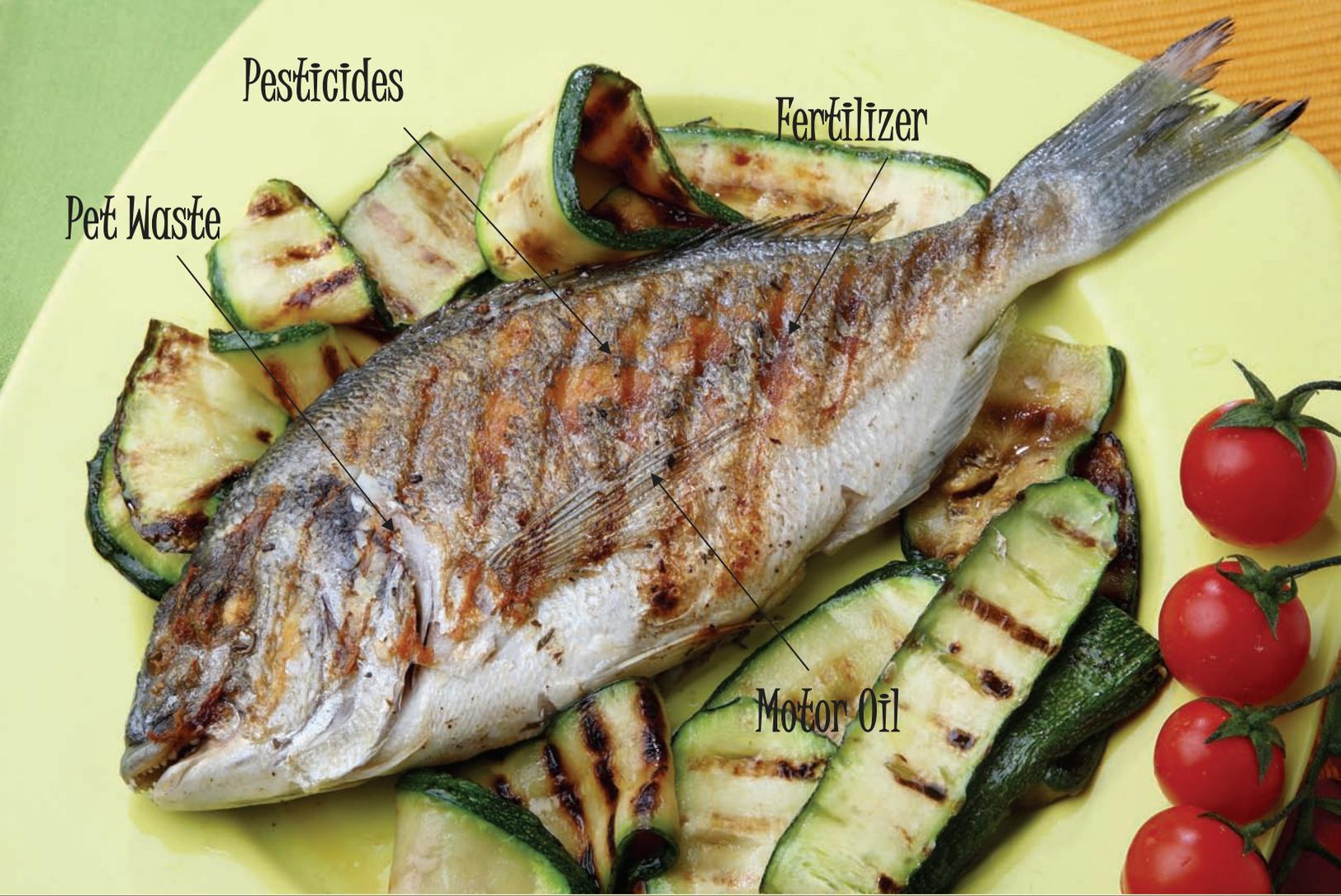




The Citizen's Guide to Stormwater Pollution Prevention
If it's on the ground, it's in your water!





What's On Your Plate ?

Everything that goes into our storm drains makes its way to our rivers, lakes, and streams—to the places where we fish.

Never throw anything down the storm drain.



To find out more visit:
www.arlingtontx.gov/stormwater



The information contained in this guide is being offering by the City of Arlington, TX through its Public Works & Transportation (PWT) Department for the use of residents of the City.

Please note that the stormwater management projects, tips, and Best Management Practices (BMPs) listed in this guide are voluntary projects recommended strictly for homeowners. They are not designed for professionals required to comply with the City's or other government entity's Stormwater Regulations.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)

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A Guide for Citizens

Robert D. Lowry, P.E.
Director, Public Works & Transportation

The City of Arlington Public Works & Transportation Department has created this guide as an attempt to foster an appreciation of the environmental concerns associated with stormwater and the work done by stormwater management practitioners.

Every year, thousands of gallons of water flow into the **municipal separate storm sewer system (MS4)**. Most people don't think about how this water is collected, or where it goes.

In order to achieve the goal of "a Clean, Green Arlington," we must work together with our local residents, civic organizations, and homeowner associations on managing stormwater in a way that will protect our valuable water resources. We all play a part in creating water pollution and must therefore all play a part in actively converting our streams, creeks, lakes, and rivers into healthy systems that local residents, along with native fish and wildlife, can use as amenities, sanctuaries, and habitats.

As a citizen of Arlington, your part can be as simple as maintaining your car properly or picking up after your pet. This guide provides you with information, steps and actions you can take to improve stormwater management on your property and in your community. These stormwater management projects will not only help protect our invaluable water sources, but they will help green the city and improve quality of life for all residents.

For more information, please visit www.arlingtontx.gov/stormwater or email stormwatereducation@arlingtontx.gov.

Key Term:
MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4): a system of conveyances that include curbs, gutters, ditches, man-made channels, pipes, tunnels, or storm drains that discharge into waters of the United States. An MS4 moves water away from an area to a local water body.

PUBLISHER
 City of Arlington, TX
 101 W. Abram St.
 PO Box 90231
 MS 01-0220
 Arlington, TX 76004-3231

DIRECTOR
 Robert D. Lowry, P.E.

**STORMWATER EXECUTIVE
 MANAGER**
 J. William Brown, P.E.

GUIDE CREATION & CHIEF EDITOR
 Dr. Brigette Gibson
 Environmental Education Specialist

COPY EDITOR
 Tim Yatko
 Commercial Sustainability
 Coordinator

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What is Stormwater and Stormwater Runoff?

Stormwater is any precipitation from a storm event (rain, snow, sleet, etc).

Stormwater runoff is any precipitation that does not soak into the ground but instead runs off its surface. Non-porous or impervious surfaces such as driveways, sidewalks, and streets block precipitation from soaking naturally into the ground. Stormwater can carry and deposit chemicals and other harmful substances into surface-water bodies.

Why should you care about Stormwater?

If stormwater is not managed properly, it can harm the environment causing:

- Increased risk of flooding
- Impaired water quality
- Increased surface runoff
- Increased soil erosion

Increased risk of flooding

High intensity thunderstorms and snowstorms are common in North Central Texas. Because urban areas have many impermeable surfaces, large volumes of water can enter the MS4.

During a rain event, thousands of gallons of water must be transported away from the street as quickly as possible. If the MS4 is clogged with debris, storm systems can become blocked and overflow. Flooding can lead to loss of life, property and infrastructure damage.



Impaired water quality



Contaminants, such as oil, grease, metals, and pesticides tend to build up on surfaces in urbanized areas. The contaminants come from sources such as pavement deterioration, tire and brake pad wear, vehicle emissions and spills. They may also come from yard and garden care, and pet feces. Stormwater runoff picks up these substances and transports them DIRECTLY to lakes, streams, rivers, or wetlands. In most cases, whatever enters a storm sewer system is discharged UNTREATED into the water bodies we use for swimming and fishing and from which we get our drinking water.

Degradation of water quality can also result in a decline in plant and animal diversity.

BOX 1	STORMWATER CONTAMINANT	SOURCE
	Suspended Solids/Sediment	Construction sites & roads
Nutrients (Nitrogen & Phosphorus)	Fertilizers, pet wastes, yard wastes, soaps & detergents	
Metals	Cars	
Oil & Grease	Cars, leaks, spills	
Bacteria	Pet wastes	
Pesticides and Herbicides	Yard and garden care	

According to the United States Environmental Protection Agency (USEPA), pollutants in stormwater discharges remain a significant source of environmental impacts to water quality. The *National Water Quality Inventory, 2002 Report to Congress* provides a general assessment of water quality based on reports submitted by the states every 2 years under Section 305(b) of the **Clean Water Act**. This report indicates that stormwater discharges (from sources including separate storm sewers, construction, waste disposal, and resource extraction) are MAJOR causes of water quality impairment.

Key Terms:

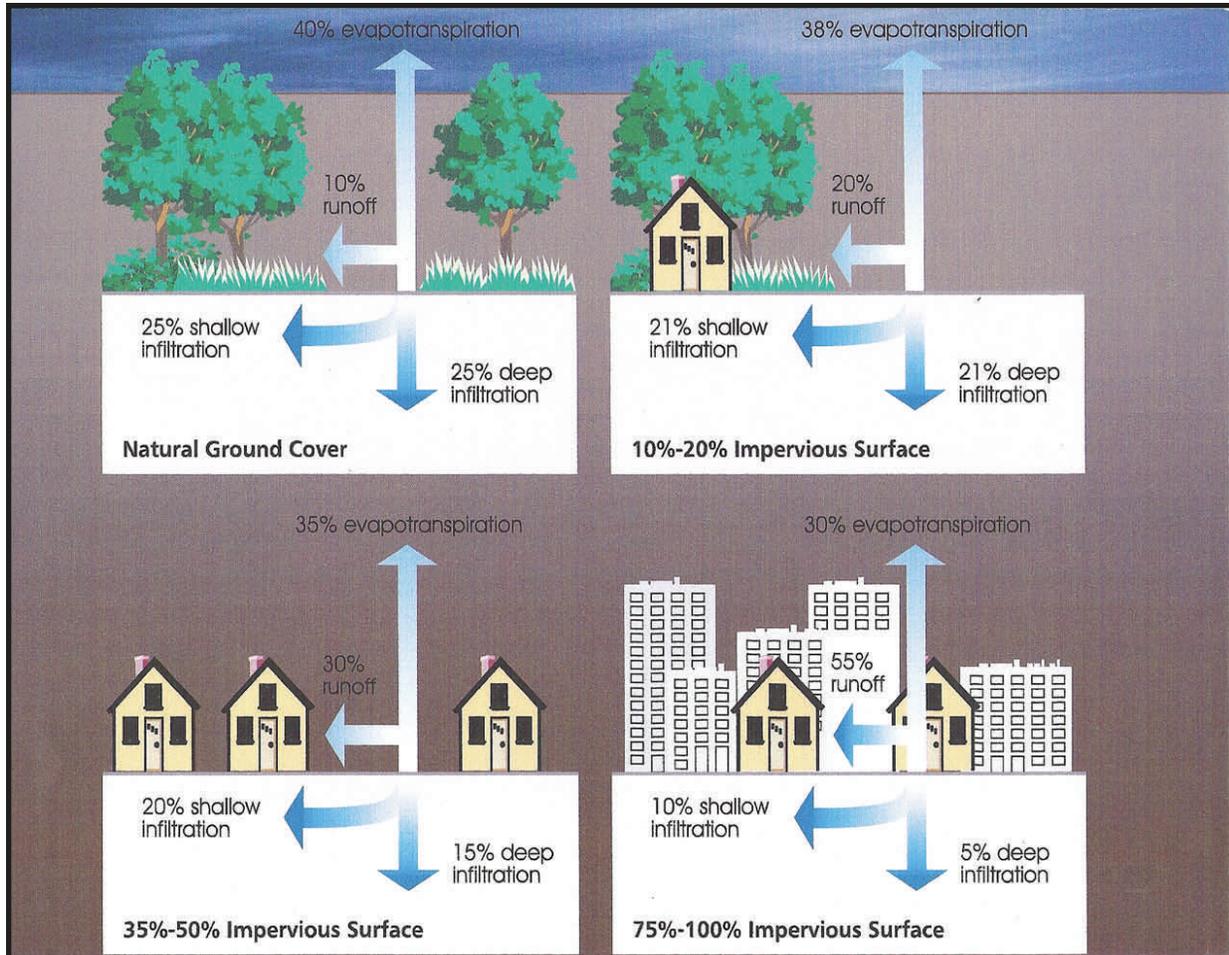
CLEAN WATER ACT (CWA): the primary federal law in the United States governing water pollution. Also known as the Federal Water Pollution Control Act.

WATER QUALITY: the physical, chemical and biological characteristics of water. The term is most frequently used to explain a set of standards against which compliance can be assessed. In lay terms, it is the safety and/or purity of water.

Increased surface runoff

When materials impervious to water, such as pavement and concrete, cover the ground, runoff increases. Differences between areas with natural ground cover (before urban development) and those with impervious cover (after urban development) are shown below. As little as 10% impervious cover in an urban area can increase surface runoff and lead to water quality problems (Source: USEPA).

