



Illinois Environmental Protection Agency

Bureau of Water • 1021 North Grand Avenue East • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Notice of Intent for New or Renewal of General Permit for Discharges from Small Municipal Separate Storm Sewer Systems - MS4's

Part I. General Information

1. MS 4 Operator Name: Village of Tilton
2. MS4 Mailing Address: 1001 Tilton Road, Tilton, Illinois 61833
City: Tilton State: IL
3. Operator Type: Village Other: N/A
4. Operator Status: Local Other: N/A
5. Name(s) of governmental entity(ies) in which MS4 is located:
Tilton MS4
6. Area of land that drains to your MS4 in square miles: Approximately 3 Square Miles
7. Latitude and Longitude at approximate geographical center of MS4 for which you are requesting authorization to discharge:
Latitude: 40 06 06 (N) Longitude: 87 38 28 (W)
Degrees Minutes Seconds: Degrees: Minutes: Seconds:
8. Name(s) of known receiving waters
Grape Creek tributary to Vermilion River
Vermilion River tributary to Walbash River

9. Persons responsible for implementation or coordination of Stormwater Management Program:

Name: David Phillips Title: Mayor Phone: (217) 477-0800

Area of Responsibility: Development, implementation, enforcement of Best Management Practices (BMP) for Tilton MS4

Name: _____ Title: _____ Phone: _____

Area of Responsibility: _____

Part II. Best Management Practices (include shared responsibilities) which have been implemented or are proposed to be implemented in the MS4 area:

A. Public Education and Outreach

Qualifying Local Programs:

Public Education and Outreach Materials/Flyers Distribution/Website Posting

Measurable Goals (include shared responsibilities)

- A.1 Distributed Paper Material

Brief Description of BMP:

Distribution/website posting of public education and outreach materials/EPA flyers. Copies of flyers are kept at the Village Hall for the interested public, as requested. Communication to include "10 Things You Can Do to Prevent Storm Water Run-off Pollution" brochure in water and/or sewer billing.

Measurable Goals, including frequencies:

Distribution of public education/outreach materials once a year; printed copies of flyers will be made available at the village Hall to the interested public, as requested. Include brochure in billing to Village residence as allowed by time and resources available.

Milestones:

Go to Additional Pages

Year 1:

Once / Year

Year 2:

Once / Year

Year 3:

Once / Year

Year 4:

Once / Year

Year 5:

Once / Year

- A.2 Speaking Engagement
- A.3 Public Service Announcement
- A.4 Community Event
- A.5 Classroom Education Material

(You may need to go to the next page to fill in this information)

Village intends to provide educational flyer to the local schools to raise awareness of types of Storm Water Pollutants and information of types of green infrastructure and how they benefit in reducing such pollutants.

Measurable Goals, including frequencies:

Provide copies of educational flyers to the local area schools once a year, as allowed by the time and resources available to the Village.

Milestones:

Year 1:

Once / Year

Year 2:

Once / Year

Year 3:

Once / Year

Year 4:

Once / Year

Year 5:

Once / Year

Go to Additional Pages

A.6 Other Public Education

B.Public Participation/Involvement

Measurable Goals (include shared responsibilities)

Qualifying Local Programs:

Public Participation/Involvement by distribution/website posting of public education/outreach materials/flyers.

B.2 Educational Volunteer (You may need to go to the next page to fill in this information)

Brief Description of BMP:

The Village intends to provide educational flyers to the local schools to raise awareness of types of Storm Water Pollutants and information of types of green infrastructure and how they benefit in reducing such pollutants.

Measurable Goals, including frequencies:

Provide copies of educational flyers to the local area schools once a year, as allowed by the time and resources available to the Village.

Milestones:

Year 1:

Once / Year

Year 2:

Once / Year

Year 3:

Once / Year

Year 4:

Once / Year

Year 5:

Once / Year

Go to Additional Pages

- B.3 Stakeholder Meeting
- B.4 Public Hearing
- B.5 Volunteer Monitoring
- B.6. Program Involvement
- B.7 Other Public Involvement

(You may need to go to the next page to fill in this information)

Brief Description of BMP:

Distribution/website posting of public education and outreach materials/EPA flyers; following a local Public Notice (PN) guidelines. Copies of flyers are kept at the Village Hall for distribution to the interested public.

Measurable Goals, including frequencies:

Distribution of public education/outreach materials once a year; Printed copies of flyers will be made available at the Village Hall to the interested public.

Milestones:

Year 1:

Once / Year

Year 2:

Once / Year

Year 3:

Once / Year

Year 4:

Once / Year

Year 5:

Once / Year

Go to Additional Pages

C. Illicit Discharge Detection and Elimination

Qualifying Local Programs:

Preparation of Storm Sewer Map for the Village of Tilton MS4

Measurable Goals (include shared responsibilities)

- C.1 Sewer Map Preparation (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Gather available storm sewer location and size information then compile on digital storm sewer map.

Measurable Goals, including frequencies:

The Village intends to update the Storm Sewer Map annually, resources permitting.

Milestones:

Year 1:

Update Annually

Year 2:

Update Annually

Year 3:

Update Annually

Year 4:

Update Annually

Year 5:

Update Annually

Go to Additional Pages

- C.2 Regulatory Control Program
- C.3 Detection/Elimination Prioritization Plan (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Communication with local, state and/or federal agencies to develop a plan to inspect solid waste transportation equipment mobilizing through the Village jurisdiction to identify any potential storm water pollution.

