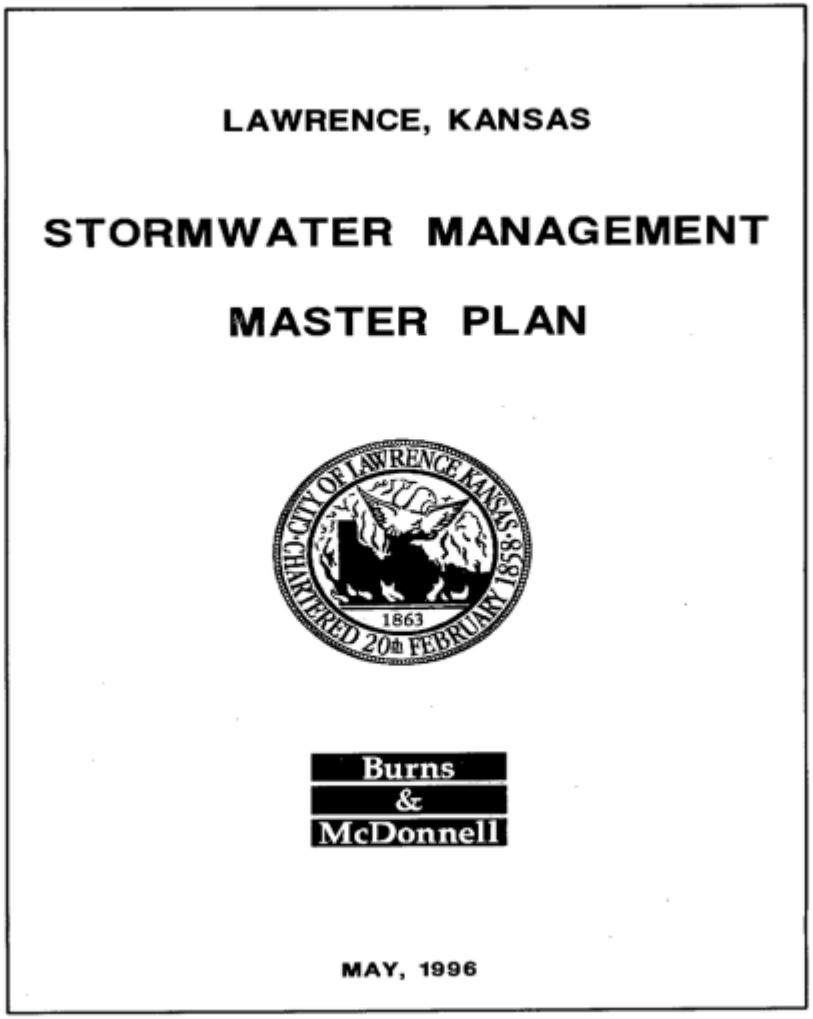

B - CONSTRUCTION
(15th Street – looking north)

B - CONSTRUCTION
(15th Street – looking north)

F - CONSTRUCTION
13th Street (looking north)

F - CONSTRUCTION
13th Street (looking north)

STORM SEWER MAINTENANCE



LAWRENCE, KANSAS

STORMWATER MANAGEMENT

MASTER PLAN

CITY OF LAWRENCE KANSAS CHARTERED 20th FEBRUARY 1858 1863

Burns & McDonnell

MAY, 1996


CAT

REVIEW OF DEVELOPMENT

- **Site Plan Review**
- **Stormwater Management Criteria**
- **Drainage Study (Hydrologic and Hydraulic Study)**
- **Detention / Retention Basins**
- **1.8 cfs/acre release rate**