Increased surface runoff means that large volumes of water enter water sources more quickly (at higher velocities) which can cause river or stream bank erosion.



Increased soil erosion

Raindrops hitting the soil's surface and the movement of water (runoff) across it cause soil erosion. Disturbed soil, lack of vegetation, or both amplify such impacts increasing erosion. Poorly controlled construction sites are also a cause of soil erosion. Not only can these sites harm aquatic environments, but adjacent properties, public roadways and drainage systems.





Example of soil disturbance or erosion. Soil movement by rainfall is usually greatest and most noticeable during short-duration, high-intensity thunderstorms. Although the erosion caused by long-lasting and less-intense storms is not as spectacular or noticeable as that produced during thunderstorms, the amount of soil loss can be significant, especially when compounded over time. Runoff can occur whenever there is excess water on a slope that cannot be absorbed into the soil or trapped on the surface.

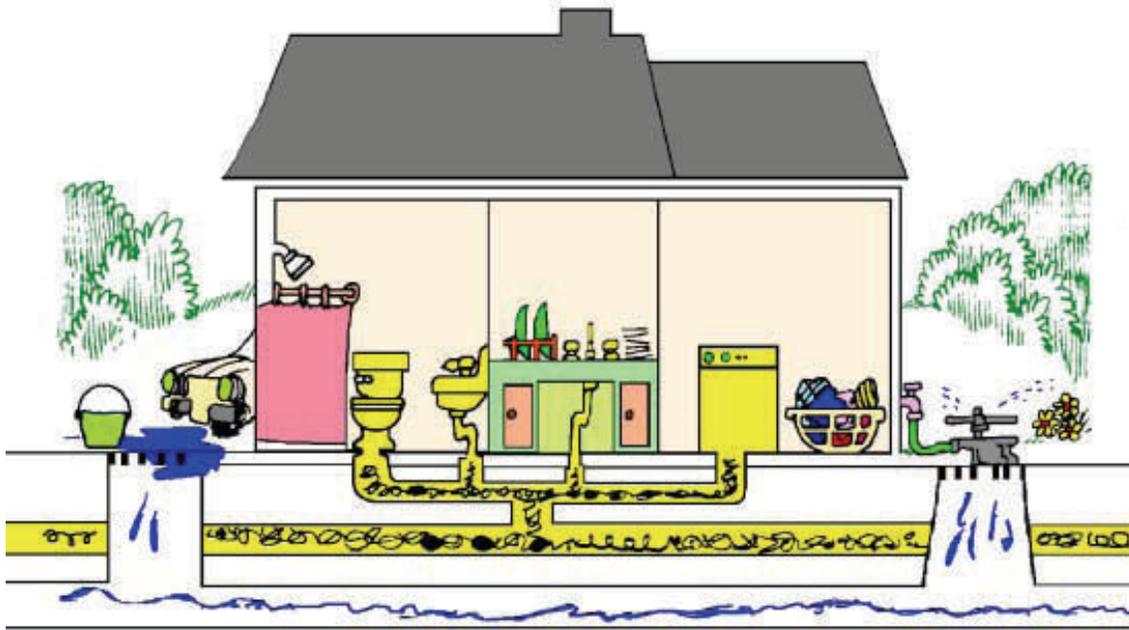
The Storm Sewer System versus Sanitary Sewer System: What's the Difference?

It's as simple as **inside vs. outside**.

Storm drain systems consist of natural and manmade channels and underground pipes that transport rainwater from streets, yards, rooftops, and other areas *outside* your home. This water goes directly to creeks, rivers, streams, and lakes carrying pollutants with it. Water entering the storm drain is not treated.

Sanitary Systems are composed of a branching network of pipes and manholes. This system is used to collect and transport the water (also known as wastewater) from sinks, washing machines, toilets, and other *indoor* plumbing. **Wastewater** entering the sanitary system flows directly to a wastewater treatment plant where it is treated, disinfected, and then released to area water sources.

These two systems are not connected.



LEFT:
The blue area in the figure represents the stormwater system (outside the home) while the yellow area represents the sanitary sewer system (inside the home).

RIGHT:

The figure shows both stormwater and sanitary underground system. Note that the systems are not interconnected.

Key Term:

WASTEWATER: Water that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products; sewage.

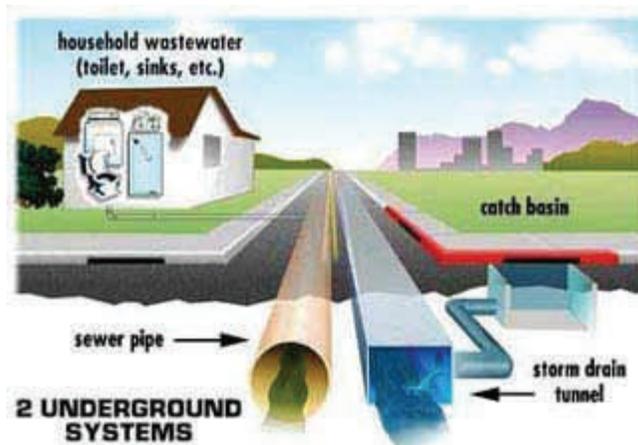


Photo provided by: City of Reno, NV.

Why Stormwater is not Treated

Many people wonder why stormwater goes untreated. Here's why:

Simply, gutters (curb inlets/catch basins) are designed to prevent flooding. Their job is to remove water from the street as quickly as possible during a rainstorm or other precipitous event. The storm drain system they deposit into is designed to remove water from the streets and dispose of it quickly. The quickest way to dispose of thousands of gallons of water is to allow it to flow into rivers, lakes, or streams, *immediately*.



Photo courtesy of: www.dipity.com

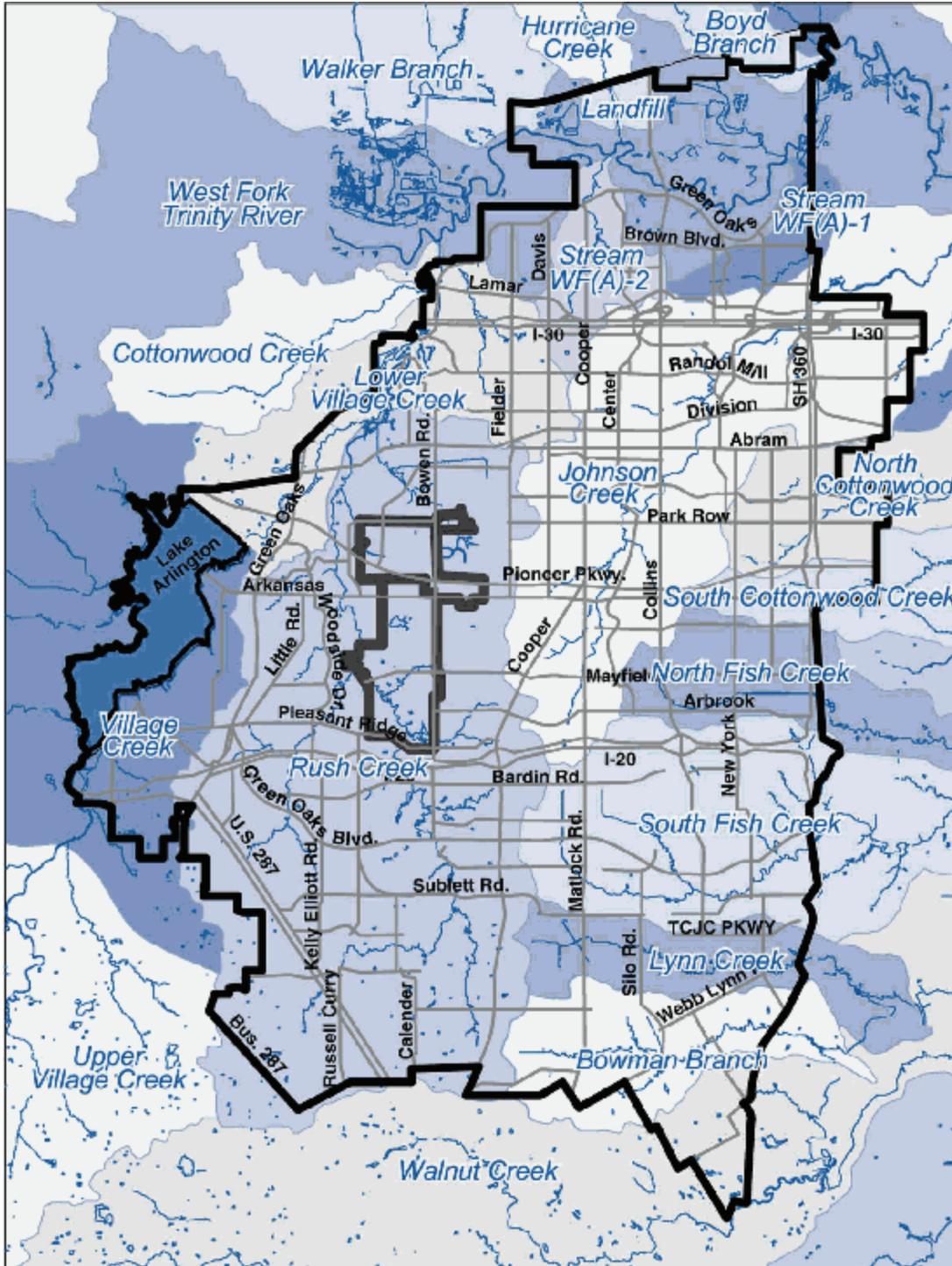
In addition, because stormwater comes in large amounts at unpredictable times, treating it as wastewater would be very expensive and quite unmanageable. If the sanitary and storm sewer systems were combined, many treatment plants would not be able to handle the quantity and velocities of water that intense storms produce.



Photo Courtesy of: www.canada.com

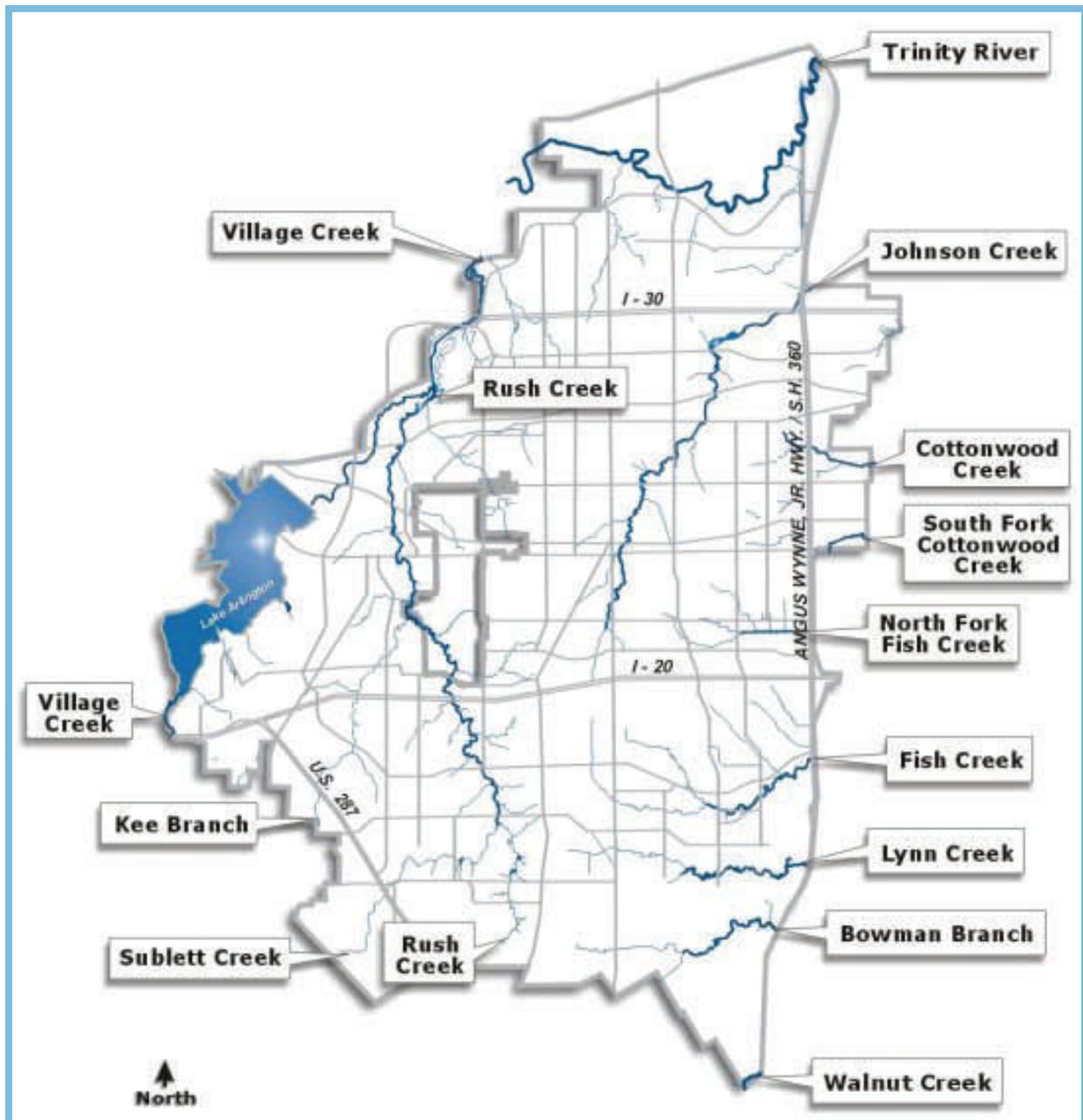
Watersheds

What is a watershed? A watershed is an area of land that catches rain and snow and drains or seeps into a water source, eventually making its way to lakes, rivers, and eventually the ocean. A watershed carries water “shed” from the land.