Measurable Goals, including frequencies:

Develop plan to inspect solid waste equipment. Determine who will be responsible for inspection, where and when the random inspections will occur and how to enforce clarifying storm water pollution violations.

Milestones:

Year 1:

Communication with local, state and/or federal authorities to develop inspection and enforcement plan.

Year 2:

Random inspections of solid waste equipment and violation enforcement.

Year 3:

Random inspections of solid waste equipment and violation enforcement.

Year 4:

Year 5:

Random inspections of solid waste equipment and violation enforcement.

Go to Additional Pages

C.4 Illicit Discharge Tracing Procedures

C.5 Illicit Source Removal Procedures

C.6 Program Evaluation and Assessment

C.7 Visual Dry Weather Screening (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Visual observation/screening of Storm Sewer Inlets and Outlets.

Measurable Goals, including frequencies:

Time/resource-permitting, the Village intends to perform a visual observation/screening of key Inlets and Outlets on existing Storm Sewer System once a year possibly during debris cleaning operations.

Milestones:

Year 1:

Once / Year

Year 2:

Once / Year

Year 3:

Once / Year

Year 4:

Once / Year

Year 5:

Once / Year

Go to Additional Pages

C.8 Pollutant Field Testing

C.9 Public Notification

C.10 Other Illicit Discharge Controls (You may need to go to the next page to fill in this information)

Utilize newly generated digital storm sewer map to generally develop plans to detain and treat water run-off from major fire protection and/or spill clean-up.

Measurable Goals, including frequencies:

Identify locations and procedures to temporarily store water run-off from fire protection and/or spill clean-up.

Milestones:

Year 1:

Prepare digital map

Year 2:

Communicate and coordinate to develop Best Management Practice locations and procedures

Year 3:

Improve Best Management Practices

Year 4:

Improve Best Management Practices

Year 5:

Improve Best Management Practices

Go to Additional Pages

D. Construction Site Runoff Control

Measurable Goals (include shared responsibilities)

Qualifying Local Programs:

Erosion and Sediment Control requirements are and will continue to be emphasized during the pre-construction conference for the Village's construction projects.

D.1 Regulatory Control Program

D.2 Erosion and Sediment Control BMPs (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Emphasize Erosion and Sediment Control requirements in the pre-construction meeting for the Village's construction projects.

Measurable Goals, including frequencies:

Continue to emphasize Erosion and Sediment Control requirements in the pre-construction meeting for the Village's construction projects.

Milestones:

Year 1:

Continue

Year 2:

Continue

Year 3:

Continue

Year 4:

Continue

Year 5:

Go to Additional
Pages

- D.3 Other Waste Control Program
- D.4 Site Plan Review Procedures
- D.5 Public Information Handling Procedures
- D.6 Site Inspection/Enforcement Procedures
- D.7 Other Construction Site Runoff Controls

E. Post-Construction Runoff Control

Qualifying Local Programs:

Review site grading/drainage plans for any new subdivisions/others to be constructed within Tilton MS4 that submit application for Storm Sewer Connection Permit to the Village.

Measurable Goals (include shared responsibilities)

- E.1 Community Control Strategy
- E.2 Regulatory Control Program
- E.3 Long Term O & M Procedures
- E.4 Pre-Construction Review of BMP Designs (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Emphasize Storm Water Management BMPs, including Erosion and Sediment Control requirements, etc. in the pre-construction meeting for the Village's Construction projects.

Measurable Goals, including frequencies:

Emphasize Storm Water Management BMPs, including Erosion and Sediment Control requirements, etc. in the pre-construction meeting for the Village's construction projects.

Milestones:

Year 1:

Continue

Year 2:

Continue

Year 3:

Continue

Year 4:

Continue

Year 5:

Continue

Go to Additional Pages

- E.5 Site Inspections During Construction
- E.6 Post-Construction Inspections

The Village intends to perform post-construction visual observation of the construction site regarding Storm Water Management BMPs.

Measurable Goals, including frequencies:

Time/resources-permitting, the Village will continue to perform post-construction visual observation of the construction sites regarding Storm Water Management BMPs.

Milestones:

Year 1:

Continue

Year 2:

Continue

Year 3:

Continue

Year 4:

Continue

Year 5:

Continue

Go to Additional Pages

E.7 Other Post-Construction Runoff Controls

F. Pollution Prevention/Good Housekeeping

Measurable Goals (include shared responsibilities)

Qualifying Local Programs:

Stream Inspection and Debris Controls
Street Sweeping Equipment and Operation Improvements
Road Deicing Salt Application Rates

F.1 Employee Training Program

(You may need to go to the next page to fill in this information)

The Village intends to schedule training of Village Public Works Personnel regarding proper street sweeping operations and debris disposal also snow and ice control operations. Village to invest in street sweeping equipment allowing for improved street sweeping operations.

Measurable Goals, including frequencies:

Time/resources-permitting, the Village will continue to educate personnel regarding street sweeping and snow and ice control operations especially with regard to proper street sweeping debris removal and disposal also efficient road salt and material application rates. Utilize Illinois Department of Transportation Technology Transfer on-line videos and publications to educate Village Public Works personnel regarding street sweeping, snow and ice control also storm water pollution prevention in general.