Capacity > Runoff


Runoff > Capacity

27th St. & Crossgate Dr. in 1995

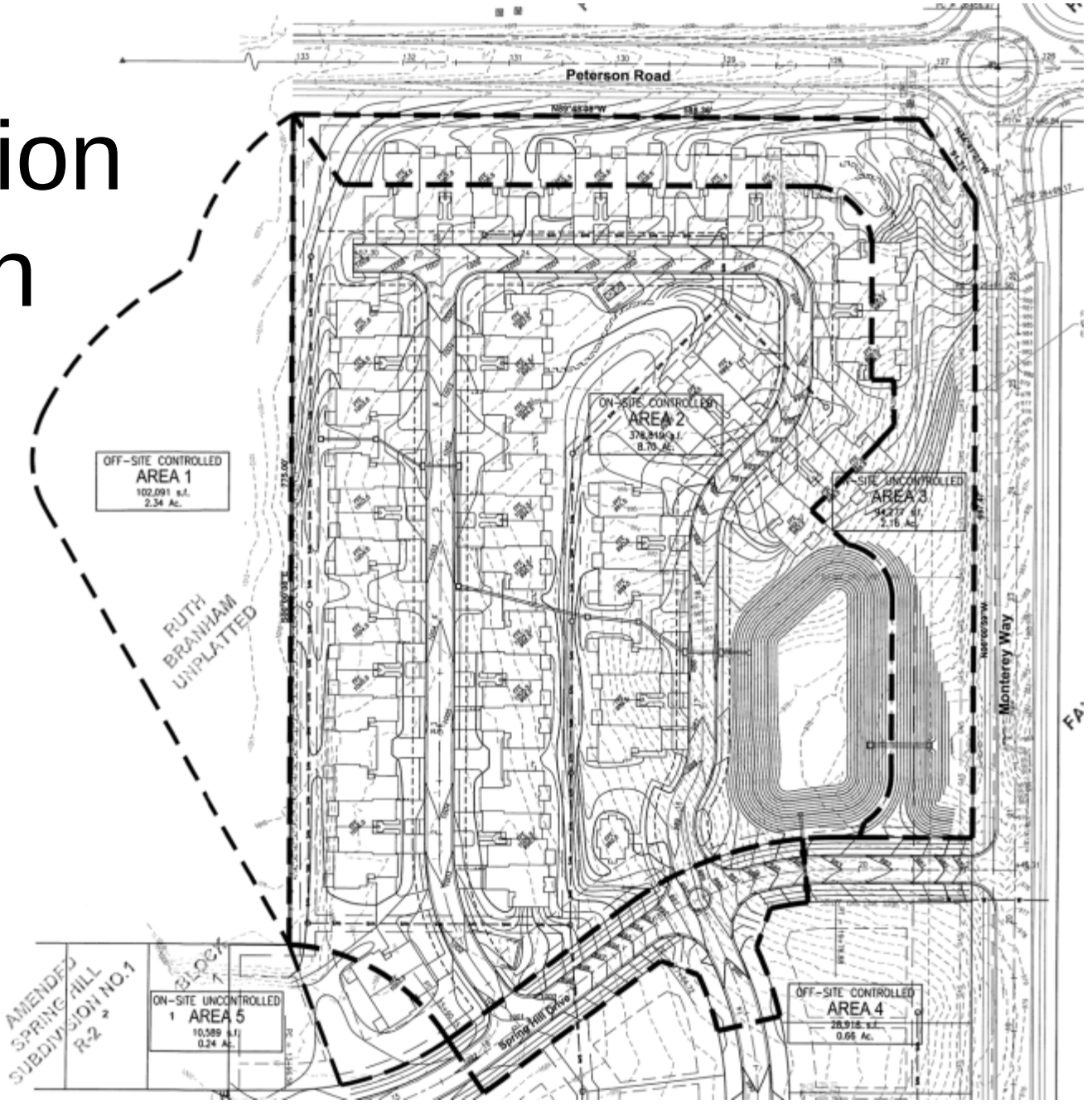
27th St. & Crossgate Dr in 2000

27th St. & Crossgate Dr. in 2006

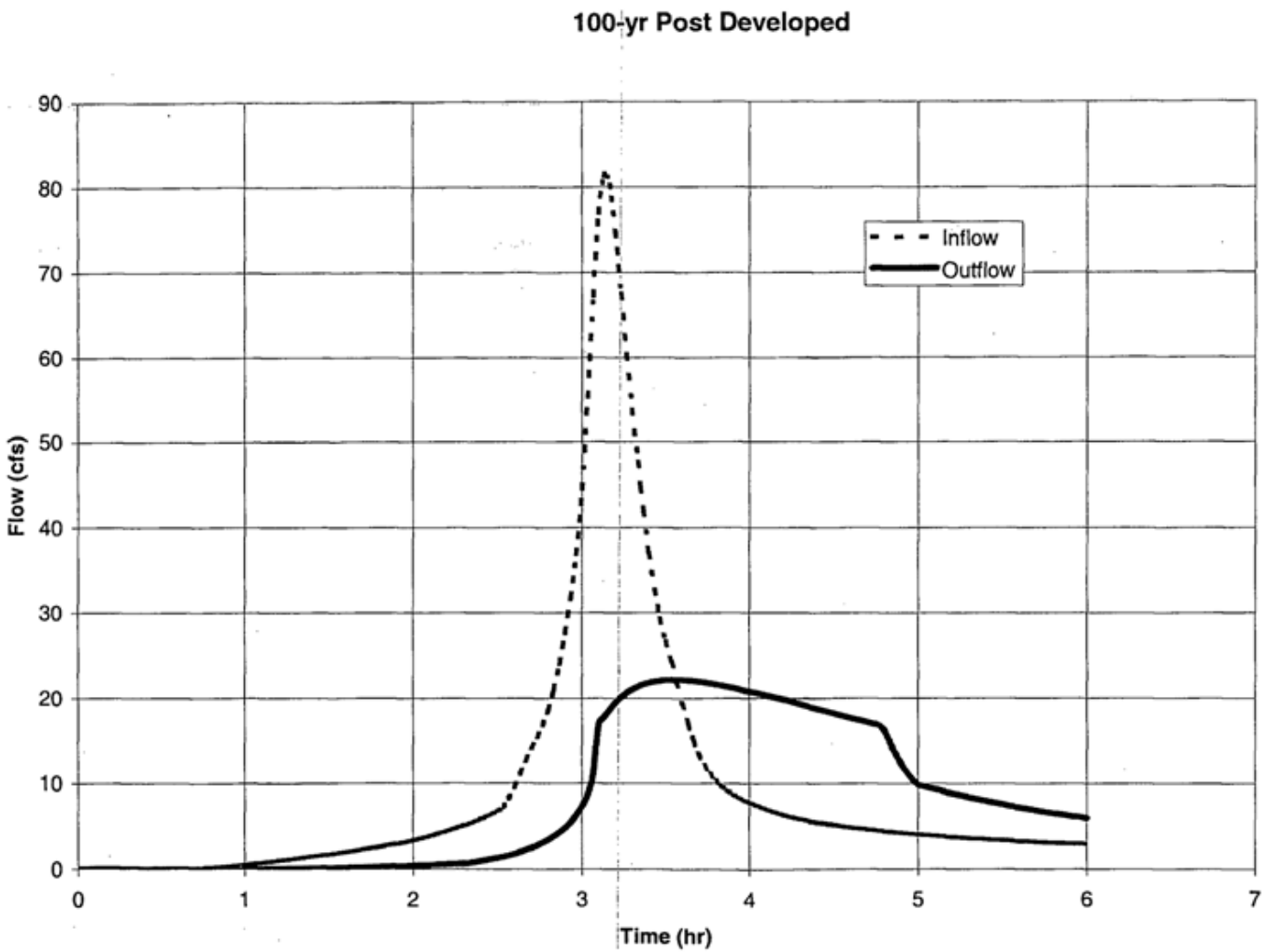

BEFORE
27th & Crossgate
Drive


AFTER
27th & Crossgate Drive