The Arlington, Texas Watershed. Note the interconnectedness of the water sources. Stormwater runoff flows directly to these sources.

Arlington, Texas Creek Map. Note: One of the most well-known (and problematic) creeks in Arlington is **Johnson Creek**. Johnson Creek has been the topic of extensive study by the Corps of Engineers and the City of Arlington since the early 1980s due to a history of flooding, extensive erosion and sedimentation, recreational challenges and opportunities, and important wildlife habitat. According to a 2006 report, sedimentation and erosion leading to poor water quality and unstable stream banks is the most serious threat to the ecological integrity of the Johnson Creek corridor. (Source: *Johnson Creek: A Vision of Conservation* 2006 report to the City of Arlington by Applied Ecological Services, Inc.)





The ultimate goal of stormwater management is to maintain the health of streams, lakes, rivers, and other water sources as well as aquatic life. Stormwater managers also wish to provide opportunities for human uses of water by mitigating the effects of urban development. To achieve this goal, stormwater management strives to maintain the natural hydrologic cycle, prevent an increased risk of flooding, prevent undesirable stream erosion, and protect water quality.

The federal Clean Water Act (CWA), directs all municipalities to improve stormwater quality and protect watersheds, rivers, streams, and drinking water sources. The City of Arlington Public Works & Transportation Department coordinates the citywide response to the federal and state stormwater permits that require the City to reduce stormwater pollution, and oversees other programs that respond to water quality requirements.



Rules and Regulations: CWA/NPDES/TPDES

In 1972, amendments to the Clean Water Act prohibited discharge of any pollutant from a point source into U.S. waters. The USEPA regulates stormwater through the National Pollutant Discharge Elimination System (NPDES), pursuant to subsequent amendments to the Clean Water Act. The Texas Commission on Environmental Quality (TCEQ) operates the NPDES program under the Texas Pollutant Discharge Elimination System (TPDES).



Three stormwater activities are regulated: municipal separate storm sewer systems (MS4s), industrial activities and construction activities.

Issued in 1990 under the Clean Water Act, Phase I of the USEPA's stormwater program relies on NPDES permit coverage to address stormwater runoff from:

- Medium and large municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater
- Eleven categories of industrial activity
- Construction activity disturbing 5 or more acres of land

Phase II regulates construction activities covering between 1 and 5 acres and regulated small MS4s. Phase II expands the Phase I program to include additional operators of MS4s in urbanized areas and operators of small construction sites. Phase II requires such operators, through the use of TPDES permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to reduce even further adverse impacts to water quality and aquatic habitat; it institutes the use of controls on the unregulated stormwater discharge that have the greatest likelihood of causing continued environmental degradation.

Key Terms:

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES): a provision of the Clean Water Act (CWA) prohibiting discharge of pollutants into waters of the United States unless a special permit has been issued by the USEPA, a state, or where delegated a tribal government on a Native American reservation.

TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM (TPDES): The State of Texas has assumed the authority to administer the NPDES program in Texas. The Texas Commission on Environmental Quality's TPDES program now has federal regulatory authority over discharges of pollutants into Texas surface water, except for discharges associated with oil, gas, and geothermal exploration and development activities, which are regulated by the Railroad Commission of Texas.

Under Phase I of the TPDES Stormwater Program, operators of large and medium MS4s require a TPDES permit authorizing them to discharge pollutants. Medium and large MS4 operators must submit comprehensive permit applications and are issued individual permits. A proposed stormwater management program must be developed that would meet the standard of reducing pollutants to the maximum extent practicable. Stormwater management programs for medium and large MS4s include measures to:

- Identify major outfalls and pollutant loadings
- Detect and eliminate non-stormwater discharges to the system
- Reduce pollutants in runoff from industrial, commercial, and residential areas
- Control stormwater discharges from new development and redevelopment areas

Only a select subset of small MS4s, referred to as regulated small MS4s, are required to have Phase II TPDES stormwater permits (No. TXR 040000). Regulated small MS4s are defined as (1) all small MS4s located in urbanized areas as defined by the Bureau of the Census and (2) small MS4s located outside of a UA but designated by TCEQ. An **urbanized**



area comprises one or more central places plus the adjacent densely settled surrounding area (urban fringe), together having a residential population of at least 50,000. Urbanized areas in Texas have (1) an overall population density of at least 1,000 people per square mile or (2) are so designated by a regulatory agency. Regulated small MS4 operators may choose to be covered by an individual permit, by a general permit, or by a modification of an existing Phase I

MS4's individual permit. Some regulated small MS4s in UAs may be eligible for a waiver from TPDES stormwater permitting requirements.

Regulated small MS4s are required to design their programs:

- To reduce their discharge of pollutants to the maximum extent practicable
- To protect water quality
- To satisfy the appropriate Clean Water Act water quality requirements

BOX 2

<i>Urbanized Areas</i>		<i>Outside Urbanized Areas</i>		
<i>Place</i>	<i>Population 2000</i>	<i>Place and County</i>	<i>Population 2000</i>	<i>Population Density (per sq. mile)</i>
Abilene, TX	107,041	Alice city, Jim Wells County	19,010	1,597.40
Amarillo, TX	179,312	Bay City city, Matagorda County	18,667	2,196.00
Austin, TX	901,920	Beeville city, Bee County	13,129	2,149.70
Beaumont, TX	139,304	Big Spring city, Howard County	25,233	1,320.40
Brownsville, TX	165,776	Borger city, Hutchinson County	14,302	1,637.90
College Station–Bryan, TX	132,500	Brenham city, Washington County	13,507	1,541.50
Corpus Christi, TX	293,925	Burkburnett city, Wichita County	10,927	1,149.50
Dallas–Fort Worth–Arlington, TX	4,145,659	Canyon city, Randall County	12,875	2,600.00
Denton–Lewisville, TX	299,823	Corsicana city, Navarro County	24,485	1,180.40
El Paso, TX–NM	648,465	Del Rio city, Val Verde County	33,867	2,194.00
Galveston, TX	54,770	Dumas city, Moore County	13,747	2,681.00
Harlingen, TX	110,770	Eagle Pass city, Maverick County	22,413	3,030.30
Houston, TX	3,822,509	El Campo city, Wharton County	10,945	1,465.80
Killeen, TX	167,976	Fort Stockton city, Pecos County	7,846	1,531.30
Lake Jackson–Angleton, TX	73,416	Gatesville city, Coryell County	15,591	1,794.20
Laredo, TX	175,586	Georgetown city, Williamson County	28,339	1,241.30
Longview, TX	78,070	Hereford city, Deaf Smith County	14,597	2,600.80
Lubbock, TX	202,225	Huntsville city, Walker County	35,078	1,135.10
McAllen, TX	523,144	Jacksonville city, Cherokee County	13,868	981.00
McKinney, TX	54,525	Kerrville city, Kerr County	20,425	1,222.50
Midland, TX	99,221	Kingsville city, Kleberg County	25,575	1,848.80
Odessa, TX	111,395	Levelland city, Hockley County	12,866	1,296.50
Port Arthur, TX	114,656	Lockhart city, Caldwell County	11,615	1,032.70
San Angelo, TX	87,969	Lufkin city, Angelina County	32,709	1,225.10
San Antonio, TX	1,327,554	Nacogdoches city, Nacogdoches County	29,914	1,185.90
Sherman, TX	56,168	New Braunfels city (Comal and Guadalupe Counties)	36,494	1,247.70
Texas City, TX	96,417	Pampa city, Gray County	17,887	2,050.00
The Woodlands, TX	89,445	Port Lavaca city, Calhoun County	12,035	1,229.90
Tyler, TX	101,494	Port Neches city, Jefferson County	13,601	1,490.40
Victoria, TX	61,529	Rio Grande City city, Starr County	11,923	1,571.60
Waco, TX	153,198	Robstown city, Nueces County	12,727	1,054.60
Wichita Falls, TX	99,396	San Marcos city (Caldwell and Hays Counties)	34,733	1,907.50
		Seguin city, Guadalupe County	22,011	1,157.20
		Snyder city, Scurry County	10,783	1,256.80
		Stephenville city, Erath County	14,921	1,488.30
		Sweetwater city, Nolan County	11,415	1,139.40
		Taylor city, Williamson County	13,575	1,003.20
		Uvalde city, Uvalde County	14,929	2,220.20
		Vernon city, Willbarger County	11,660	1,439.20

Areas regulated as MS4s. (Source: Texas AgriLife Extension Office.)

Rules and Regulations: City of Arlington Stormwater Pollution Control Ordinance

In December 1996, the Arlington City Council adopted a new Storm Water Pollution Control Ordinance. The primary purpose of this ordinance is to maintain and improve the quality of surface and ground water. The Stormwater Pollution Control Ordinance prohibits the discharge of non-storm water. It also requires that management practices be implemented for certain industrial, commercial, residential, and construction activities to prevent or minimize pollutants in the rainfall runoff entering the city's storm drain system and streams.

Environmental Compliance Officers and Field Operations Specialists

The City of Arlington utilizes Environmental Compliance Officers (ECO's), Environmental Engineers, and Field Operations Specialists to oversee stormwater pollution and maintenance activities. Their duties include conducting inspections and preparing related technical reports to meet federal and state requirements; responding to hazardous materials incidents or releases to stormwater systems; pipe maintenance and cleaning, improved channelization efforts, and investigating citizen complaints. Duties also include sampling, monitoring and inspections for stormwater activities related to construction, industrial, commercial, and agricultural sites.



ABOVE: City of Arlington personnel removing a tree in a concrete channel.

RIGHT: City of Arlington personnel entering storm drain for inspection.



Stormwater Utility Fee

The current storm water fee structure and rates became effective on October 1, 2007. Under the current fee structure, every property owner pays the same unit rate based on the amount of impervious area on the property. Impervious area is defined as a surface that is resistant to infiltration by water. Several examples of impervious area include asphalt or concrete pavement, parking lots, driveways, sidewalks and buildings. Based on a study of Arlington residential property, the average square feet of impervious surface is 2800, referred to as an Equivalent Residential Unit (ERU).

The monthly fee adopted by the City Council bills per ERU. The fee structure and scheduled rates are as follows:

October 1, 2007 - \$2.00

October 1, 2008 - \$2.75

October 1, 2009 - \$3.50

October 1, 2010 - \$4.25

Residential Property

Residential parcels include any benefited property platted, zoned or used for residential development including single family, duplex, triplex, quadraplex, townhomes, manufactured homes or other improved parcel upon which buildings contain less than five dwelling units. Residential parcels will be billed based on one ERU at the scheduled rate, for the number of dwelling units.

Commercial Property

Non-residential parcels include all benefited property that is not defined as residential by the storm water utility ordinance, including commercial, industrial, institutional, multi-family and governmental property. The monthly fee for non-residential parcels is determined by dividing impervious area square footage by 2800 square feet and multiplying by the current rate – the result shall be a minimum of 1 ERU for each non-residential account.

Other Storm water Fee Information

- ✦ Failure to pay storm water fees promptly when due shall subject users to discontinuance of any utility services provided by the City.
- ✦ Apartments are considered non-residential for the purpose of the calculation of the storm water fee.
- ✦ Any non-residential property on which mitigation measures have been taken may be eligible for a credit to the storm water fee. The Director of Public Works and Transportation shall adjust the fee for such properties according to the actual mitigative effect of the measures taken.

For more information on the City of Arlington's Stormwater Utility fee, contact the Stormwater Fund Administrator at 817-459-6586.

Pollution Prevention for Residents

One of the key ways to achieve the goals of stormwater management is prevention. Preventing stormwater (or non-point source) pollution is more cost effective via **front-of-pipe** rather than **end-of-pipe** measures. That is, the best way to prevent pollution from entering the storm sewer system is to manage it *before* it enters the storm drain.

Municipalities, businesses and individuals can put pollution prevention measures into practice. This chapter includes information on **Best Management Practices (BMPs)** that can be utilized in preventing stormwater pollution around your home.

Pollution prevention measures and BMPs apply to everyday activities that occur inside and outside the home. These include the following categories: vehicle maintenance, lawn & garden care, pet waste, vehicle & pressure washing, swimming pool & spa drainage, litter prevention, **household hazardous waste**, tree planting, rain barrels, and rain gardens.