Milestones:

Year 1:

Attend IDOT snow and ice control also manufacturer of street sweeper equipment training as available. Utilize IDOT on-line training.

Year 2:

Research and attend additional training updates. Provide training to any new Village personnel.

Year 3:

Research and attend additional training updates. Provide training to any new Village personnel.

Year 4:

Research and attend additional training updates. Provide training to any new Village personnel.

Year 5:

Research and attend additional training updates. Provide training to any new Village personnel.

Go to Additional Pages

F.2 Inspection and Maintenance Program (You may need to go to the next page to fill in this information)

Brief Description of BMP:

Inspect inlet and outlet drainage facilities within the Village thence remove debris and address erosion. Generally start from upstream then proceed downstream.

Measurable Goals, including frequencies:

Time/resources permitting, the Village intends to utilize copy of Village Storm Sewer Map to track sweeping and drainage facility inspection and debris removal operations. Record progress documentation in Village file system.

Milestones:

Year 1:

Beginning operation upstream thence work toward downstream.

Year 2:

Continue

Year 3:

Continue

Year 4:

Continue

Year 5:

Continue

Go to Additional Pages

Brief Description of BMP:

Conduct visual observation of streams for accumulated debris and other items and maintain records.

Measurable Goals, including frequencies:

Time/resources-permitting, the Village will conduct visual observation of accessible segments of streams in the jurisdiction of Tilton MS4 annually for any accumulated debris, floatable items, etc. and maintain records.

Milestones:

Year 1:

Begin inspection upstream thence work downstream.

Year 2:

Continue

Year 3:

Continue

Year 4:

Continue

Year 5:

Continue

Go to Additional Pages

Brief Description of BMP:

Develop operational plans to separate debris from stream, drainage system and various public works clean-ups into recyclables (metals, plastics, etc), landscape waste, street sweeping fines and garbage. Identify appropriate locations to dispose or recycle materials in a manner that avoids storm water pollution. Village intends to invest in street sweeping equipment allowing for improved street debris removal operations.

Measurable Goals, including frequencies:

Document waste disposal procedures and educate Village personnel. Keep records of quantities disposed.

Milestones:

Year 1:

Develop waste separation procedure and establish recycling and waste disposal locations. Obtain and begin utilizing street sweeping equipment.

Year 2:

Continue to improve waste disposal procedures.

Year 3:

Continue to improve waste disposal procedures.

Year 4:

Continue to improve waste disposal procedures.

Year 5:

Continue to improve waste disposal procedures.

Go to Additional Pages

Brief Description of BMP:

Inspect Grape Creek through Village to assess and remove debris build-up obstructing or potentially restricting channel and/or bridges. Address erosion along creek allowing water to flow consistently and naturally through Village in a manner minimizing flooding potential.

Measurable Goals, including frequencies:

Inspect Grape Creek through Village annually then implement mitigation and document measures taken.

Milestones:

Year 1:

Inspect creek, implement mitigation and document action taken.

Year 2:

Inspect creek, implement mitigation and document action taken.

Year 3:

Inspect creek, implement mitigation and document action taken.

Year 4:

Inspect creek, implement mitigation and document action taken.

Year 5:

Inspect creek, implement mitigation and document action taken.

Go to Additional
Pages

F.6 Other Municipal Operations Controls

Part III. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for knowingly submitting false information, including the possibility of fines and imprisonment.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony (415 ILCS 5/44 (h)).

David Phillips _____

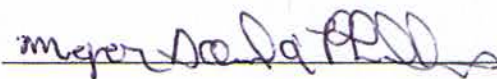
Authorized Representative Name

Mayor _____

Title

7/12/13 _____

Date

 _____

Authorized Representative Signature

You may complete this form online and save a copy locally before printing and signing the form. It should then be sent to:

Illinois Environmental Protection Agency
Bureau of Water
Division of Water Pollution Control
Attn: Permit Section
P.O. Box 19276
1021 North Grand Avenue East
Springfield, IL 62794-9276

A. Public Education and Outreach

BMP Number A.1

Copies of public education/outreach materials/EPA flyers intended to be used are attached.

BMP Number A.5

Copies of public education/outreach materials/EPA flyers to be used are attached.

BMP Number A.7

Copies of public education/outreach materials/EPA flyers to be used are attached.

Add Another BMP

Delete Last Entry

B. Public Participation/Involvement

BMP Number B.2

Copies of public education/outreach materials/EPA flyers to be used are attached.

BMP Number B.7

Copies of public education/outreach materials/EPA flyers to be used are attached.

Add Another BMP

Delete Last Entry

C. Illicit Discharge Detection and Elimination

BMP Number C.1

Attached is Gleisner Engineering Written Response to Village of Tilton Small Municipal Separation Storm Sewer System (MS4) Audit Non-Compliance Advisory dated February 21, 2013 and IEPA Acceptability Letter dated February 28, 2013.

BMP Number C.3

Attached is Gleisner Engineering Written Response to Village of Tilton Small Municipal Separation Storm Sewer System (MS4) Audit Non-Compliance Advisory dated February 21, 2013 and IEPA Acceptability Letter dated February 28, 2013.