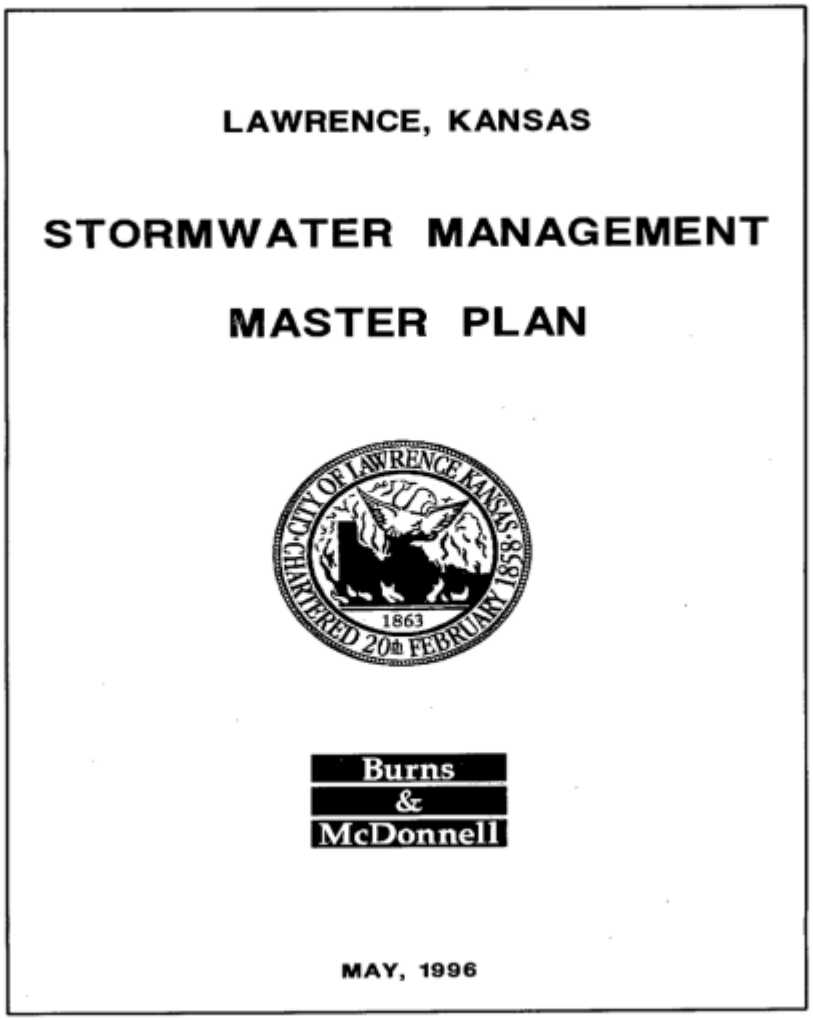
Detention Basin



Detention - Reshapes the hydrograph



POLLUTION PREVENTION



Water Quantity

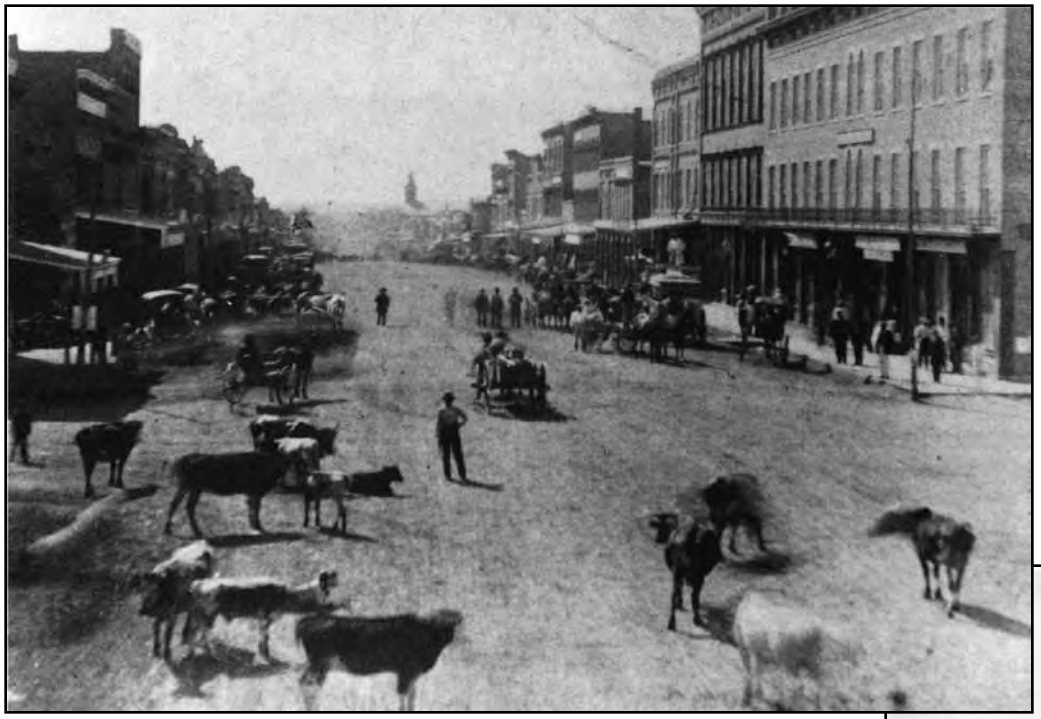
Water Quality

Stormwater Quality

rain

runoff

river



19th Century Lawrence

20th Century Lawrence