BOX 3	POLLUTION PREVENTION	
	POLLUTION PREVENTION	BMPs
	Home vehicle maintenance	Tree Planting
	Lawn & garden care	Rain Barrels
	Pet waste	Rain gardens
	Vehicle & pressure washing	Backyard Composting
	Swimming pool & spa drainage	
	Litter prevention & proper disposal of household hazardous wastes	

Key Terms:
FRONT-OF-PIPE: Methods used to remove contaminants from air, water, waste or other similar product before they enter ecological systems.
END-OF-PIPE: Methods used to remove already formed contaminants from a stream of air, water, waste, product or similar. These techniques are called 'end-of-pipe' as they are normally implemented as a last stage of a process.
BEST MANAGEMENT PRACTICES (BMPs): permanent controls to minimize the discharge of pollutants to the MS4 or storm sewer system.
HOUSEHOLD HAZARDOUS WASTE (HHW): Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." Products, such as paints, cleaners, oils, batteries, and pesticides, that contain potentially hazardous ingredients require special care when you dispose of them.

Home Vehicle Maintenance

At-home vehicle maintenance is a common practice. Many individuals choose to repair or maintain their vehicles at home rather than visit an auto repair service center. While the actual maintenance work of personal vehicles is not a problem, the byproducts that result from this kind of work can add significant amounts of pollutants into the storm sewer system.

These byproducts (i.e. oil, grease, brake fluid, gasoline, diesel, kerosene, antifreeze, etc), all contain toxins that are harmful to fish and birds, aquatic vegetation, wildlife and humans. Maintaining and repairing vehicles at home can allow these byproducts to leach into the street and then into the storm sewer system, transporting these pollutants to area waterways.



When repairing or maintaining your vehicle at home, adopt these few simple practices that can reduce the detrimental impacts of pollutants on our local waterways. And remember two simple rules:

1. Only rainwater may be discharged to the storm sewer system.
2. Minimize the contact of rainfall & runoff with pollutants. Do this by keeping hazardous materials covered and by managing wastes responsibly.

Your Work Area

Be aware of where you work. Any drips or spills on the ground can be carried away by rainwater to a storm drain and into a nearby waterway. So:

- NEVER work on a vehicle in the street or near a storm drain.
- Work on a flat concrete surface where you can easily clean up accidental spills.
- NEVER hose down your work area unless the resulting wash water is contained and disposed of properly.
- Keep storage and work areas clean and dry.

Replacing brakes and brake parts

Follow these tips when replacing brakes and brake parts.

- Don't hose down brake pads, rotors or drums. Remember, brake pads contain copper, which can erode as the pads wear and contribute to stormwater pollution.
- Use shop cloths to wipe as much brake dust as possible from rotors and drums before using brake cleaner fluid.
- Recycle cleaner fluid by using a drip pan.
- Never discharge cleaning solutions from cleaning into the storm sewer system.

Recycling

You can recycle many of the waste products that come from maintaining your vehicle at home, including:

- Antifreeze
- Batteries
- Brake Fluid
- Degreasers
- Gasoline
- Motor Oil
- Oil Filters
- Transmission Fluid

STORMWATER FACT:

A single quart of oil can pollute 250,000 gallons of drinking water.
(Source: Natural Resources Defense Council)

Changing Your Oil or other Fluids

Follow these tips for changing your oil and other fluids.

- Use funnels or pumps when handling liquid products or wastes to avoid spills.
- Capture vehicle fluids in separate drip pans or containers.
- Drain and recycle used oil filters. Poke holes in the filter and let it drain into your oil pan for several hours before you recycle them.
- If spills occur, use kitty litter, sawdust, or oil absorbent to clean spills. Apply to the spill, sweep it up and dispose of the waste in the trash.
- NEVER sweep or wash used oil products or other fluids into the storm sewer system.
- Collect your used motor oil and other fluids in separate containers and transport to the Environmental Collection Center. Be sure to verify that your waste materials are accepted at the local collection center.

Hazardous Products Associated with Home Vehicle Maintenance or Repair

BOX 4	Product	Hazardous Property
	Antifreeze	Toxic Flammable
Auto Batteries	Corrosive Toxic	
Auto Paint & Primers	Flammable Toxic	
Brake and Transmission Fluid	Flammable Toxic	
Carburetor Cleaner	Corrosive Toxic	
Engine Cleaner and Degreasers	Flammable Toxic	
Gasoline, Diesel, and Kerosene	Flammable Toxic Highly Volatile	
Motor Oil	Toxic Flammable	
Used Motor Oil Filter(s)	Toxic	
Windshield Washer Fluid	Toxic	

Lawn and Garden Care



Yard Waste entering storm drains or streams and other water sources, increases the risk of flooding and adds pollutants to the environment. Not only does yard waste cause blockages to the drainage system which can lead to localized flooding, it can also quickly “super-fertilize” streams and lakes and can lead to algae blooms and fish kills. Sweeping or blowing grass clippings, fallen leaves, or other yard waste into the street or down

the storm drain can cause serious damage to the storm sewer system and to the water resources to which storm drains lead. Leaves, grass clippings and other yard waste (depending on type) should be composted, left on your lawn, or placed in acceptable containers for curbside pick-up.

If you have to use fertilizers, pesticides, and herbicides, carefully read all labels and apply products sparingly. According to surveys conducted by the Center for Watershed Protection, over 50% of lawn owners fertilize their lawns, yet only 10% to 20% perform soil tests to determine whether fertilization is even needed (CWP, 1999). Conduct a soil test on your lawn and follow the practices listed here to reduce the need to fertilize on your lawn and garden.

Grasscycling: Don't Bag It!

In an effort to save landfill space, the City of Arlington banned the curbside collection of bagged grass clippings with the adoption of the “Don't Bag It” program in 1993. According to the “Don't Bag It” program, presented by the Texas Agricultural Extension Service, leaving clippings on the lawn and allowing them to work their way back into the soil, helps produce a beautiful, green lawn.



IMPROPER DISPOSAL OF GRASS CLIPPINGS

Grass clippings from edging or mowing that fall on the streets or sidewalks must be removed and disposed of properly. Grass clippings should not be disposed of in trash dumpsters. The City of Arlington landfill will accept yard waste at a fee per truckload. Failure to dispose of yard waste properly can result in a citation and a fine.

Fertilizers & Pesticides

Fertilizers are essentially nutrients used by plants to live. Most fertilizers contain nitrogen, phosphorus, and potassium but can contain other elements as well. Just like humans, plants can only use so much food. Fertilizer that is not used by the plant is available to mix with rain and become stormwater pollution. Nutrients from fertilizers, like nitrogen and phosphorus, promote algae blooms and excessive plant growth in water. Algae deplete oxygen, making it unavailable to fish and other aquatic life. Algae blooms and excessive plants also limit much needed sunlight.

Texas homeowners pour approximately four million pounds of pesticides on their lawns and gardens each year. More pesticides per square inch are applied to a typical yard than to the most intensely sprayed farmland. An estimated 1/3 of the pesticides used at home are wasted because more is used than is needed.



Fertilizer Tips:

- ▲ **TEST** your soil to determine the type of fertilizer needed.
- ▲ **USE** fertilizers sparingly and apply fertilizers exactly where you want them.
- ▲ **SLOW RELEASE (ORGANIC) FERTILIZER** does not have to be applied as frequently and the risk of burning your grass is reduced.
- ▲ **LEAVE** grass clippings on your lawn as natural fertilizers.
- ▲ **STORE** fertilizers in areas that are covered to avoid mixing them with rain.
- ▲ **DO NOT** apply fertilizer if rain is predicted or on frozen ground or dormant lawns.
- ▲ **WASH** spreader equipment on a pervious (penetrable) vegetated area, like the lawn, to allow for the natural absorption of excess fertilizer.

Pesticide Tips:

- ◀ **DO NOT** apply any pesticides if rain is predicted.
- ◀ **SWEEP** any pesticides from paved surfaces onto your lawn.
- ◀ **READ** the label instructions before applying any chemical product.
- ◀ **SPOT TREAT** areas of pest damage instead of treating the whole yard. If you have fire ants, they may be controlled or eliminated by ant baits.
- ◀ **INSECTICIDAL SOAP** is an alternative to traditional pesticides.



Plans for caring for your lawn

WATERING PLAN

There are several grass types in the North Central Texas region. Most common forms found in Arlington are:

1. Tall Fescue (requires the most water)
2. St. Augustine
3. "Tif" Bermuda
4. Zoysia
5. Common Bermuda
6. Buffalo (requires the least water)

During the driest period of summer, lawns usually require about 1 inch of water every 6 days. If water runs off the lawn before 1 inch is applied, turn the sprinkler off, let the water soak in for about 1 hour, and then continue watering.

The best time to water is early morning, so less water is lost by evaporation. The worst time to water is in the evening because the lawn stays wet all night. This encourages disease development. Lawns watered too frequently tend to develop shallow root systems.

REMEMBER: No watering between 10am—6pm in the City all year long.

FERTILIZING PLAN

The rate of fertilizer application, the frequency of application, the ratio of nutrients in the fertilizer and the source of the nitrogen all have a great deal to do with how fast the lawn grows.

The following fertilizing plan is designed to allow the lawn to grow at a reasonable rate and still have good color.

Fertilizer Ratio (NPK)	Fertilizer Analysis	Application rate (lbs/1000 sq ft)
3-1-2	12-4-8	6
	15-5-10	5
	21-7-14	4
4-1-2	16-4-8	5
	20-5-10	4

Fertilizer application dates

<u>Tall Fescue</u> Mar. 1, Sept. 15, Nov. 15	<u>Zoysia</u> May 1, June 1, Sept. 1
<u>St. Augustine</u> Apr. 15, June 1, Sept. 1	<u>Common Bermuda</u> Apr. 15, June 1, July 15, Sept. 1
<u>"Tif" Bermuda</u> Apr. - Sept. (1st of each month)	<u>Buffalo</u> May 1, Sept. 1

MOWING PLAN

The "rule of thumb" for mowing home lawns is not to remove more than 1/3 of the blade surface at any one time. If you use the following mowing schedule, you no longer will need to bag your grass clippings.

Grass clippings left on your lawn will not lead to thatch, but will return valuable nutrients to the soil. They contain the necessary elements your lawn needs. Clippings are an excellent source of nitrogen for compost.

Grass type	Mower setting (inches)	Mow when this height (inches)
Tall Fescue	2	3
St. Augustine	2	3
"Tif" Bermuda	1	1
Zoysia	2	3
Common Bermuda	1	2
Buffalo	2	3

Pets and Pet Waste

Pet waste left on streets, pavement, yards, driveways, or along the sides of the road does not magically disappear or fertilize the ground. Improperly disposed animal feces can be picked up by stormwater runoff and carried into storm drains or nearby water sources. Storm drains do not connect to sanitary sewer systems and treatment facilities, so pet waste can be the cause of significant stormwater pollution and present health risks to adults, children and other pets.

Pets and children who play in yards or parks and those who garden in yards where pets defecate are at risk for infections from disease-causing viruses, bacteria and parasites found in pet waste.

Dangers of Improperly Handled Pet Waste

Some of the diseases that can be transmitted from pet waste to humans include:

- **Salmonellosis:** the most common bacterial infection transmitted to humans by other animals. Symptoms include fever, muscle aches, headache, vomiting, and diarrhea.
- **Toxocariasis:** roundworms usually transmitted from dogs to humans, often without noticeable symptoms, but may cause vision loss, rash, fever, or cough.
- **Toxoplasmosis:** A parasite carried by cats that can cause birth defects such as mental retardation and blindness if a woman becomes infected during pregnancy; also a problem for people with suppressed immune systems.
- **Campylobacteriosis:** a bacterial infection carried by dogs and cats that frequently causes diarrhea in humans.
- **Fecal Coliform Bacteria:** found in the feces of warm blooded animals; poses potential health risk for those exposed to it in water.



Until your pet can do this...

You must do this...



STORMWATER FACTS:

1. The average dog releases 3/4 pound of waste per day or 274 pounds per year. North Central Texas is home to approximately 1.2 million dogs; that's over 900,000 pounds of waste per day!
2. A days worth of poop from one large dog can contain 7,800,000,000 fecal coliform bacteria.

Other issues

Nutrients in pet waste also encourage weed and algae growth, thus causing serious problems for water quality. Pet waste contains nitrogen and phosphorus, two elements that fertilize aquatic plants and make them grow out of control. This nutrient-rich water is cloudy, green, unattractive and unhealthy for swimming, boating, fishing, or drinking. It also smells. Finally, when pet wastes decays, it uses up oxygen and releases ammonia, which can lead to fish kills.