BMP Number C.7

N/A

Add Another BMP

Delete Last Entry

D. Construction Site Runoff Control

BMP Number D.2

N/A

Add Another BMP

Delete Last Entry

E. Post-Construction Runoff

BMP Number E.4

N/A

BMP Number E.6

N/A

Add Another BMP

Delete Last Entry

Additional Info - Page 6

F. Pollution Prevention/Good

BMP Number F.1

Training videos at the following web site <http://www.dot.state.il.us/blr/lib.html>. Snow & Ice Control Operation Training video (V077) Parts 1 through 6, New Generation of Snow and Ice Control video (V107), Good Highway Winter Maintenance/Risk Management video (V129), Snow Fighters Salt Institute video (V130), Sand & Salt Spreader Calibration video (V191), Storm Water Management Systems video (V073).

BMP Number F.2

Copies of Engineers Grape Creek Inspection Report and maintenance planning may be obtained upon request.

BMP Number F.3

Locations for disposal of separated waste by Village Public Works Staff:

- Metals - Mervis Industries and/or Bryant Industries
- Landscape - Village Landscape waste disposal area near Public Works facility
- Oil - Village oil containment barrel at Public Works facility
- Concrete - Village crushing to aggregate recycling operation
- Garbage - Brickyard Landfill

BMP Number F.4

N/A

BMP Number F.5

Engineerings Inspection Report and/or Improvement Plans along Grape Creek through Village may be obtained from Gleisner Engineering or Village upon request.

Add Another BMP

Delete Last Entry

Copies of EPA Flyers

- **BMP # A.1 and #A.5 – Public Education and Outreach**
- **BMP # B2 and B.7 – Public Participation/Involvement**

U.S. EPA Stormwater Educational Videos

Reduce Runoff: Slow It Down, Spread It Out, Soak It In

Building Green: A Success Story in Philadelphia

RiverSmart Homes: Getting Smart about Runoff in Washington, DC



Office of Wetlands, Oceans, and Watersheds

<http://water.epa.gov/aboutow/wow/>

EPA 823-S-10-004

What is LID (Low Impact Development) ?

Low Impact Development (LID), also known as Green Infrastructure, helps mimic the natural way water moves through an area before development by using design techniques that infiltrate, evapotranspire, and reuse runoff close to its source. LID helps protect and restore water quality. Using vegetated areas that capture runoff also improves air quality, mitigates the effects of urban heat islands, and reduces a community's overall carbon footprint.

For more information, visit:

Low Impact Development
www.epa.gov/nps/lid

Green Infrastructure
www.epa.gov/greeninfrastructure



United States Environmental Protection Agency
1200 Pennsylvania Ave, NW
4501T
Washington, DC 20012

Watch the videos and download them for free!

<http://www.epa.gov/nps/lid/video.html>

Reduce Runoff: Slow It Down, Spread It Out, Soak It In

This 9-minute video by the U.S. EPA and the U.S. Botanic Garden highlights green techniques such as rain gardens, green roofs and rain barrels to help manage stormwater runoff. The film showcases green techniques that are being used in urban areas to reduce the effects of stormwater runoff on the quality of downstream receiving waters. The techniques are innovative stormwater management practices that manage urban stormwater runoff at its source, reduce the volume of stormwater runoff, and capture harmful pollutants. Using vegetated areas to capture runoff improves air quality, mitigates the effects of urban heat islands, and reduces a community's carbon footprint. The video is also available with Spanish subtitles.



Building Green: A Success Story in Philadelphia

In 2010, EPA's Office of Water produced this 11-minute video which highlights innovative efforts by green builders in Philadelphia who are helping protect and restore environmental quality and beautify the city. By installing cisterns, green roofs, porous pavers, solar panels, and Energy Star appliances, builders are capturing rainwater, reducing stormwater runoff, and saving energy. The exciting news is that the units are selling even in a depressed market, thanks to many of the amenities, including the attractive green roofs, reduced utility bills and proximity to public transit. The city is now offering incentives to builders and developers like Orion Flats to use green techniques to help meet clean water and other environmental goals.



RiverSmart Homes: Getting Smart about Runoff in Washington, DC

This 12-minute video produced in 2010 highlights RiverSmart Homes, a program that was launched in 2006 by the District Department of the Environment as a way to combat Washington, DC's serious stormwater problems and to actively involve the community. Residential properties are the single largest land use in the nation's capital, and the program actively engages the community in restoring the rivers. Thanks to this unique urban waters project, homeowners in diverse city neighborhoods are enthusiastically adopting environmentally friendly landscaping practices to reduce the effects of stormwater runoff and help bring back the Anacostia and Potomac Rivers, as well as lesser known Rock Creek and Oxon Run.



Design Principles for Stormwater Management on Compacted, Contaminated Soils in Dense Urban Areas

EPA's Brownfields Program is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. A brownfield is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. EPA's Brownfields Program provides financial and technical assistance for brownfield revitalization, including grants for environmental assessment, cleanup and job training.

What is Green Infrastructure?

Most development and redevelopment practices cover large areas of the ground with impervious surfaces such as roads, driveways, sidewalks, and new buildings themselves, which then prevent rainwater from soaking into the ground. These hard surfaces increase the speed and amount of stormwater that runs into nearby waterways, carrying pollutants and sediment each time it rains.