21st Century Lawrence

Increased Runoff

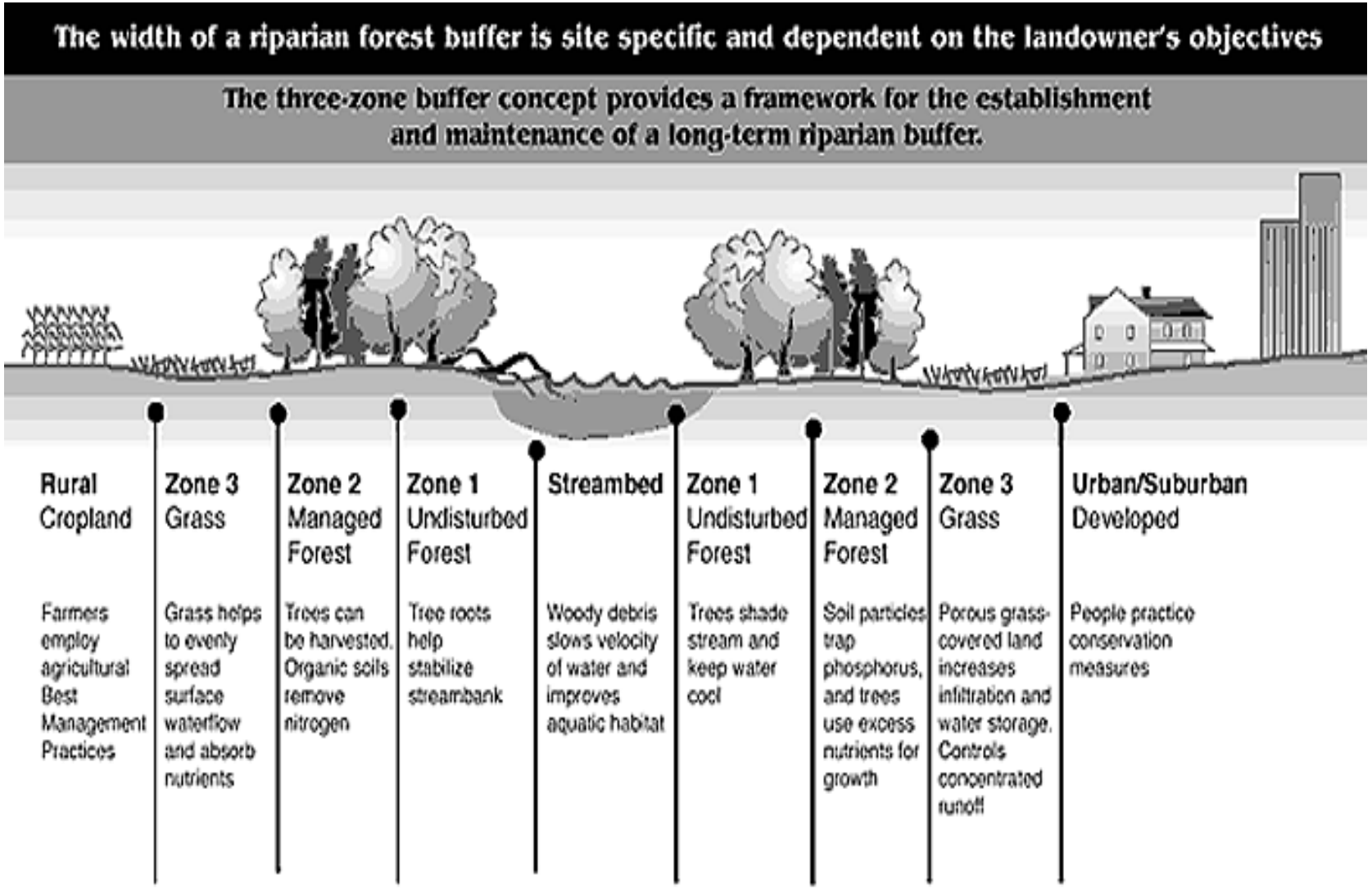
Flooding

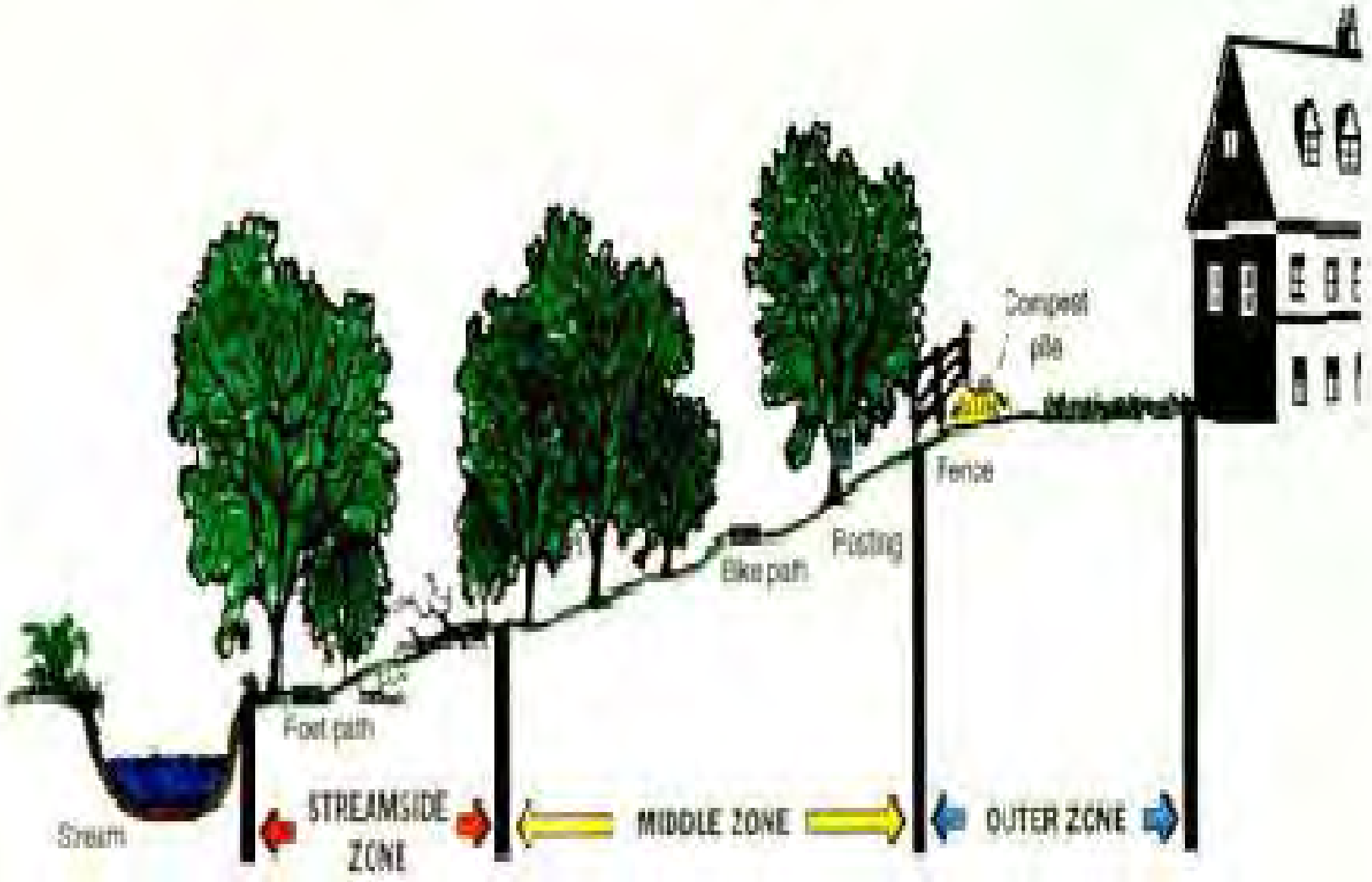
Pollution

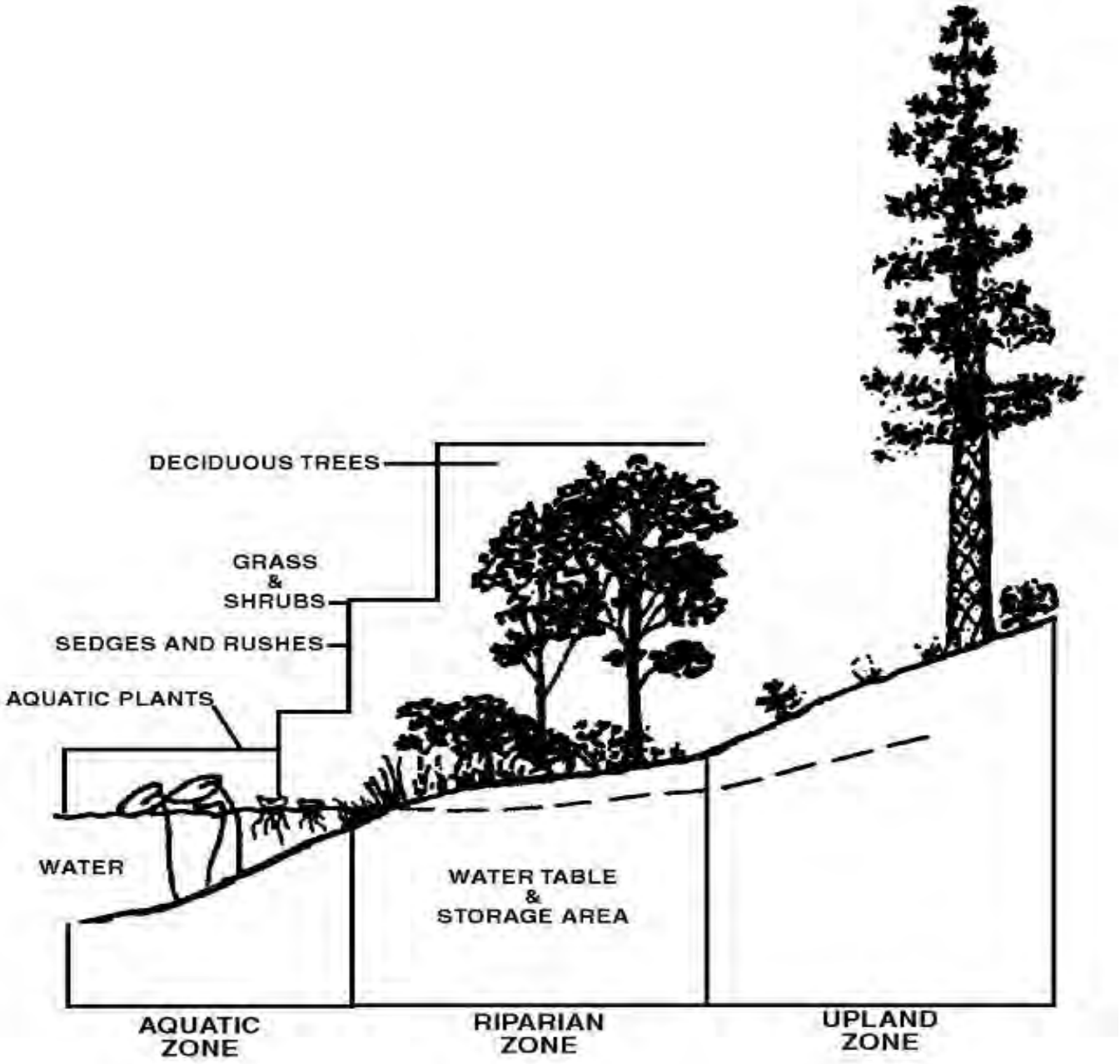
Examples of Stormwater Pollution

Sediment, trash & litter, oils (automotive fluids)