Pet Waste Tips: Bury it, Flush it, or Trash it

- Always clean up after your pet, even in your own yard. Your pet's waste is NOT fertilizer.
- Bury your waste in a hole that is at least 5-6" deep and cover it with soil away from gardens, ditches, storm drains, and waterways. It will decompose slowly so bury waste in different locations throughout the yard.
- Flush your pet's waste down the toilet where it will flow through the sanitary sewers for treatment.
- Throw your pet's waste in the trash. Carry disposable bags with you while you walk your pet and dispose of it in the trash when done.
- Hire a professional. Believe it or not, a number of professional pet waste disposal services exist in the North Central Texas area. These businesses will completely remove the waste from your yard and dispose of it themselves, for a fee. Check your local phone listings for more information.
- Tell others not to leave their pet's waste on the ground.

Flea Dips

Do not pour flea dip solutions onto driveways or into the street. Flea dips usually contain an insecticide that can harm aquatic life.

REMEMBER:
It is unlawful not to pick up after your pet.

STORMWATER FACT: THE FERTILIZER MYTH

Contrary to popular belief, carnivorous animals, such as dogs, do not produce useable manure-fertilizer for plants.

Beneficial manure-fertilizer comes from herbivores like horses and cows. These animals consume vegetation and return unused waste back to the soil to be taken up by plants.



Kitty Litter

Dispose of kitty waste and litter properly. Use a two-step process to clean out the cat box.

- Scoop cat waste out of the flushable litter and, flush it down the toilet, taking care to minimize the amount of litter you flush.
- When litter is no longer usable, bag the litter and dispose of it in the trash, not in the toilet. Large amounts of litter flushed down the toilet may damage plumbing. **Never** flush any kind of litter if you have a **septic tank!**



Car Washing

For many, car washing is a spring and summertime ritual. Often, citizens do not know that by washing off all of the grime that accumulates on their vehicles, that they might actually be causing harm to our local waterways.

When cars are washed on streets and driveways, that dirty water eventually ends up in rivers, streams, creeks, and lakes. Washing one car may not seem to be a problem, but collectively, car washing activity adds up to big problems for our local water sources. Pollution associated with car washing degrades water quality and also finds its way into **sediments**, impacting aquatic habitats.



STORMWATER FACT:

Car washing is a pollution problem because many metals and automotive fluids are washed off along with the soapy water. Water does not disappear when it goes down the street. It usually enters a storm drain inlet, and then flows to a waterway. Even biodegradable soap can be toxic to aquatic habitats. Just one gallon of liquid soap will pollute 200,000 gallons of water.



The Problem

Washing your car is only a problem if you do not know where or how to do it correctly. The average homeowner uses 116 gallons of water to wash one car. Most commercial carwashes use 60 percent less water for the entire process than a homeowner uses just to rinse one car.

Outdoor car washing has the potential to result in high loads of nutrients, dirt, metals, and hydrocarbons entering our waterways as the detergent-rich water used to wash the grime off of cars flows down the driveway and the street. Dirty water containing soap, detergents, residue from exhaust fumes, gasoline, heavy metals from rust, metals and other elements from brake linings, rubber, trace amounts of benzene and chromium, and motor oils can wash off cars and flow directly to storm drains and into the nearest creek or stream where it can harm water quality and wildlife.

Small concentrations of detergents in streams can kill fish and their eggs, as well as inhibit their ability to reproduce. Detergents can also destroy the natural protections fish have against bacteria and parasites and can severely damage a fish's gills.

The phosphates from soap can also cause excess algae to grow in our waterways. Excessive algae growth makes water cloudy, green, unattractive, smelly, and unhealthy for swimming, boating, fishing, or drinking.

The Best Alternative

The best way to minimize the environmental effects of washing your car at home is to use a **commercial car wash facility**. Commercial carwash facilities are required to treat their wash water discharge before releasing it to the sanitary sewer system where the water is treated prior to release back into our water sources. Some facilities even recycle their wash water—reusing it several times before sending it to the sanitary sewer and water treatment facilities. Changing the way you wash your car is something that you can do to make a difference in the quality of our water sources. Proper individual actions can result in significant water quality improvement when carried out by the majority. The individual citizen can easily and economically manage this source of stormwater pollution.

Car Washing Tips

Use a commercial car wash facility where wash water is treated and cleaned before it is returned to our waterways.

If you do wash your car at home:

- Wash it on gravel, grass, or other **permeable** surfaces. Avoid washing on concrete or asphalt unless it drains into a vegetated area.
- Use plain water with a coarse sponge or, phosphate-free, water-based cleaners only.
- Use a trigger nozzle on your hose or a bucket to conserve water.
- Always empty wash buckets into sinks or toilets, never into the street or storm drain.



STORMWATER FACT:

Most car washing best management practices are inexpensive, and rely more on good housekeeping practices (where vehicles are washed, planning for the collection of wash water) than on expensive technology.

Key Terms:

SEDIMENT: Sediment is any particulate matter that can be transported by fluid flow and which eventually is deposited as a layer of solid particles on the bed or bottom of a body of water or other liquid. Sedimentation is the deposition by settling of a suspended material.

PERMEABLE: PENETRABLE; having pores or openings that permit liquids or gases to pass through; porous; pervious.

COMMERCIAL CARWASH FACILITY: A place or business equipped for washing cars and other motor vehicles.

Car Wash Fundraisers



Community car wash events are a popular means of raising money for worthwhile causes. However, car wash fundraisers can be a significant source of stormwater pollution. These events are usually held in heavily paved areas where there is little runoff control or grass to filter out harmful substances. If runoff from car washes is not properly managed, it can negatively impact our local creeks and rivers.

Wash water from car washing activities typically contains dirt (sediment), soap (detergent/surfactants), gasoline and motor oil, as well as metals and oil/grease residues from exhaust fumes and brake pads. When this dirty water is allowed to flow into storm drains, it travels directly to our local creeks and rivers without treatment. This pollution can kill or harm fish and other aquatic life and make our waterways unsafe for drinking, swimming and fishing. Alone, one car wash fundraiser event may not create a significant adverse environmental impact. But, collectively, car wash fundraiser events can contribute large amounts of polluted wash water to our local waterways.

Planning a Low Impact Car Wash Fundraiser

Consider holding your car washing fundraiser at a commercial car wash. Wash water from commercial car washes goes to sewage treatment plants rather than down a storm drain. Call your local car wash to ask if they offer fundraising options for schools, teams, and charities.

If you choose not to partner with a commercial car wash, try to incorporate these practices to reduce the overall environmental impact of your fundraiser:



- Selecting the site for your car wash is very important. When talking to property owners of shopping centers, schools or churches where you are considering holding the event, ask them where the water flows from the storm drains on the property. The best locations will have some storm water management controls in place. These controls include grass swales, sand filters, oil and grit separators, storm water management ponds, and wetlands that treat storm water before it is discharged to a stream.

- If there are no storm water management controls in place, choose a site where the wash water can soak into grass, gravel, or be diverted to nearby landscaping. This will allow the wash water to filter through the vegetation and/or soil instead of flowing directly into a storm drain. Absorbent pads, which can be purchased at automotive shops, can also be placed in the curb or grass swale to catch oils and other chemicals.
- Remove all trash and debris from the car washing area.
- Do not use acid-based wheel cleaners or engine degreasers.
- A soap-free wash is best for the environment. If you do use soaps, use cleaners or detergents labeled “non-toxic,” “chlorine-free”, “phosphate- free,” or “biodegradable.” The safest products for the environment are vegetable or citrus-based products. Using biodegradable soap does not lessen its immediate environmental impact – it simply means that the soap will degrade in time. A flush of “biodegradable” soap suds will still harm fish or invertebrates in your local stream.
- Use a bucket of soapy water to re-soap rags or sponges throughout the wash rather than adding soap directly to rags or sponges.
 - Wring sponges and washrags into buckets, not the ground.
 - Conserve water by using a spray nozzle with an automatic shut-off.
 - Always empty buckets into the sanitary sewer system (e.g. sinks or toilets), NOT down the storm drain.

Remember to clean up after the car wash fundraiser. Have a volunteer walk the perimeter of the site to pick up trash and debris and dispose of it properly.

Remember to stop and think before you allow anything to go directly into the gutter or storm drain.

STORMWATER FACT:

Both the owner/occupant of the property on which you conduct your car wash and your organization are responsible for implementing pollution prevention measures. Ensuring that your group implements these practices will protect the site owner/occupant and should make them supportive of hosting car wash events of the future.



Pressure Washing

What is Pressure Washing?

Pressure washing uses mechanical equipment to create a high pressure stream of water, typically ejected from a hand-held wand or nozzle. This jet of water is used for cleaning a wide variety of surfaces and objects. Depending on the application, pressure washing may be conducted with or without heated water or added cleaners.

In recent years, the use of pressure washing equipment has grown substantially. Numerous contractors provide pressure washing as a service to others, businesses purchase their own units to use in their own operations and maintenance, and many homeowners rent units or purchase low cost equipment.



Pressure washing is used to clean many things around the home, including:

- Automobiles
- Driveways
- Home exteriors
- Sidewalks
- Garages
- Roofs
- Graffiti

Pressure washing equipment is also used for stripping paint or for preparing and treating other types of surfaces.



STORMWATER FACT:

As a consumer who may employ pressure washing contractors, you can have a significant impact on the prevention of water pollution by simply choosing a contractor who follows pollution prevention guidelines and techniques. Keep in mind that as the consumer, you may also be held responsible for illegal discharges that occur on your property.

Key Terms:

PRESSURE WASHING: also known as power washing; cleaning with a machine that delivers a high-pressure water spray.

The Problem

Most pressure washing activities are conducted outside. This often results in the discharge of wastewater to the storm drainage system, unless the equipment operator takes steps to collect and dispose of it legally. Discharge of pressure washing wastewater to the storm drainage system is prohibited because it contains pollutants from the cleaning compounds used and/or from the objects or surfaces being cleaned. Even cleaners labeled “biodegradable” and “non-toxic” may be harmful to aquatic life, especially after cleaning various surfaces (e.g. home exteriors, driveways, equipment and more) that contain oils, greases, chemicals, and other substances.

Any substance, including pressure washing wastewater that enters storm drains flows directly into lakes, rivers, and streams. This water is not treated or cleaned to remove pollutants. Pollutants discharged to the storm drainage system harm fish and wildlife and contaminate recreational sites and drinking water supplies.

Pressure Washing as part of the Solution

Pressure washing is an activity that can help improve the quality of our waters when done properly. By cleaning (pressure washing) surfaces (e.g. equipment, parking lots, sidewalks, buildings, etc.), collecting the wastes (water and/or debris), and properly disposing of the wastes, there is less chance of pollutants ending up in our waterways. It is through education, proper collection and disposal that pressure washing can have a positive impact on the environment.

DISPOSAL REQUIREMENTS AND PROHIBITIONS

Proper disposal of pressure washing wastewater, in compliance with environmental regulations, depends on the nature of the pollutants in it. It is the responsibility of the generator to determine the proper collection and disposal method for wastewater created by pressure washing. To avoid unanticipated costs, delays, and violations, this determination should always be made prior to starting any job. All disposal methods are subject to requirements, restrictions, and prohibitions, as outlined by the City of Arlington.

Consider using dry methods for surface pre-cleaning, such as using absorbents on small oil spots and sweeping up trash, debris, or dirt before washing. Remember to pick up pre-cleaning debris as soon as possible and dispose of them properly after use so that they do not enter storm drains.



Examples of Pressure Washers.



Swimming Pool and Spa Drainage

There are three options for draining your swimming pool. Please note that whichever method you choose, you must **dechlorinate** the water before draining occurs.

Here's how:

- Dechlorinate naturally: Allow the water to sit in the sun for 5-10 days without adding any chlorine; or
- Use a chemical dechlorination additive (contact your local pool store for options).
- Verify water is dechlorinated with a pool testing kit.

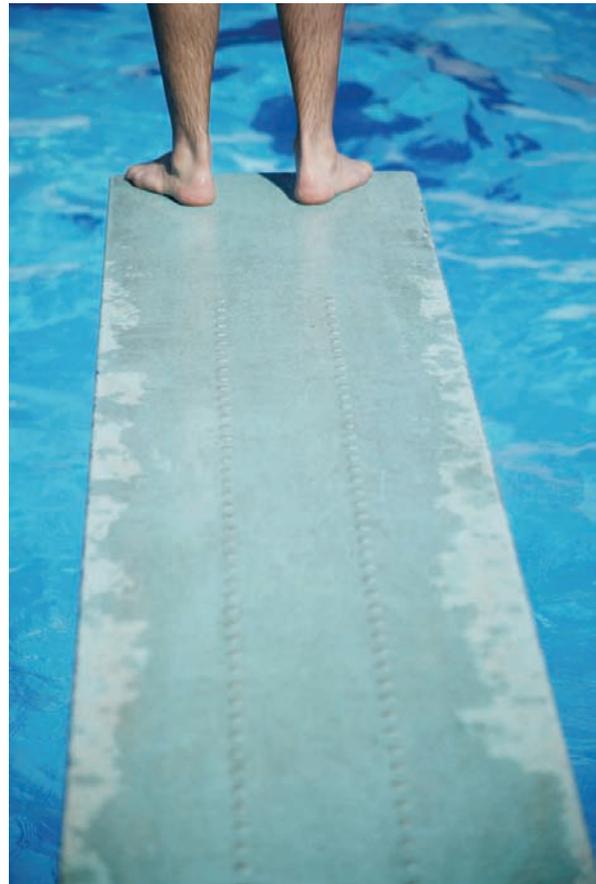
Option 1: Your Lawn

The Preferred Discharge Method

Drain **dechlorinated** water to the grass, turf or any area on your property that will allow the water to percolate into the ground, **if and only if...**

- You do not cause flooding of your neighbor's property or any other adjacent property.
- The land area is sufficient to prevent erosion and runoff into a ditch, creek, or other conveyance (i.e. storm drain).
- You do not cause harm to the environment.