Green infrastructure seeks to reduce or divert stormwater from the sewer system and direct it to areas where it can be infiltrated, reused or evapotranspirated. Soil and vegetation are used instead of, or in conjunction with, traditional drains, gutters, pipes and centralized treatment areas. In many new and redevelopment projects, green infrastructure is implemented to manage and mitigate the polluted runoff created by precipitation that falls on rooftops, streets, sidewalks, parking lots and other impervious surfaces.

How can Green Infrastructure be Applied to Brownfield Sites?

Preparing brownfields for redevelopment often requires capping of contaminated soils, creating even larger impervious surfaces. The challenge for managing stormwater on brownfield sites is allowing this capping while mitigating the impervious surface conditions that can negatively impact local waterways.

Unlike many conventional developments, impervious footprints on brownfields cannot always be minimized through site designs that incorporate more porous surfaces to allow for infiltration. Direct infiltration on a brownfield site may introduce additional pollutant loads to groundwater and nearby surface waters. However, green infrastructure practices exist that can retain, treat and then release stormwater without it ever coming in contact with contaminated soils.



At Washington in Washington, DC, green infrastructure practices are being used to manage stormwater runoff.

The University of Michigan's School of Natural Resources and Environment developed design guidelines that use low impact development techniques on contaminated sites. Using a former industrial site in Flint, Michigan, called Chevy in the Hole, graduate students considered and refined methods to prevent residual contamination from moving with stormwater.



Design Considerations

A key component of using green infrastructure for brownfield sites is treatment and storage of stormwater, rather than complete infiltration. Most brownfields that have residual contamination need caps, so vegetated areas need to be located above caps and fitted with underdrain systems to remove overflow stormwater.

Development and redevelopment projects should start with keeping existing trees onsite, minimizing compaction of earth that inhibits water infiltration, and planting trees and other vegetation in areas where none exists. Retaining existing tree cover and vegetated areas helps infiltrate and evapotranspirate stormwater runoff while intercepting large amounts of rainfall that would otherwise enter waterways as runoff.

Buildings and other impervious surfaces can be strategically located to act as caps over areas with known contamination. Areas with fill caps can include soils and vegetation above the cap in the form of swales or rain gardens. If fitted with an under-drain system to release treated stormwater off site, these planted areas can safely allow filtration and evapotranspiration of stormwater. Additional features like impermeable liners or gravel filter blankets can be coupled with modified low impact development (LID) practices that safely filter stormwater without exposing the water to contaminated soils.

Green roofs are an ideal way to reduce the runoff from building roofs by encouraging evapotranspiration of rainwater. Another option for brownfield sites is the capture and reuse of stormwater for non-potable uses; this can include runoff storage in rain barrels for irrigation of green roofs or landscaped areas, or in cisterns that store rainwater for toilet flushing and other uses.

Site location within the watershed is very important. In particular, projects in groundwater recharge areas should avoid low impact development practices that promote infiltration, and use techniques that directly discharge treated stormwater instead. Furthermore, new and redeveloped sites near brownfields should use green infrastructure practices to prevent additional runoff from flowing onto potentially contaminated areas.

Overall, when developing a stormwater management plan on a brownfield, surrounding sites must be considered. (Source: *Flint Futures: Alternative Futures for Brownfield Redevelopment in Flint, Michigan*)



The McCheser Henson Greenroofs Center in Washington, DC, utilizes a green roof.

Stormwater Pollution Solutions

Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams



- ◆ Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler
- ◆ Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- ◆ Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- ◆ Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- ◆ Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- ◆ Don't dispose of household hazardous waste in sinks or toilets.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- ◆ Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- ◆ Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for



rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

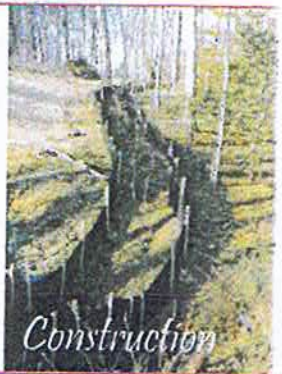


Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- ◆ Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- ◆ Cover grease storage and dumpsters and keep them clean to avoid leaks.
- ◆ Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- ◆ Divert stormwater away from disturbed or exposed areas of the construction site.
- ◆ Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- ◆ Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction

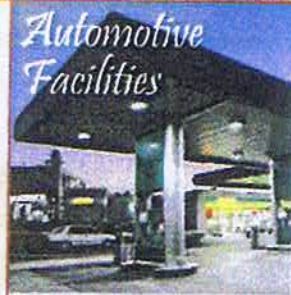
Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- ◆ Keep livestock away from streambanks and provide them a water source away from waterbodies.
- ◆ Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- ◆ Vegetate riparian areas along waterways.
- ◆ Rotate animal grazing to prevent soil erosion in fields.
- ◆ Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- ◆ Clean up spills immediately and properly dispose of cleanup materials.
- ◆ Provide cover over fueling stations and design or retrofit facilities for spill containment.
- ◆ Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- ◆ Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- ◆ Conduct preharvest planning to prevent erosion and lower costs.
- ◆ Use logging methods and equipment that minimize soil disturbance.
- ◆ Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- ◆ Construct stream crossings so that they minimize erosion and physical changes to streams.
- ◆ Expedite revegetation of cleared areas.