RIPARIAN BUFFER ZONES

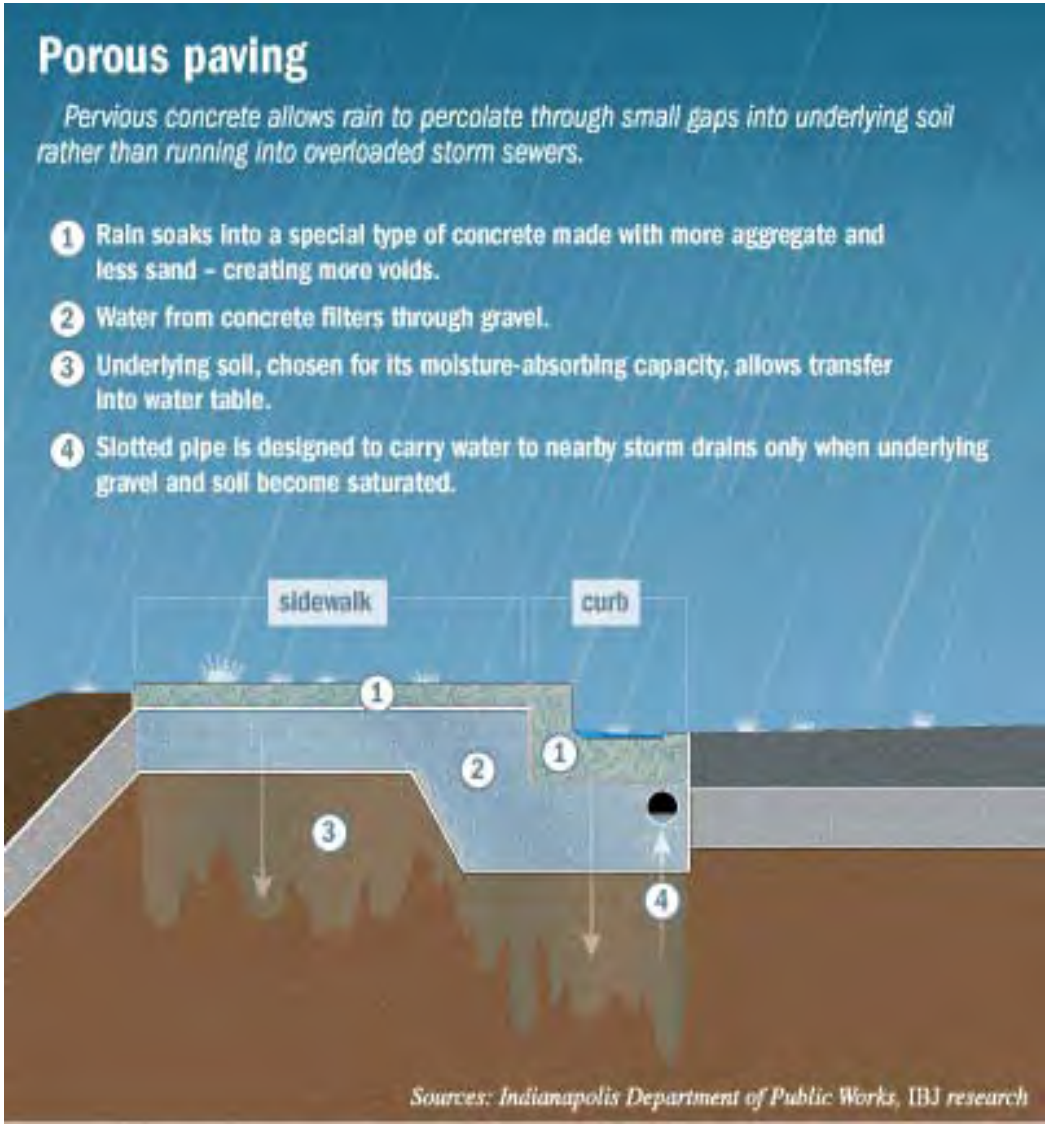


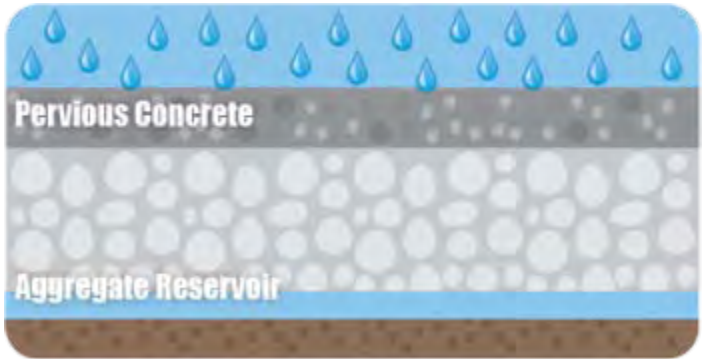

Compost
pile
Fence
Posting
Bike path
Foot path
Stream
STREAMSIDE
ZONE
MIDDLE ZONE
OUTER ZONE


DECIDUOUS TREES
GRASS
&
SHRUBS
SEDGES AND RUSHES
AQUATIC PLANTS
WATER
WATER TABLE
&
STORAGE AREA
AQUATIC
ZONE
RIPARIAN
ZONE
UPLAND
ZONE