This water can be used to irrigate plants, saturate dry ground, or soak into mulched areas.



Option 2: The Sanitary Sewer

Drain your pool to the sanitary sewer. Most in-ground pools have a drain line connected to the sanitary sewer which can be used once the pool water has been **dechlorinated**.

Follow these steps:

- Locate the sanitary sewer cleanout on your property or an indoor drain such as a sink or bathtub.
- Using a hose, connect a siphon or sump pump that pumps no more than 12-20 gallons per minute.
- Pump the water from the pool or spa to the cleanout or indoor drain.
- Replace all cleanout covers when finished.

DO NOT drain swimming pool or spa water to your SEPTIC SYSTEM as it may cause system failure.

It is not advisable to connect a hose to your indoor toilet to drain your swimming pool or spa. In most cases, water being pumped from your pool will drain faster than the time needed for flushing and refilling of the commode.

If you are unsure whether or not the discharge from your pool will create a problem in the sanitary sewer system or wastewater treatment plant, contact the City of Arlington Water Utilities Department at 817.459.6600.



Option 3: The Storm Drain

Swimming pool water may be discharged to the storm drain **only** after **all** of the following conditions are met:

- Other disposal methods (i.e. sanitary sewer or landscaping) are not possible.
- The pool or spa is completely **dechlorinated**.
- The pH of the water is between 6 and 9.
- There is no discharge of filter media.
- There is no discharge of acid cleaning wastes.
- Discharge water will not pond or flow to neighboring properties.



REMEMBER: discharges into the City's Storm Drain System should be via pump and hose directly to the storm drain inlet or catch basin. **DO NOT** allow effluent to run down the street.

Filter Backwash

NEVER discharge filter backwash to the storm sewer system. It is a violation of the City of Arlington Code of Ordinances. This practice is illegal and you can be fined.

Disposing of filter rinse water and backwash :

- Filter backwash must be collected, contained, and discharged to the sanitary sewer.
- Cartridge filters should be rinsed in a sink, bathtub, or over a lawn or other vegetated area.
- Use a separation tank for diatomaceous earth (DE) and cellulose fiber filters to capture the DE or fibers.
- For water conservation, direct the clean water back into the pool.

See Page 37 for specific steps to drain your pool or spa.

Steps for Draining Your Swimming Pool

Try to use your lawn or the sanitary sewer when draining your pool. Use a dechlorinator such as Sodium Thiosulphate (available at pool or hardware stores, or online) to remove all traces of chlorine before discharge. Pool overflow water should be discharged onto land or other surface where there is no chance of it running off into streets or adjacent properties. If this is not possible, use the sanitary sewer system. The sewer system is designed to remove many pollutants from water. Draining should be done via pool plumbing, a gully trap, or sink. Do not discharge pool water when it is raining. Filtered backwash water **must not** be discharged into the stormwater system.



Follow these steps to properly drain your swimming pool.

1. Shut off the power to the circulation system at the circuit breaker.
2. Locate the clean-out port for the sanitary sewer line. The port is usually located in the ground and close to the home in the front yard. It may be near a water spigot. The port should have a rubber or threaded cap with a square wrench fitting and should be three to four inches in diameter. If you can't locate the port, contact a plumber. **CAUTION: Using a clean-out in the wall creates greater potential for water to back up into the house.**
3. Run a hose from the sewer clean-out port to the pool and connect it to a submersible pump. Lower the pump into the deepest part of the pool near the drain. As you drain, monitor the water's flow to ensure that the water does not backup. If the water begins to back up, stop draining and contact a professional plumber. The maximum recommended discharge rate is 12-20 gallons per minute.
4. After draining your pool, refill it as soon as possible. Direct sunlight can damage the plaster in your pool if it is left exposed. It may take a few days for the fresh water to reach the proper chemical levels, so check the levels every day for a week and add chemicals as needed.
5. If you are unsure about draining your pool, or you'd like assistance, contact a professionally licensed pool service company or plumber. By following these guidelines you can ensure your drained pool water is properly treated and recycled.

KNOW THE LAW:

It is a violation of the City of Arlington's Code of Ordinances to drain chlorinated water or filter backwash from your swimming pools or spas to the storm sewer system.

*Remember, you are responsible for the actions of your pool maintenance service. Be sure you know how your service is disposing of your pool or spa water and the filter backwash. They **must** follow all discharge requirements set forth by the City.*

Litter Prevention and Household Hazardous Waste (HHW)

LITTER

Litter is an unsightly health hazard. However, many people do not realize that litter on the ground will pollute our water. Storm water systems are designed to take rainfall into the waterways and with the run off are carried trash, litter, and chemical waste. The nature of modern cities is to have extensive paved surfaces, resulting in litter that ends up in storm water systems. Whether someone dumps an auto ashtray at a curb, or drops a candy wrapper on the ground, the result is washed, untreated, into storm water systems and then into our waterways and onto our beaches. Litter in storm water systems impacts people, animals, fish, and plants.

The impact of litter and chemicals in our waterways on aquatic life and wildlife can be devastating: fish and other aquatic animals can be poisoned; wildlife can become entangled in or suffocate from litter while searching for food; and wildlife can contract diseases from eating or being exposed to rotting substances.

Litter in the waterways can also reduce oxygen to levels that suffocate aquatic plants, animals, and fish. These conditions, in turn, affect the quality of the water we drink and the water in which we play.



STORMWATER FACTS:

1. Cigarette butts are the most littered item worldwide. An estimated 450 trillion cigarette butts are said to be littered each year.
2. The City of Arlington conducts several litter clean-up events throughout the year.
3. In the State of Texas, littering is illegal and the fine is up to \$500. The fine for dumping items more than 5 pounds is up to \$2,000.



Much of the litter washed into the waterways does not break down. This litter is ugly and dangerous. Broken glass and shattered plastic can result in cuts and wounds which can become infected, especially if the water quality is poor. Diseases can spread to people directly and indirectly as contaminated water enters the food chain. There is also a cost to local governments and to taxpayers, when systems must be cleaned and repaired and health issues must be treated.

Litter Prevention Tips

How can you become part of the solution? Follow these simple tips:

- Don't litter -- put trash in an appropriate receptacle.
- If you see litter, pick it up and throw it away.
- Recycle.
- Participate in local clean up days.
- If you see an area that needs to be cleaned up, report it to the appropriate government agency.

To report a litterer, call 817.459.6777 or visit www.dontmesswithtexas.org

HOUSEHOLD HAZARDOUS WASTE (HHW)

Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients are considered to be "household hazardous waste" or "HHW." Products, such as paints, cleaners, oils, batteries, and pesticides, that contain potentially hazardous ingredients require special care when you dispose of them.

Improper disposal of household hazardous wastes can include pouring them down the drain, on the ground, into storm sewers, or in some cases putting them out with the trash. The dangers of such disposal methods might not be immediately obvious, but improper disposal of these wastes can pollute the environment and pose a threat to human health.

Certain types of HHW have the potential to cause physical injury to sanitation workers, contaminate septic tanks or wastewater treatment systems if poured down drains or toilets, and present hazards to children and pets if left around the house. To avoid the potential risks associated with household hazardous wastes, it is important that people always monitor the use, storage, and disposal of products with potentially hazardous substances in their homes.



HHW Tips

- Use and store products containing hazardous substances carefully to prevent any accidents at home. Never store hazardous products in food containers; keep them in their original containers and never remove labels. Broken and leaky containers should be placed in a second container of like material (i.e. glass for corrosives, metal for flammables).
- When leftovers remain, never mix HHW with other products. Incompatible products might react, ignite, or explode, and contaminated HHW might become unrecyclable.
- Remember to follow any instructions for use and disposal provided on product labels.

Some environmentally friendly alternatives to household hazardous waste products.

BOX 5	Household Hazardous Waste (HHW)		Alternative
	Household	Air Fresheners	Simmer whole cinnamon sticks, cloves & allspice; Leave out a shallow bowl of vinegar; Odors can be absorbed by placing baking soda at the source of the problem; or put a few drops of vanilla extract in a dish.
		Batteries	Use nickel-cadmium rechargeable batteries whenever possible.
		Flea Collar	Talk with your veterinarian about natural flea control methods.
		Bleach	Natural oxygen safe bleaches are commercially available.
		Rug & upholstery cleaner	Mix 3 tbsp of borax with 1/2 quart of warm water in a spray bottle. Spray on stained area and wipe with a damp sponge.
		Glass & window cleaners	Combine 1/4 cup vinegar, 1/2 tsp liquid soap or detergent, and 2 cups of water in a spray bottle. Shake to blend.
		Oven Cleaners	Mix baking soda & water and scrub. For tough stains leave on dampened oven overnight and scrub the next day.
		Drain Cleaners	Apply a plunger or snake through lines. Or mix 1/4 cup of salt, 1/4 cup of baking soda, and 1/2 cup of vinegar. Let sit for 15 minutes, then flush with boiling water.
		Furniture Polish	1/4 cup vinegar plus a few drops of oil (olive or liquid jojoba).
Automotive	Gasoline	Do not store in areas that allow this material to mix with rain. Properly dispose of excess by taking it to a full service environmental collection center (ECC). The ECC that serves the Arlington area is located at: 6400 Bridge Street Fort Worth, TX 76112 817-871-5257 Call for more information	
	Batteries		
	Used Motor Oil		
	Antifreeze		
	Automotive Fluids (transmission, brake, etc.)		
Workshop	Paint	Use water-based paints instead of oil based; use non-aerosol paints.	
	Turpentine & paint thinners	Use water-based paints and avoid unnecessary brush and roller cleanup.	
	Wood stains	Use water-based stains instead of oil-based stains.	
Yard	Pesticides	Introduce predator insects in your yard; apply soapy water to leaves and rinse well.	
	Fertilizers	Composting.	
	Bug sprayers/killers	Ants: Red chili power at point of entry; Mosquitoes: remove any standing water outside; burn citronella candles/oil.	

STORMWATER FACTS:

1. Americans generate an estimated 1.6 tons of HHW per year and the average home can accumulate as much as 100 pounds of HHW in the basement and garage and in storage closets.

2. One quart of used oil can pollute an acre of surface water.

Tree Planting

Trees are not only a beautiful addition to the landscape, but they also provide invaluable benefits to cities. They reduce heat by cooling and shading homes during the hot summer months, decreasing the amount of energy required to cool a home and its related electric bills. Mature trees can actually cut summer cooling costs by 40% and tree-lined blocks can even decrease local temperatures. Trees naturally clean the air of pollutants and create a neighborhood noise buffer. Trees also improve stormwater management, reducing the amount of polluted stormwater that normally would go directly into storm drains. Tree roots also allow rainwater to filter back into the soil, recharging the often thirsty water table.



How to Plant Your Tree

It is important to carefully choose the site where you will plant your tree before digging. Pay special attention to where the tree will be planted making sure that it will have plenty of clearance from obstructions as the tree matures. Overhead power lines, underground lines, sidewalks, and buildings should be given consideration before choosing the planting site.

Correct soil preparation encourages root growth reducing the difficulties already challenging the young tree. Most roots spread through the top 12" of soil in a wide periphery around the tree. Slope the side of the hole and dig or deeply **rototill** an area around the hole at least twice the diameter of the container.



Plant the tree with the top of the root ball even with the surrounding terrain. When wet conditions or heavy soil are problems, raising several inches of the root ball above ground will aid the spread of lateral roots.

Backfill with native soil or a mix of native soil and high quality top soil. Gently pack and soak with water. Add a 2-3" thick mulch layer around the tree out to the edge of the drip line, mounding the mulch at the outer edge to create a bowl effect. Be careful not to let the mulch touch the trunk of the tree. The best time to plant trees in the Arlington area is between December and March.

Key Terms:

ROTOTILL: To cultivate or dig with a rotiller.