Clean Water



Everybody's
Business



10 Things You Can Do to Prevent Stormwater Runoff Pollution

- Use fertilizers sparingly and sweep up driveways, sidewalks, and roads
- Never dump anything down storm drains
- Vegetate bare spots in your yard
- Compost your yard waste
- Avoid pesticides; learn about Integrated Pest Management (IPM)
- Direct downspouts away from paved surfaces
- Take your car to the car wash instead of washing it in the driveway
- Check car for leaks, and recycle motor oil
- Pick up after your pet
- Have your septic tank pumped and system inspected regularly



For more information, visit
www.epa.gov/nps or
www.epa.gov/npdes/stormwater

Stormwater and the Construction Industry

Protect Natural Features



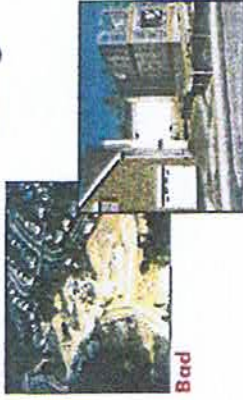
- Minimize clearing
- Minimize the amount of exposed soil
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas

Silt Fencing



- Inspect and maintain silt fences after each rainstorm
- Make sure the bottom of the silt fence is buried in the ground
- Securely attach the material to the stakes
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas
- Install key sediment control practices before site grading begins
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour

Vegetative Buffers



- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness

Site Stabilization



- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed

Maintain your BMPs!

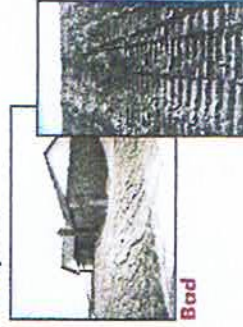
www.epa.gov/npdes/menuefbmps

Construction Entrances



- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly use entrance BMPs for all anticipated vehicles
- Make sure that the construction entrance does not become buried in soil

Slopes



- Rough grade or terrace slopes
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes

Dirt Stockpiles



- Cover or seed all dirt stockpiles

Storm Drain Inlet Protection



- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter)
- If you use inlet filters, maintain them regularly

Pet Care

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local water bodies.

Swimming Pool and Spa

- Drain your swimming pool only when a test kit does not detect chlorine levels.
- Whenever possible, drain your pool or spa into the sanitary sewer system.
- Properly store pool and spa chemicals to prevent leaks and spills, preferably in a covered area to avoid exposure to stormwater.

Septic System Use and Maintenance

- Have your septic system inspected by a professional at least every 3 years, and have the septic tank pumped as necessary (usually every 3 to 5 years).
- Care for the septic system drainfield by not driving or parking vehicles on it. Plant only grass over and near the drainfield to avoid damage from roots.
- Flush responsibly. Flushing household chemicals like paint, pesticides, oil, and antifreeze can destroy the biological treatment taking place in the system. Other items, such as diapers, paper towels, and cat litter, can clog the septic system and potentially damage components.

Storm drains connect to waterbodies!

Recycled Paper • Printed With Vegetable Oil Based Inks on 100% Postconsumer Recycled Paper • Process Chlorine Free Recycled Paper



For more information, visit
www.epa.gov/ppdes/stormwater
or
www.epa.gov/nps

Remember: Only rain down the drain!



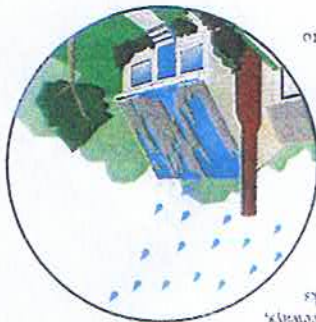
Make your home
The
**SOLUTION
TO STORMWATER
POLLUTION!**

A homeowner's guide to healthy
habits for clean water



Healthy Household Habits for Clean Water

By practicing healthy household habits, homeowners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater. Adopt these healthy household habits and help protect lakes, streams, rivers, wetlands, and coastal waters. Remember to share the habits with your neighbors!



A stormwater flows over driveways, lawns, and sidewalks. It picks up debris, chemicals, dirt, and other pollutants. Stormwater can flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water. Polluted runoff is the nation's greatest threat to clean water.

Vehicle and Garage

- Use a commercial car wash or wash your car on a lawn or other unpaved surface to minimize the amount of dirty, soapy water flowing into the storm drain and eventually into your local watershed.



- Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Clean up spilled fluids with an absorbent material like kitty litter or sand, and don't rinse the spills into a nearby storm drain. Remember to properly dispose of the absorbent material.
- Recycle used oil and other automotive fluids at participating service stations. Don't dump these chemicals down the storm drain or dispose of them in your trash.

Lawn and Garden

- The pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Avoid application in the forecast call for rain. Often, chemicals will be washed into your local stream.
- Select native plants and grasses that are drought- and pest-resistant. Native plants require less water, fertilizer, and pesticides.
- Sweep up yard debris rather than blowing it away. Compost or recycle yard waste when possible.
- Don't overwater your lawn. Water during the cool times of the day, and don't let water run off into the storm drain.
- Cover piles of dirt and mulch being used in landscaping projects to prevent those pollutants from blowing or washing off your yard and into local waterbodies. Vegetate bare spots in your yard to prevent soil erosion.