ROADSIDE DRAINAGE

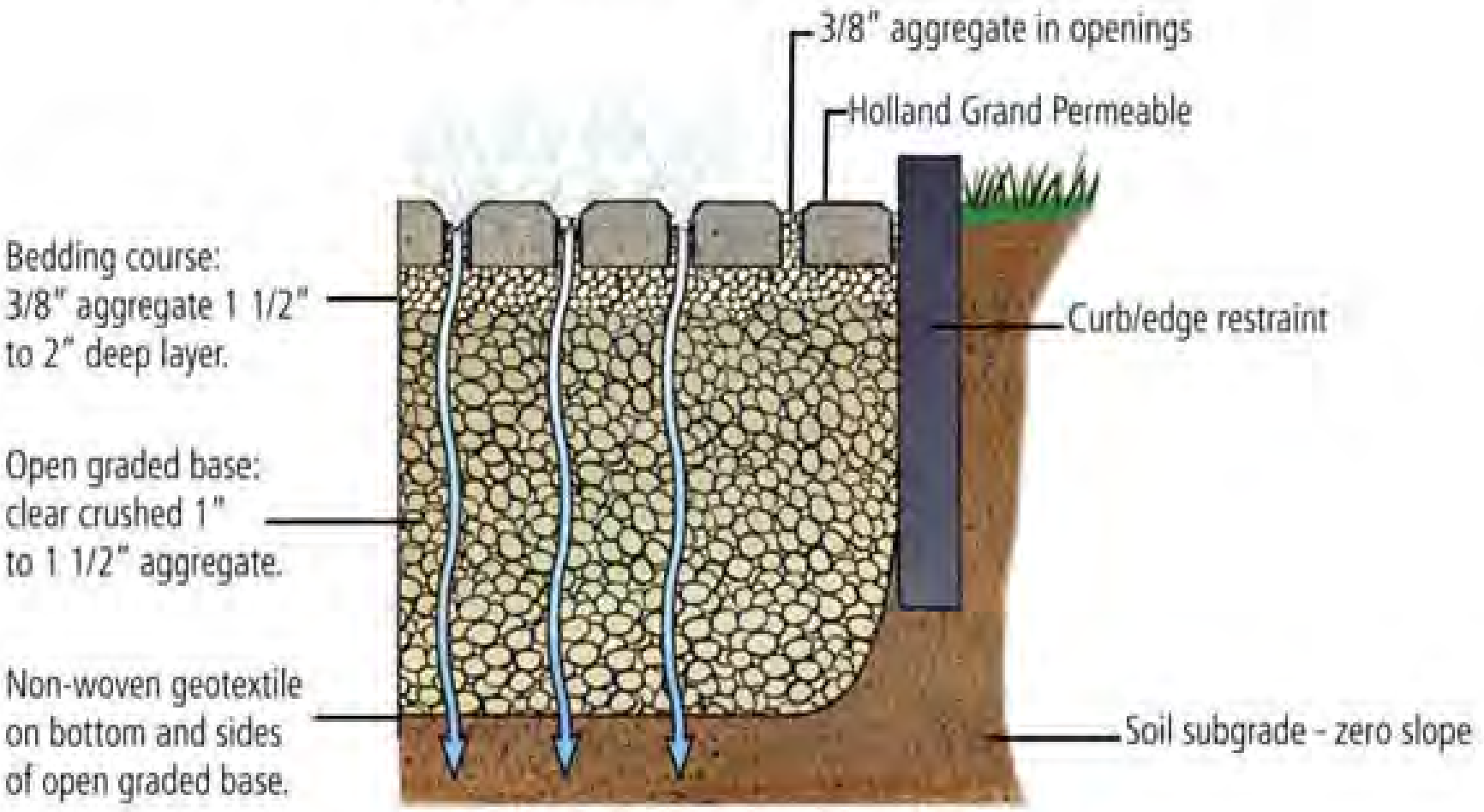
POROUS PAVMENT



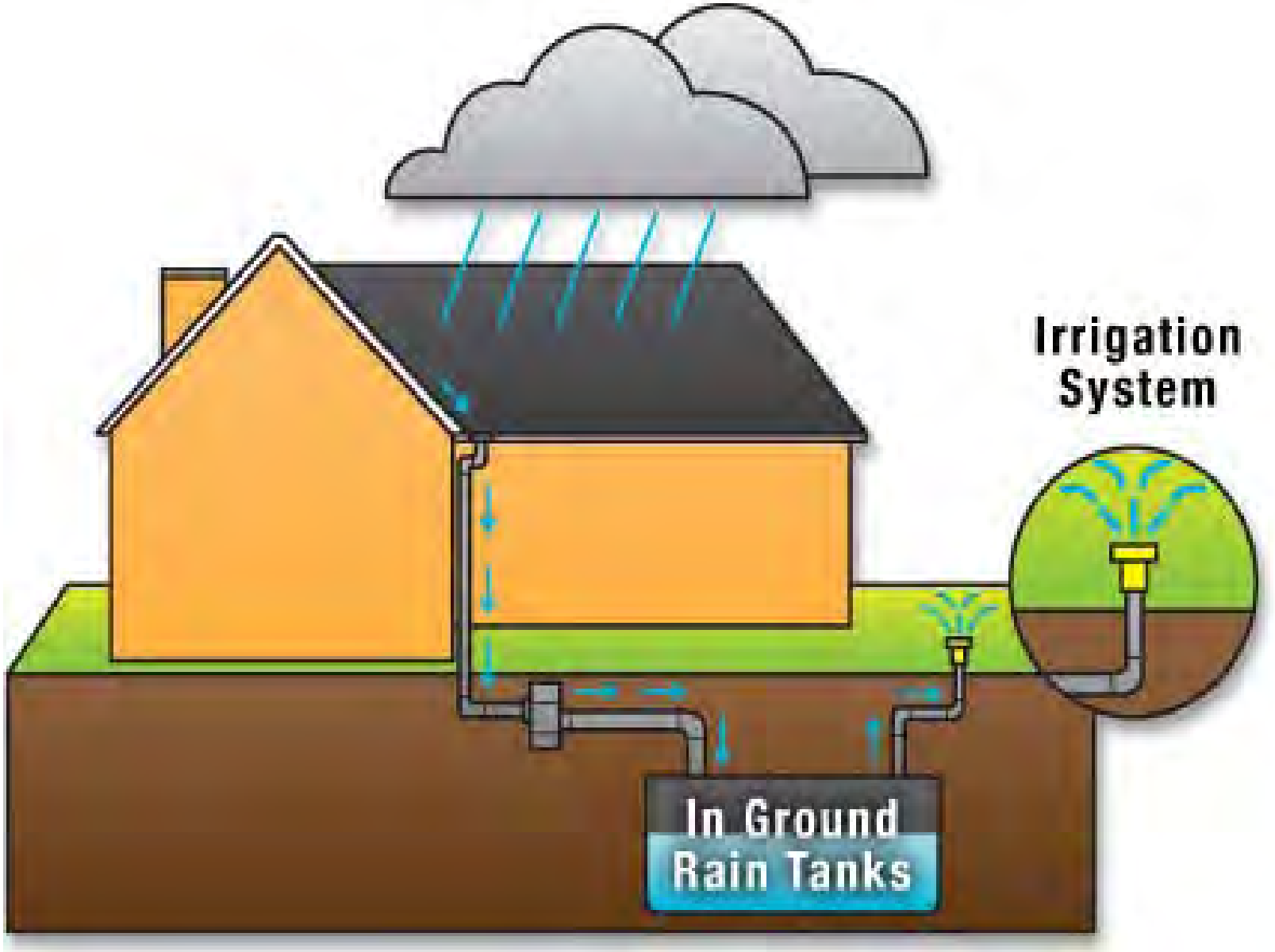


PERVIOUS / PERMEABLE PAVERS

Typical Permeable Paver Installation



RAINWATER HARVESTING


Irrigation System
In Ground Rain Tanks

Rain Barrels

Pollutants In Our Stormwater

Pet Waste

Sediment

Fertilizers and Lawn Chemicals

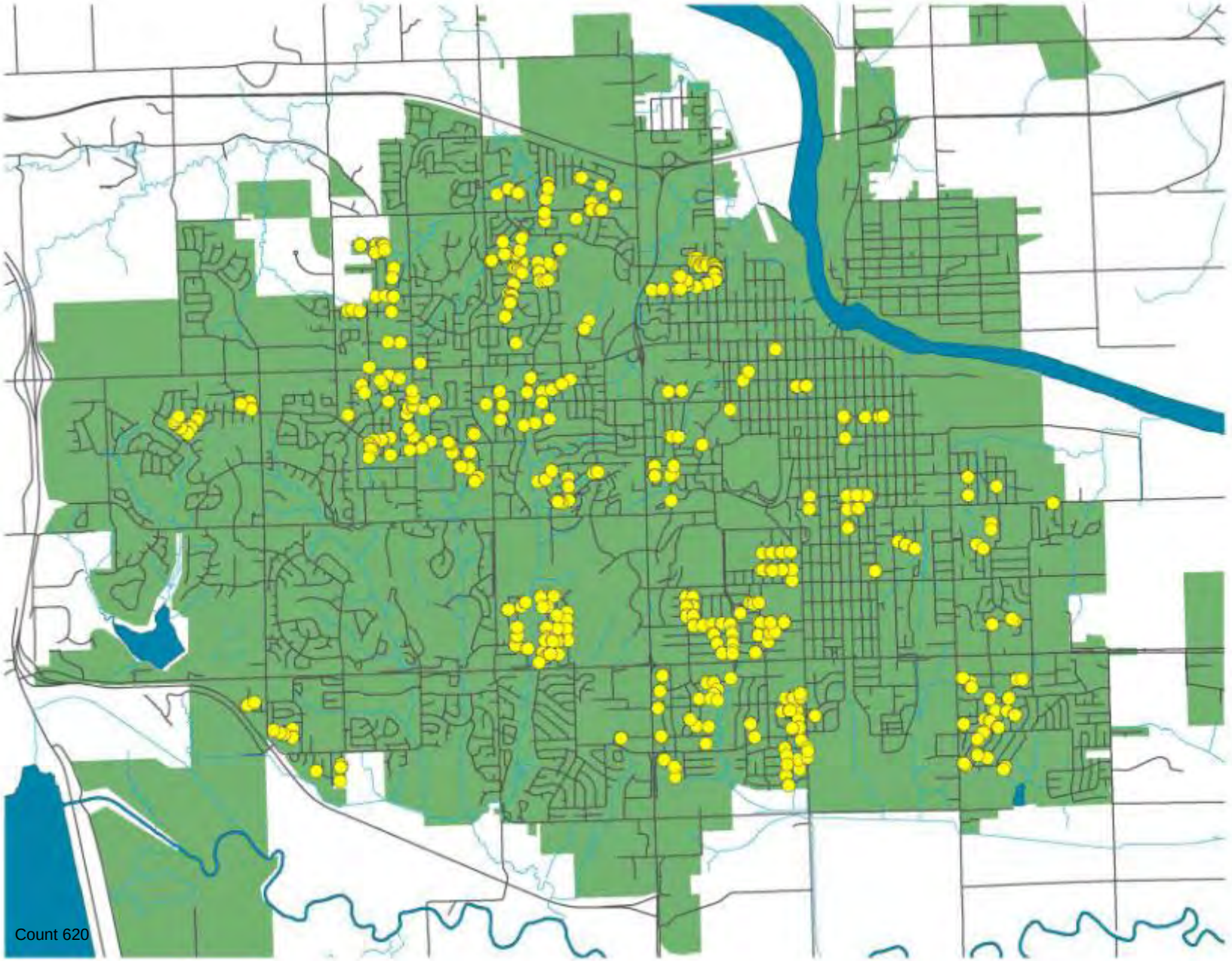
Detergents and Paint

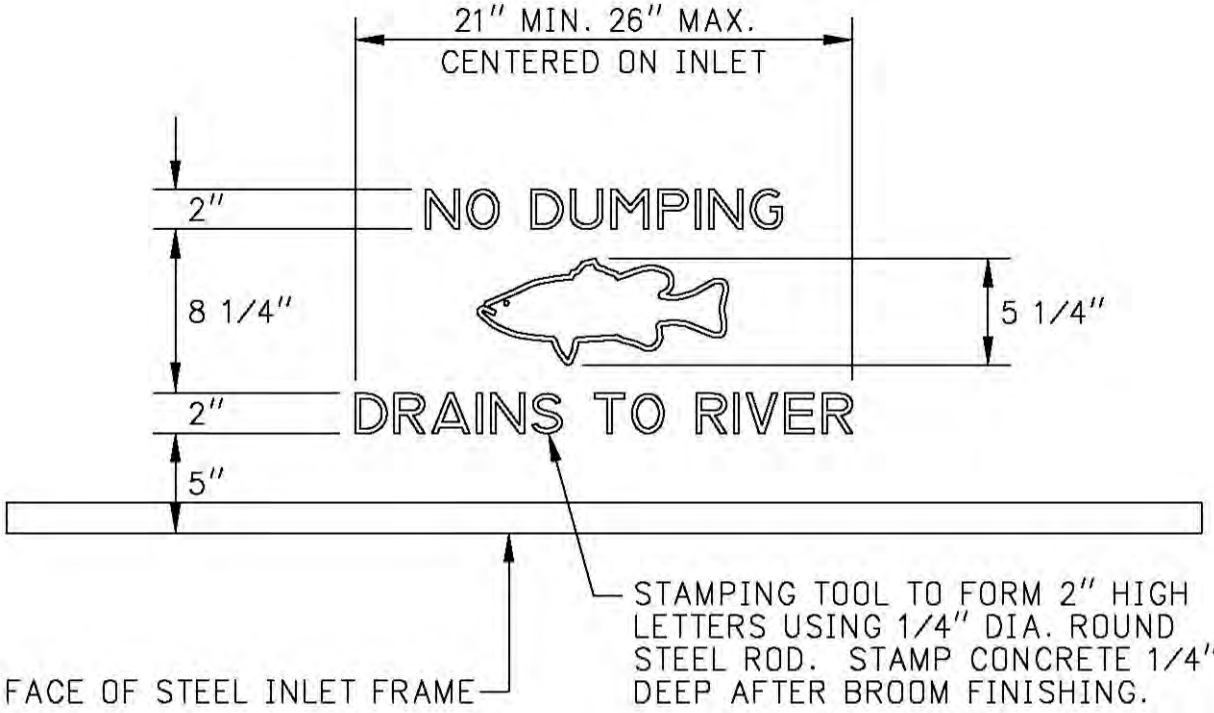
Yard Waste

Motor Oil and Antifreeze


NO DUMPING
DRAINS TO RIVER


NO DUMPING
DRAINS TO RIVER


Count 620



PLAN

SCALE 1" = 1'-0"

CURB INLET STAMP


NO DUMPING
DRAINS TO RIVER


DRAINS TO RIVER

STOP WORK

STORMWATER VIOLATION

All construction permits and inspections are on hold until violation is resolved.

City of Lawrence - Department of Public Works
Contact: 785-832-3136

DO NOT REMOVE SIGN - TO BE REMOVED BY CITY PERSONNEL ONLY

Ordinance No. 7373

Notice of Violation

City of Lawrence — Department of Public Works

Stormwater Pollution

Responsible Person _____

Date of Violation _____ Location _____

Description of Violation _____

Remedy _____