BOX 6

Shade Trees	Ornamental Trees
Texas Ash	Mexican Buckeye
White Ash	Red Buckeye
Eastern Red Cedar	Texas Buckeye
Arizona Cypress	Carolina Buckthorn
Bald Cypress	Crepe Myrtle
Cedar Elm	Desert Willow
Lacebark Elm	Eve's Necklace
Black Hickory	Hawthorne
Ashe Juniper	Possumhaw Holly
Southern Magnolia	Yaupon Holly
Ashleaf Maple	Blue Point Juniper
Caddo Maple	Hollywood Juniper
Bigelow Oak	Wichita Blue Juniper
Blackjack Oak	Little Gem Magnolia
Bur Oak	Honey Mesquite
Chinquapin Oak	Texas Persimon
Durand Oak	Mexican Plum
Escarpment Live Oak	Redbud
Lacey Oak	Rose of Sharon
Live Oak	Soapberry
Post Oak	Flame-leaf Sumac
Shumard Oak	Downy Viburnum
Southern Live Oak	Texas Chastetree
Texas Red Oak	
Pecan	
American Sycamore	
Black Walnut	

For more information on tree planting in Arlington visit: www.naturallyfun.org

Rain Barrels



A rain barrel collects and stores stormwater runoff from rooftops that would otherwise be lost to runoff and diverted to storm drains and streams. By detaining (temporarily holding) water, rain barrels help add capacity to the city's sewer system and reduce sewer overflows to creeks, rivers, lakes, and other water sources. The collected rain water can be reused for irrigation to water lawns, gardens, window boxes or street trees. Rain barrels can be purchased on-line or they can be built.

Advantages

Lawn and garden watering make up nearly 40% of total household water use during the summer. A rain barrel collects water and stores it for when you need it most -- during periods of drought -- to water plants, wash your car, or to top a swimming pool. It provides an ample supply of free "soft water" to homeowners, containing no chlorine, lime or calcium making it ideal for gardens, flower pots, and car and window washing.

Rainwater harvesting will lighten the load on water wells as well as public water supplies. It prevents overtaxing of wastewater treatment plants, and saves you money and energy (decreased demand for treated tap water). Diverting water from storm drains also decreases the impact of runoff to streams, rivers, and lakes. Therefore, a rain barrel is an easy way for you to have a consistent supply of clean, fresh water for outdoor use. And best of all it's FREE!

Purchasing a (Ready-Made) Rain Barrel

Ready-made rain barrels can be purchased from a number of companies, including hardware and garden supply stores. Below are just a few sources. ***(This listing does not constitute an endorsement by the City of Arlington).***

BOX 7

Ace Hardware (different models available) (866.290.5334) www.acehardware.com	Gaiam (produces the Great American Rain Barrel) (877.989.6321) www.gaiam.com
Plow & Hearth (several available including a pop-up barrel that folds flat when not needed) (800.494.7544) www.plowhearth.com	Rain Barrel sources (offers an extra large system) (866.912.9719) www.rainbarrelsource.com
Spruce Creek company (produces the Spruce Creek Rainsaver) (800.940.0187) www.sprucecreekrainsaver.com	Urban Garden Center (offers the Urban Rain Barrel) (866.923.1922) www.urbangardencenters.com

Building your own Rain Barrel

Tools:

- 7/8" to 1" spade drill bit
- Electric jigsaw
- Hacksaw
- Electric drill
- Utility knife
- Marker

Supplies:

- 1—55 gallon plastic barrel
- 2—3/4" plastic faucets
- 1—3/4" female coupling
- 1—skimmer basket
- 1—roll of Teflon tape
- 1—all purpose caulk or plumbing sealant
- 1—12" x 12" piece of fiberglass window screen
- 2—4 concrete cinder blocks
- 1—downspout flex elbow



Skimmer basket



55 gallon barrel

STEP ONE: TOP HOLE

1. Use skimmer basket to trace template on barrel.
2. Pre-drill a small hole using spade bit.
3. Make sure to drill inside the line.
4. Use a jigsaw to cut out hole following the inside line.



STEP TWO: UPPER DRAIN (OVERFLOW)

1. Mark holes at least 2" from top of barrel.
2. Use drill bit to drill hole.
3. Screw plastic faucet into hole. Use utility knife as needed to alter hole.
4. Wrap 3/4" coupling threads in Teflon tape and caulk and screw onto faucet *inside* the barrel.

THE UPPER DRAIN SHOULD ALWAYS BE LEFT IN THE OPEN POSITION TO KEEP THE BARREL FROM OVERFLOWING.

STEP THREE: BOTTOM DRAIN

1. Mark holes at least 2" from bottom of barrel.
2. Use drill bit to drill hole.
3. Screw plastic faucet into hole. Use utility knife as needed to alter hole.
4. Remove faucet, wrap threads in tape, caulk threads, and replace faucet.
5. Caulk area where faucet and barrel meet to reduce leakage.





STEP FIVE: BASKET

1. Cut fiberglass window screen to fit basket.
2. Affix screen to lip of basket using caulk/plumbing sealant.
3. Allow several hours to dry and place in top hole.



STEP SIX: BASE AND DOWNSPOUT

1. Place concrete blocks under your selected downspout as a raised base to allow room for a watering can or to screw on a hose to the lower drain.
2. Cut the downspout with a hacksaw about 4' above the top of the barrel lid (top hole).
3. Attach downspout flex elbow to the downspout.
4. Direct the flex elbow into the skimmer basket on top of your barrel.



TIPS FOR USING YOUR RAIN BARREL

1. Make sure your barrel is clean and free of chemicals before use.
2. Make sure all caulk is thoroughly dry before using your rain barrel.
3. Disconnect the barrel from downspout during winter months to avoid the formation of damaging ice.
4. ENJOY making a difference and reducing stormwater pollution.

For more information on building rain barrels and rain barrel construction workshops, contact the City of Arlington Water Conservation Coordinator at 817.459.6628 or visit www.SaveArlingtonWater.com.

Completed rain barrel

STORMWATER FACT:

Whether you buy or build a rain barrel, the most important thing to remember is that they are only effective at stormwater management when the stored water is emptied in between storms, making room in the barrel for the next storm.

Rain Gardens

A rain garden is a garden which takes advantage of rainfall and stormwater runoff in its design and plant selection. Usually, it is a small garden which is designed to withstand the extremes of moisture and concentrations of nutrients, particularly nitrogen and phosphorus, that are found in stormwater runoff. Rain gardens are sited ideally close to the source of the runoff and serve to slow the stormwater as it travels downhill, giving the stormwater more time to infiltrate and less opportunity to gain momentum and erosive power.

On the surface, a rain garden looks like an attractive garden. It may support habitat for birds and butterflies, it may be a formal landscape amenity or it may be incorporated into a larger garden as a border or as an entry feature. What makes it a rain garden is in how it gets its water and what happens to that water once it arrives in the garden.

Below the surface of the garden, a number of processes are occurring which mimic the hydrologic action of a healthy forest. Soils are engineered and appropriate plants selected for the rain garden. The garden is a small **bioretention cell** in which stormwater is cleaned and reduced in volume once it enters the rain garden. Nitrogen and phosphorus levels and overall sediment loads in the stormwater are reduced by the action of the plants and growing media on the water. Multiple rain gardens over an area will have a positive cumulative effect on both the volume and quality of stormwater run off.

What does a rain garden cost?

The cost of a rain garden will vary depending on who does the work and where the plants come from. If you grow your own plants or borrow plants from neighbors there can be very little or no cost at all. If you do all the work but use purchased plants, a rain garden will cost approximately \$3 to \$5 per square foot. If a landscaper does everything, it will cost approximately \$10 to \$12 per square foot.

It might seem easiest to sow native wildflower seed over the garden, but experience shows that seeding a rain garden has its problems. Protecting the seeds from wind, flooding, weeds, and garden pests is very difficult, and the rain garden will be mostly weeds for the first two years. Growing plugs from seed indoors or dividing a friend's plants is much better. If you grow plugs, start them about four months before moving them to the rain garden. When the roots have filled the pot and the plants are healthy, they may be planted in the rain garden.

Key Terms:

BIORETENTION CELL: A shallow planted depression designed to retain or detain stormwater before it is infiltrated or discharged downstream (also known as a rain garden).



Photo courtesy of: www.apwa.net

For more information on how to design and install a rain garden visit: www.lowimpactdevelopment.org

For a list of native plants to use in your rain garden, visit The City of Arlington's Forestry website at www.naturallyfun.org

Backyard Composting

Research has shown that compost and composted products can help reduce water pollution (Source: US Composting Council 2008). Compost products can be used directly and indirectly to prevent pollution or remediate polluted water and by replacing polluting activities with less polluting alternatives.

Organic wastes, such as leaves, branches, grass clippings and other yard waste products, are a major source of nonpoint source (or stormwater) pollution. The process of composting takes these raw materials and stabilizes them under controlled conditions. Stabilizing the material takes the nutrients, such as nitrogen, and ties them up in the compost's organic matter. The nutrients are slowly released over time, increasing the opportunity for up-take by plants and reducing downstream water pollution problems.



What is Backyard Composting?

Backyard composting refers to a variety of practices individuals can use to manage organic materials at home. All backyard composting techniques use the natural activity of bacteria, fungi, and other soil organisms to decompose organic materials and return them to the soil. Decomposed organic material—compost—is essential to healthy gardens and landscapes.

Benefits of Backyard Composting

Using compost has several positive benefits as related to Stormwater Pollution Prevention. Backyard composting can be the most economical and environmental way to manage organic materials produced at home. The benefits include:

- Reduces the need for chemical pesticides because it contains beneficial microorganisms that protect your plants from diseases and pests.
- Reduces or eliminates your use of synthetic fertilizers used in gardens and other yard areas.
- Reduces herbicide use from using composted mulches for weed suppression.
- Reduces soil loss from erosion because of improved soil structure.
- Use of compost improves any soil. Compost makes soil better able to absorb and retain moisture reducing runoff, erosion, and irrigation needs.
- Diverts organic material from landfills – Keeping these materials at home prolongs the life of landfills and reduces the expenses and environmental impacts associated with them.

Composting Methods

There are several different composting methods, including cold composting, hot composting, vermicomposting (worms), in-vessel composting (industrial), Bokashi composting, high fiber composting, tunnel composting, and Windrow (agricultural).

The cold and hot composting methods are listed here.

Cold Composting (Cool & Easy)

With this method, compost is ready in six months to two years. This practice does not destroy weed seeds, runners, or plant diseases.

Advantages

- Low maintenance
- Can add materials as they become available

Disadvantages

- Doesn't heat up enough to kill weed seeds
- May create unpleasant odors if carbon/nitrogen ratio and the balance between wet and dry materials are not maintained

Tools

- Garden fork
- Water hose with spray head
- Compost bin (optional)
- Burlap scraps or black plastic to cover top of pile (optional)

Ingredients

- Grass clippings
- Brown leaves
- Twigs
- Water

Directions

1. Set compost bin or start pile in an area where water does not puddle when it rains, preferably in a shaded spot near a water source.

2. Put yard trimmings in bin or pile as collected from garden clean-up or mowing.

Moisten dry materials as they are added. Mix grass clippings with leaves or composting materials already in pile.

3. Chop or shred woody trimmings over ½ inch diameter if adding large amounts.

4. Cover top of compost with burlap scrap or black plastic to keep pile moist but not too wet.



Your compost is ready when material at the bottom of the bin looks like dark, rich soil. When ready pull aside undecomposed materials to start a new batch. Harvest the finished compost to use in the garden or other yard areas.

Hot Composting (Hot & Fast)

This approach requires more maintenance but produces compost in batches that are ready in one to four months. This practice destroys most plant diseases, weeds, and weed seeds.

Advantages

- Heats up enough to kill most weed seeds and pathogens
- Uses space efficiently

Disadvantages

- Labor intensive
- Must be built all at once, requiring storage of materials until enough is collected
- Requires careful control of moisture and carbon/nitrogen ratio

Tools

- Garden fork
- Water hose with spray head
- Compost thermometer
- Compost bin (optional)
- Burlap or black plastic to cover top of pile (optional)

Ingredients

- Grass clippings or other high-nitrogen material
- Brown leaves
- Twigs
- Water

Directions

1. Set compost bin or start pile in an area where water does not puddle when it rains, preferably in a shaded spot near a water source.
2. Chop or shred woody trimmings over ½ inch diameter if adding large amounts.
3. Place about 6 inches of brown materials at bottom of bin or pile.
4. Add 1 or 2 inches of green material – grass clippings, green leaves, cottonseed meal, etc.
5. Mix layers with a garden fork (optional) and moisten dry materials (not optional).
6. Repeat steps 3 and 4 until the pile is at least 3 ft. x 3 ft. x 3 ft., or until the bin is full.
7. Monitor the heat in pile using a compost thermometer. Turn the pile once it has heated and starts to cool (about one week). Using a garden fork, move the material, shaking it in order to add air around the particles.
8. Repeat step 7 in about one week. Repeat until pile does not reheat after turning.

Let the compost cure for two weeks before using.

REMEMBER: Using compost before it is ready can damage plants and can also introduce weed seeds and root damaging organic acids to your garden or yard.



Compost is ready when...