Home Repair and Improvement

- Before beginning an outdoor project, locate the nearest storm drains and protect them from debris and other materials.
- Sweep up and properly dispose of construction debris such as concrete and metal.
- Use hazardous substances like paints, solvents, and cleaners in the smallest amount possible, and follow the directions on the label. Clean-up spills immediately, and dispose of the waste safely. Store substances properly to avoid leaks and spills.
- Purchase and use nontoxic, biodegradable, recycled, and recyclable products whenever possible.
- Clean your bathtub in a sink, not outdoors. Filter and reuse paint thinner when using oil-based paints. Properly dispose of excess paint through a household-based or work collection program, or donate unused paint to local organizations.
- Reduce the amount of paved area and increase the amount of vegetated areas in your yard. The native plants in your landscape help reduce the need for watering during dry periods. Consider directing downspouts away from paved surfaces with basins and other measures to increase infiltration and reduce polluted runoff.





Water-Efficient Landscaping:



Preventing
Pollution &
Using Resources
Wisely

A Message from the Administrator



Christine Todd Whitman

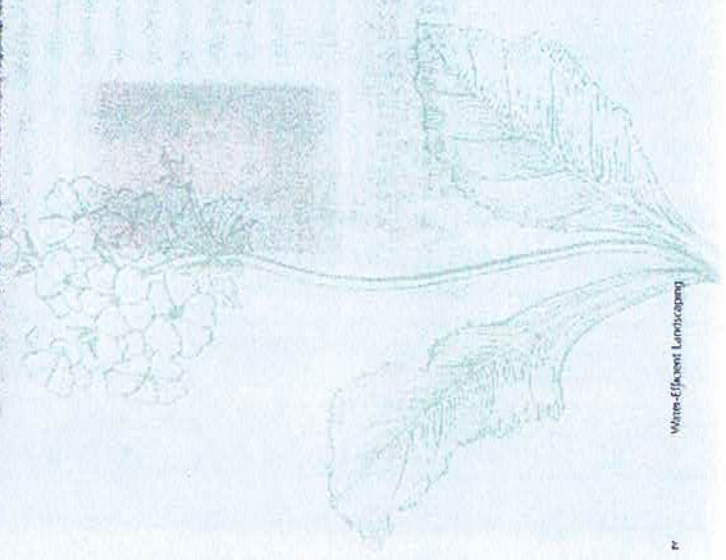
I believe water is the biggest environmental issue we face in the 21st Century in terms of both quality and quantity. In the 30 years since its passage, the Clean Water Act has dramatically increased the number of waterways that are once again safe for fishing and swimming. Despite this great progress in reducing water pollution, many of the nation's waters still do not meet water quality goals. I challenge you to join with me to finish the business of restoring and protecting our nation's waters for present and future generations.

United States Environmental Protection Agency
Office of Water (4204M)
EPA 832-F-02-002
September 2002
www.epa.gov/owm/water-efficiency/index.htm



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What is Water-efficient Landscaping?

Water, our most precious natural resource; without it, life ceases. Yet judging by our water use and consumption practices, many of us in the United States seem to take it for granted. A typical household uses approximately 260 gallons of water per day. "Water conscious" individuals often install high-efficiency shower heads and toilets and wash only full loads of clothes and dishes to reduce consumption. But in the summer, the amount of water used outdoors by a household can exceed the amount used for all other purposes in the entire year. This is especially true in hot, dry climates.

Gardening and lawn care account for the majority of this seasonal increase, but other outdoor activities, such as washing cars and filling swimming pools, also contribute. According to the U.S. Geological Survey, of the 26 billion gallons of water consumed daily in the United States¹, approximately 7.8 billion gallons, or 30 percent², is devoted to outdoor uses. The majority of this is used for landscaping. In fact, it is estimated that the typical suburban lawn consumes 10,000 gallons of water above and beyond rainwater each year (Vickers, p. 140).

Many mistakenly believe that stunning gardens and beautiful lawns are only possible through extensive watering, fertilization, and pesticide application. As this booklet will demonstrate, eye-catching gardens and landscapes that save water, prevent pollution, and

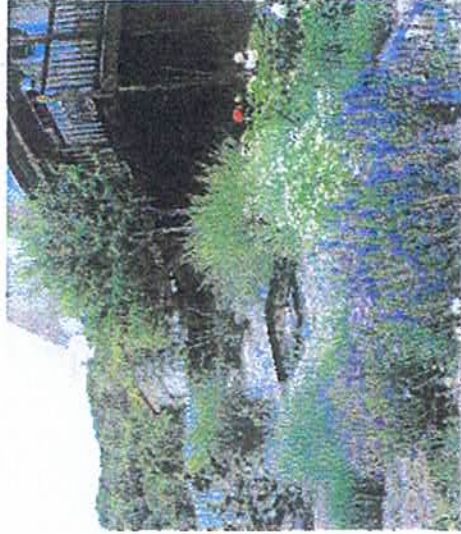
protect the environment are, in fact, easily achieved by employing water-efficient landscaping. Water-efficient landscaping produces attractive landscapes because it utilizes designs and plants suited to local conditions.

This booklet describes the benefits of water-efficient landscaping. It includes several examples of successful projects and programs, as well as contacts, references, and a short bibliography. For specific information about how to best apply water-efficient landscaping principles to your geographical area, consult with your county



Xeriscape garden at Denver Water

extension service and local garden and nursery centers. Local governments and water utilities also possess a wealth of information and suggestions for using water more efficiently in all aspects of your life, including landscaping.