_____ to be completed by _____

City of Lawrence laws prohibit the discharge of pollutants to the stormwater drainage system. Potential enforcement actions may include stop work orders, abatement and recovery of costs, termination of city services, prosecution and/or fines. You may appeal this notice in writing within 15 days of the notice date. Appeals should be addressed to the Director of Public Works, P.O. Box 708, Lawrence, KS 66044, 785-832-3123.

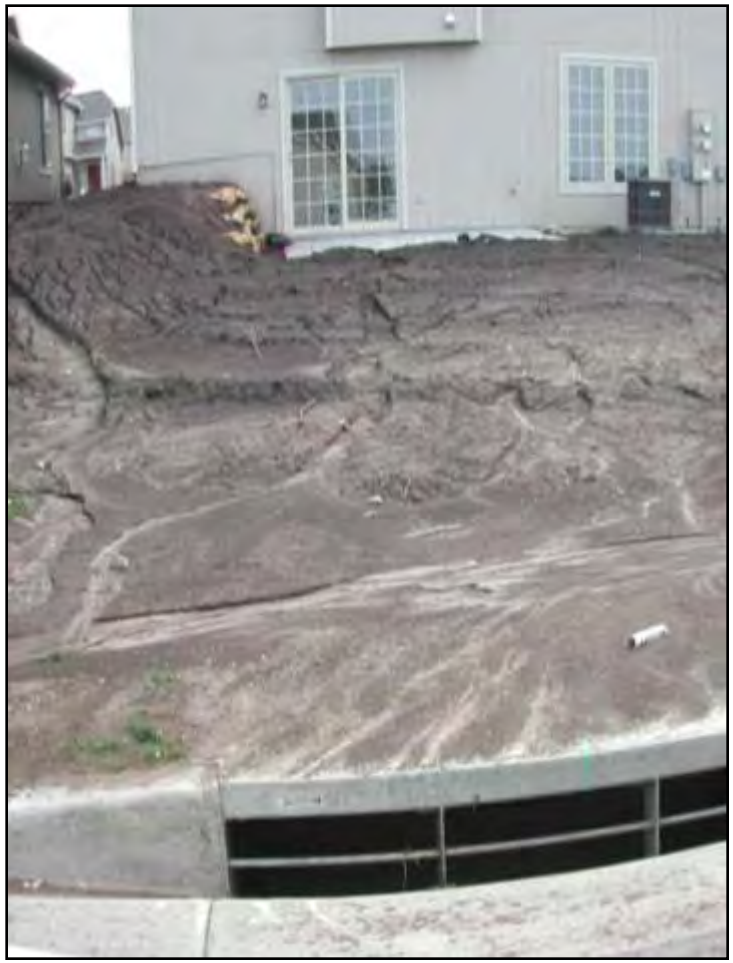
_____ _____

Signature of responsible person (optional) *Date*

_____ _____

Enforcement personnel *Phone number* *Notice Date*

Construction Site Violations



Gravel Construction Entrance

Sediment Barrier

(Silt Fence)

Hydromulch

Post Construction Ordinance

Establish post construction Best Management Practices (BMPs) to address water quality. Post construction quality must meet pre-construction quality.

BMPs could include:

- *Preservation of existing vegetation*
- *Wetland / Extended Detention*
- *Porous Pavement*
- *Bioretention*
- *Rain Gardens / Rain Barrels*

Haskell Settling Basin

Rain Gardens

A beautiful choice for stormwater

-Rain Garden-

Collects runoff from roof and yard, keeping it out of stormwater drainage system.

Allows pollutants to be filtered out and decreases localized flooding.