- It smells earthy—not sour, putrid, or like ammonia
- It no longer heats up after it is turned or wetted
- It has a crumbly texture and looks like dark soil



What to put in your compost bin/pile

MATERIAL	USE: Y/N	COMMENTS
Algae or seaweed	Yes	Good nutrient source.
Animal wastes (bird, cat, dog feces or cat litter)	No	Droppings from pets (and litter) may contain disease organisms.
Ash from coal or charcoal	No	May contain materials that harm plants. Best to exclude.
Ashes from wood fireplace or stove	No	Too alkaline for our clay soils. Can cause nutrient imbalance problems.
Cardboard	Yes	Use if it cannot be recycled. Best if shredded into small pieces. Glue is usually organic.
Cottonseed meal	Yes	Can be a source of nitrogen in the fall when green grass clippings are scarce.
Diseased plants	No	Piles often do not get hot enough to destroy all plant disease organisms.
Dryer lint	Yes	May need to be moistened. (If high synthetic, may not decompose, but is not harmful).
Food scraps	Yes	May attract rodents and other pests if not buried at least 6" to 12" deep in pile.
Hair	Yes	Add moisture and mix thoroughly in pile.
Manure (horse, cow, pig, sheep, goat, chicken, rabbit)	Yes	Excellent source of Nitrogen. Due to high water content, should be mixed with drier materials.
Newspaper	Yes	Use if cannot be recycled. Shredding is recommended before use. Most inks today are safe for garden use.
Pine cones and needles	Yes; use sparingly	Recommended shredding and adding in small quantities. Other compost materials with neutralize their acidic effect.
Sawdust and wood shavings	Yes; but may need to add nitrogen	Have a high carbon content. Do not use sawdust from pressure-treated wood.
Weeds	Yes, but not seeds or spreading roots	Annual weeds that have not gone to seed can be used. Plants that spread by roots or runners should be dried thoroughly before adding to compost.

Summing it Up: Preventing Pollution Starts with You

Pollution prevention and good stormwater management is essential to protecting water quality. All activities from agriculture, urban development, industrial, and RESIDENTIAL activities influence how much stormwater will enter our water sources and what potential pollutants it will carry. EVERYONE is responsible for working to reduce the impacts of stormwater runoff.

Remember these pollution solutions:

- ✓ Do **not** dispose of household hazardous wastes in sinks, toilets, or storm drains.
- ✓ Use a commercial carwash that treats or recycles its wastewater, or wash your car on your lawn so that water infiltrates the ground. Washing your car and degreasing auto parts in your driveway can send detergents and other contaminants through storm sewer systems.
- ✓ Do **not** dump automotive fluids into storm drains. In some cases this has the same result as dumping these materials directly into a water body.
- ✓ Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.
- ✓ When walking your pet, remember to pick up wastes and dispose of them properly. Pet waste can be a major source of bacteria and excess nutrients in local waters. Flushing pet waste is the best disposal method.
- ✓ Use pesticides and fertilizers sparingly. Excess fertilizers and pesticides applied to lawns and gardens wash into storm sewers and pollute streams.
- ✓ Do not water your lawn too much, as it causes runoff.
- ✓ Compost or mulch yard wastes. Yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.
- ✓ Use non-colored mulch from native trees whenever possible.
- ✓ Use pest control methods minimizing pesticide applications whenever possible.
- ✓ Cover piles of dirt or mulch used in landscaping projects.
- ✓ Inspect your septic system every 3 years and pump your tank as necessary. Leaking and poorly maintained septic systems release nutrients and pathogens—bacteria and viruses—that can be picked up by stormwater and discharged into nearby water bodies. Such pathogens can cause public health problems and environmental concerns.
- ✓ Volunteer in your City's next litter clean-up event.
- ✓ Attend public hearings or meetings on stormwater so that you can express your concerns.
- ✓ Report all stormwater violations to the City.
- ✓ Keep learning about stormwater runoff and tell a friend!



NO ONE WANTS TO SEE YOUR BUTT!



PLEASE DISPOSE OF CIGARETTES PROPERLY!



Help your kids Discover Stormwater

Call 817.459.6587

or email

stormwatereducation@arlingtontx.gov
for a free stormwater activity book. *

** while supplies last*



BE A PART OF THE POLLUTION SOLUTION!

ENTER YOUR CONTACT
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DATABASE & WE'LL CONTACT YOU WHEN
OPPORTUNITIES ARISE.

WWW.ARLINGTONTX.GOV/STORMWATER
CLICK ON "VOLUNTEERING"



Stormwater Glossary of Terms

303 (d) Waterbody - A list of lakes, rivers, and streams that have been designated as impaired or threatened by a pollutant(s) for which one or more TMDLs are needed. Impaired means that the water is not meeting state water quality standards.

319 - The section of the Federal Clean Water Act that deals with nonpoint pollution.

Best Management Practice (BMP), nonstructural - Strategies implemented to control stormwater runoff that focus on pollution prevention such as alternative site design, zoning and ordinances, education, and good housekeeping measures.

Best Management Practice (BMP), structural - Engineered devices implemented to control, treat, or prevent stormwater runoff pollution.

Biofiltration - The use of vegetation (usually grasses or wetland plants) to filter and treat stormwater runoff as it is conveyed through an open channel or swale.

Bioretention - The use of vegetation in retention areas designed to allow infiltration of runoff into the ground. The plants provide additional pollutant removal and filtering functions while infiltration allows the temperature of the runoff to be cooled.

Buffer zone - A designated transitional area around a stream, lake, or wetland left in a natural, usually vegetated state so as to protect the waterbody from runoff pollution. Development is often restricted or prohibited in a buffer zone.

Catchbasin - An inlet to a storm or combined sewer equipped with a sediment sump, and sometimes a hood, on its outlet pipe to the sewer. Catchbasins can collect some of the sediment and debris washed off the streets, and help to provide a water seal against the venting of sewer gases. Catchbasins should be cleaned out regularly to function properly.

Catchment - See Watershed.

Combined sewer system - A sewer system that conveys stormwater runoff along with sanitary sewage and industrial waste.

Conveyance - The process of water moving from one place to another.

Detention - The storage and slow release of stormwater following a precipitation event. Detention is used for both pollutant removal, stormwater storage, and peak flow reduction. Both wet and dry detention methods can be applied.

Discharge - The volume of water that passes a given location within a given time period.

Erosion - Removal of soil particles by wind or water.

Eutrophication - Nutrient enrichment (nitrogen, phosphorus, and carbon) from sewage effluent, runoff, or atmospheric deposition to surface waters. This process can increase the growth potential for algae and aquatic plants. Excessive eutrophication can leave waterbodies devoid of most life, impede navigation, and result in aesthetic nuisances.

Filter Strip - Grassed strips situated along roads or parking areas that remove pollutants from runoff as it passes through, allowing some infiltration, and reductions of velocity.

Floatables - Materials found in runoff that are buoyant, such as polystyrene, plastic, some organic material, or cigarette butts.

Groundwater - Water that flows below the ground surface through saturated soil, glacial deposits, or rock.

Hydrology - The science addressing the properties, distribution, and circulation of water across the landscape, through the ground, and in the atmosphere.

Illicit connection - Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater and is not authorized by an NPDES permit, with some exceptions (e.g., discharges due to firefighting activities)

Illicit discharges - Discharges of non-stormwater to the storm drainage system. Examples are discharges from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges should be going to the sanitary sewer system, a holding tank, an on-site process water treatment system, or a septic system.

Impervious surface - A surface that cannot be penetrated by water such as pavement, rock, or a rooftop and thereby prevents infiltration and generates runoff.

Imperviousness - The percentage of impervious cover within a defined area.

Impoundment - A natural or man-made containment for surface water.

Infiltration - The process or rate at which water percolates from the land surface into the ground. Infiltration is also a general category of BMP designed to collect runoff and allow it to flow through the ground for treatment.

Integrated Pest Management (IPM) - The practice of using biological and physical measures to control pests while minimizing or eliminating the use of synthetic chemical pesticides.

National Pollutant Discharge Elimination System (NPDES) - National Pollutant Discharge Elimination System, the two-phased surface water quality program authorized by Congress as part of the 1987 Clean Water Act. This federally mandated system is used for regulating point source and nonpoint stormwater discharge. The second phase of the program requires local governments to implement the following six minimum measures:

1. Public Education and Outreach
2. Public Participation/ Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention / Good Housekeeping

Natural buffer - A variable width area maintained with natural vegetation between a pollutant source and a waterbody that provides natural filtration and other forms of protection.

Nonpoint-source pollutants - Pollutants from many diffuse sources. Nonpoint-source pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even underground sources of drinking water.

Outfall - The point of discharge from a river, pipe, drain, etc. to a receiving body of water.

Point-source pollutants - Pollutants from a single, identifiable source such as a factory or refinery.

Pollutant loading - The total quantity of pollutants in stormwater runoff.

Polluted runoff - Rainwater or snowmelt that picks up pollutants and sediments as it runs off roads, highways, parking lots, lawns, agricultural lands, logging areas, mining sites, septic systems, and other land-use activities that can generate pollutants.

Porous pavement and pavers - Alternatives to conventional asphalt that utilize a variety of porous media, often supported by a structural matrix, concrete grid, or modular pavement, which allow water to percolate through to a sub-base for gradual infiltration.

Retention - The process of collecting and holding surface and stormwater runoff with no surface outflow.

Runoff - Water from rainfall, snowmelt, or otherwise discharged that flows across the ground surface instead of infiltrating the ground.

Sanitary sewer system - Underground pipes that carry only domestic or industrial wastewater to a sewage treatment plant or receiving water.

Sedimentation - A solid-liquid separation process utilizing gravitational settling to remove soil or rock particles from the water column.

SSO (sanitary sewer overflow) - Wastewater entering sanitary sewers may be so great, because of blockage, a lack of capacity, inflow and infiltration, or other reasons, that the collection system or sewage treatment plant cannot handle the increased flow. As a result, untreated sewage empties directly into receiving waters, often from manholes or up through sewer connections.

Storm sewer system - A system of pipes and channels that carry stormwater runoff from the surfaces of building, paved surfaces, and the land to discharge areas.

Stormwater - Water derived from a storm event or conveyed through a storm sewer system.

Stormwater utility - A utility established to generate a dedicated source of funding for stormwater pollution prevention activities where users pay a fee based on land-use and contribution of runoff to the stormwater system.

Surface water - Water that flows across the land surface, in channels, or is contained in depressions on the land surface (e.g. runoff, ponds, lakes, rivers, and streams).

Swale - A natural or human-made open depression or wide, shallow ditch that intermittently contains or conveys runoff. Can be used as a BMP to detain and filter runoff.

Total maximum daily load (TMDL) - The maximum allowable loading of a pollutant that a designated water body can assimilate and still meet numeric and narrative water quality standards. TMDLs were established by the 1972 Clean Water Act

Urban (metropolitan) runoff - Runoff derived from urban or suburban land-uses that is distinguished from agricultural or industrial runoff sources.

Water (hydrologic) cycle - The flow and distribution of water from the sky, to the Earth's surface, through various routes on or in the Earth, and back to the atmosphere. The main components are precipitation, infiltration, surface runoff, evapotranspiration, channel and depression storage, and groundwater.

Water quality - The biological, chemical, and physical condition of a waterbody; a measure of the ability of a waterbody to support beneficial uses.

Watershed - The land area, or catchment, that contributes water to a specific waterbody. All the rain or snow that falls within this area flows to the waterbodies as surface runoff, in tributary streams, or as groundwater.

Additional Resources



City of Arlington Public Works & Transportation
817.459.6550

Stormwater Pollution Prevention Hotline
(Report Polluters)
817.459.6599

Stormwater Education Coordinator
817.459.6587
stormwatereducation@arlingtontx.gov

Parks & Recreation Department
817.459.5474

Residential Recycling Coordinator
(Recycling, Composting)
817.459.6778

Water Conservation Coordinator
(Rain Barrels, Smart Yards, etc)
817.459.6628

Stormwater Fund Administrator
(Stormwater Utility Fee)
817.459.6586

United States Environmental Protection
Agency (USEPA)
<http://www.epa.gov/nps/pubs.html>

Texas AgriLife Extension Service
<http://texasextension.tamu.edu>

Texas Commission on Environmental Quality
<http://www.tceq.state.tx.us>

City of Arlington Stormwater
<http://www.arlingtontx.gov/stormwater>

City of Arlington Green Team
<http://www.arlingtontx.gov/greenteam>

City of Arlington Parks & Recreation
<http://www.naturallyfun.org>

North Central Texas Council of Governments
(NCTCOG)
<http://www.nctcog.org>

Natural Resources Defense Council (NRDC)
<http://www.nrdc.org>

City of Fort Worth, TX
<http://www.fortworthgov.org>

City of Dallas
<http://www.wheredoesitgo.com>





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WATER
POLLUTION!**

**REPORT STORM
DRAIN
POLLUTERS TO
THE
STORMWATER
POLLUTION
PREVENTION
HOTLINE!**

817.459.6599



The Arlington Green Team helps Arlington commercial properties go green. Find out more at www.ArlingtonGreenTeam.com

**Arlington
Recycles!**



www.arlingtontx.gov

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City of Arlington
Public Works & Transportation Department
Stormwater Management
PO Box 90231 MS 01-0220
Arlington, TX 76004-3231
www.arlingtontx.gov/stormwater
817.459.6550
817.459.6565 (fax)
stormwatereducation@arlingtontx.gov