13th & Oregon

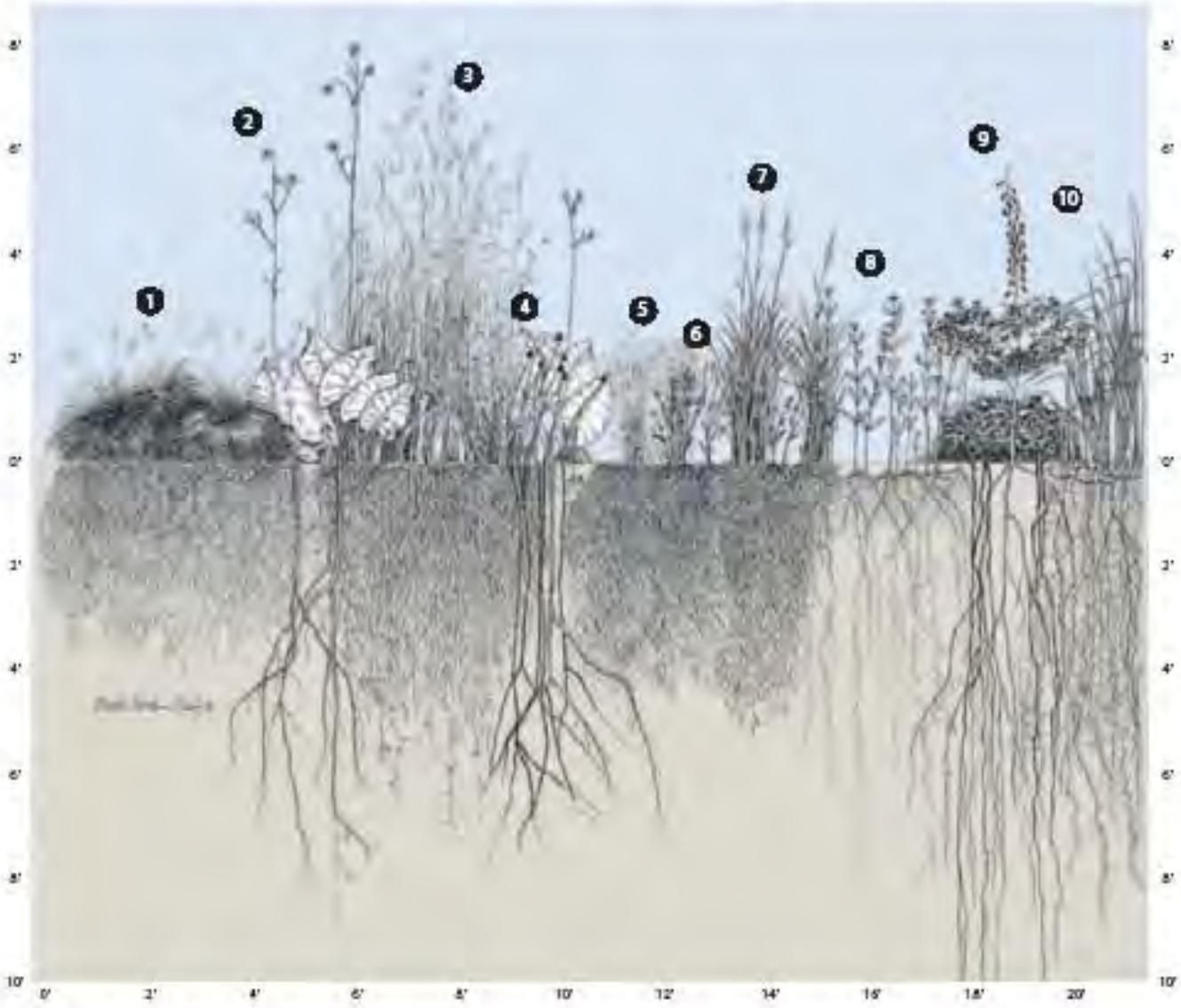
Other options for volume and quality.

Bioretention

Modular Porous Pavers

Porous Pavement

Power of the Prairie: Roots!



1. Prairie Dropseed
2. Prairie Dock
3. Big Bluestem
4. Pale Purple Coneflower
5. Little Bluestem
6. Black Eyed Susan
7. Indiangrass
8. Showy Sunflower
9. White False Indigo
10. Prairie Cordgrass

7,586 miles of streets swept in 2014

Tons of yard waste collected 9,125.13.

1210 catch basins cleaned, 620 linear feet of pipe cleaned, 2,617 linear feet of ditch dipped in 2014.

All waste oil from City's maintenance facility is recycled.

Wakarusa (Baker) Wetlands
Total Maximum Daily Load (TMDL) for Dissolved Oxygen

Decreased dissolved oxygen due to:

- **Increased organic materials such as yard waste and pet waste.**
- **Increased nutrients from fertilizers and pet waste.**
- **Increased temperature.**
- **Increased sediments especially salts.**

Stormwater Pollution

Stormwater pollution is caused by the daily activities of people everywhere. Rainwater and snowmelt run off streets, lawns, construction and industrial sites and pick up fertilizers, dirt, pet waste, pesticides, leaves oil and grease and many other pollutants on the way to our streams, rivers and lakes.

For more information, contact:

Patty Ogle, Stormwater Quality Technician
785-832-3136

or visit us online at:
www.lawrenceks.org/stormwater
www.lawrencerecycles.org

City of Lawrence, Kansas

Construction Site Pollution

Our ***storm sewer system*** consists of streets, curb inlets, surface drains and ditches. Runoff from rainfall and snow melt enters this system and is then discharged directly into our streams and rivers without treatment.

Construction site debris and sediment can obstruct this system and discharge harmful pollutants into water bodies. Pollutants commonly discharged from construction sites include sediment, solid waste, construction materials, concrete truck washout, paint, oil and debris.

For more information contact:

Shawna Trarbach, Stormwater Quality Technician
785-832-3136

www.lawrenceks.org/public_works/stormwater

City of Lawrence
PUBLIC WORKS

Yard Waste

Yard waste entering storm drains or streams increases the risk of ***flooding*** and adds ***pollutants*** to the environment. Leaves, grass clippings and other yard waste should be composted or placed in acceptable containers for curbside pick-up.

Leaves and grass clippings should not be left along the street.

Yard waste should not be placed in or near streams and creeks.

Yard waste clogs the stormwater system and must be removed by city crews to prevent flooding.

City of Lawrence, KS
Stormwater Division
785-832-3136
www.lawrenceks.org/stormwater

Congratulations on your new pet!

Please be a responsible pet owner and remember to clean up and properly dispose of your pet's waste. Pet waste left in yards, parks and other outdoor areas washes away with rain or snowmelt into storm sewers or ditches that flow directly into our streams, lakes and rivers. Pet waste contains bacteria and excess nutrients that have been identified as primary pollutants in the Kansas River and local streams and ponds. These pollutants destroy our natural resources and threaten public health. With 68 million dogs and 73 million cats in the United States, it all adds up.

To properly dispose of pet waste, please flush it down the toilet or place it in a bag and throw it in the trash.

For more information contact Patty Ogle, Stormwater Quality Technician at **832-3136**
or visit us online at **www.lawrenceks.org/stormwater**
City of Lawrence, Kansas

Scoop Your Poop!

Please be a responsible pet owner and remember to clean up and properly dispose of your pet's waste.

Pet waste left in yards, parks, and other outdoor areas washes away with rain or snow melt into storm sewers or ditches that flow directly into our streams, lakes and rivers. Pet waste contains bacteria and excess nutrients that have been identified as primary pollutants in the Kansas River and local streams and ponds. These pollutants destroy our natural resources and threaten public health. With 68 million dogs and 73 million cats in the United States, it all adds up!

To properly dispose of pet waste, flush it down the toilet or place it in a bag and throw it in the trash.

For more information contact

Patty Ogle, Stormwater Quality Technician
at 832-3136

or visit us online at
www.lawrenceks.org/stormwater

City of Lawrence, Kansas

BMPs

for

Pressure Washing

and

Surface Cleaning

Public Works - Stormwater Division

City of Lawrence, KS

November, 2004


QUESTIONS?
www.lawrenceks.org/stormwater