Xeriscape front yard in Colorado Springs

Many terms and schools of thought have been used to describe approaches to water-efficient landscaping. Some examples include "water-wise," "water-smart," "low-water," and "natural landscaping." While each of these terms varies in philosophy and approach, they are all based on the same principles and are commonly used interchangeably. One of the first conceptual approaches developed to formalize these principles is known as "Xeriscape" landscaping. Xeriscape landscaping is defined as "quality landscaping that conserves water and protects the environment." The word "Xeriscape" was coined and copyrighted by

Denver Water Department in 1981 to help make water conserving landscaping an easily recognized concept. The word is a combination of the Greek word "xeros," which means "dry," and "landscape."

The seven principles upon which Xeriscape landscaping is based are:

- Proper planning and design
- Soil analysis and improvement
- Appropriate plant selection
- Practical turf areas
- Efficient irrigation
- Use of mulches
- Appropriate maintenance

The eight fundamentals of water-wise landscaping, below, illustrate the similarities in the underlying concepts and principles of Xeriscape landscaping and other water-efficient approaches.

- Group plants according to their water needs.
- Use native and low-water-use plants.
- Limit turf areas to those needed for practical uses.
- Use efficient irrigation systems.
- Schedule irrigation wisely.
- Make sure soil is healthy.
- Remember to mulch.
- Provide regular maintenance.

In short, plan and maintain your landscape with these principles of water efficiency in mind and it will continue to conserve water and be attractive.

¹ W.B. Salley, R.R. Pierce, and H.A. Perlman. 1998. *Estimated Use of Water in the United States in 1995* (USGS Circular 1200). USGS, Reston, VA, p.27.

² Amy Vickers. 2001. *Handbook of Water Use and Conservation*. WaterFlow Press, Amherst, MA, p. 140.

Why Use Water-efficient Landscaping?

- Proper landscaping techniques not only create beautiful landscapes, but also benefit the environment and save water. In addition, attractive, water-efficient, low-maintenance landscapes can increase home values.
- Water-efficient landscaping offers many economic and environmental benefits, including:
- Lower water bills from reduced water use.
 - Conservation of natural resources and preservation of habitat for plants and wildlife such as fish and waterfowl.
 - Decreased energy use (and air pollution associated with its generation) because less pumping and treatment of water is required.
 - Reduced home or office heating and cooling costs through the careful placement of trees and plants.

- Reduced runoff of stormwater and irrigation water that carries top soils, fertilizers, and pesticides into lakes, rivers, and streams.
- Fewer yard trimmings to be managed or landfilled.
- Reduced landscaping labor and maintenance costs.
- Extended life for water resources infrastructure (e.g., reservoirs, treatment plants, groundwater aquifers), thus reduced taxpayer costs.



Meadow Sage (*Salvia pratensis*) is the background for New Mexico Evening Primrose (*Oenothera biundiatii* "subyou")

Water-Efficient Landscaping

3

How is Water-efficient Landscaping Applied?

Landscaping that conserves water and protects the environment is not limited to arid landscapes with only rocks and cacti.

Through careful planning, landscapes can be designed to be both pleasing to the senses and kind to the environment. One simple approach to achieving this is applying and adopting the basic principles of water-efficient landscaping to suit your climatic region. The seven principles of Xeriscape landscaping are used below to describe these basic concepts in greater detail.

Proper planning and design

Developing a landscape plan is the first and most important step in creating a water-efficient landscape. Your plan should take into account the regional and micro-climatic conditions of the site, existing vegetation, topography, intended uses of the property, and most importantly, the grouping of plants by their water needs. Also consider the plants' sun or shade requirements and preferred soil conditions. A well-thought-out landscape plan can serve as your roadmap in creating beautiful,

water-efficient landscapes and allow you to continually improve your landscape over time.

Soil analysis and improvements

Because soils vary from site to site, test your soil before beginning your landscape improvements. Your county extension service can analyze the pH levels, nutrient levels (e.g., nitrogen, phosphorus, potassium); and the sand, silt, clay, and organic matter content of your soil. It can also suggest ways to improve your soil's ability to support plants and retain water (e.g., through aeration or the addition of soil amendments or fertilizers).

Appropriate plant selection

Your landscape design should take into account your local climate as well as soil conditions. Focus on preserving as many existing trees and shrubs as possible because established plants usually require less water and maintenance. Choose plants native to your region. Native plants, once established, require very little to no additional water beyond normal rainfall. Also, because they are adapted to local soils and climatic conditions, native plants commonly do not require the addition of fertilizers and are more resistant to pests and disease.

When selecting plants, avoid those labeled "hard to establish," "susceptible to disease," or "needs frequent attention," as these types of plants frequently require large amounts of supplemental water, fertilizers, and pesticides. Be careful when selecting non-indigenous species as some of them may become invasive. An invasive plant might be a water guzzler and will surely choke out native species. Your state or county extension service or local nursery can help you select appropriate plants for your area.



Dragon's Blood Sedium (*Sedum spurium*) under Honeylocust trees (*Gleditsia triacanthos*)

should take into account the regional and micro-climatic conditions of the site, existing vegetation, topography, intended uses of the property, and most importantly, the grouping of plants by their water needs. Also consider the plants' sun or shade requirements and preferred soil conditions. A well-thought-out landscape plan can serve as your roadmap in creating beautiful,

Water-Efficient Landscaping

4

The key to successful planting and transplanting is getting the roots to grow into the surrounding soil as quickly as possible. Knowing when and where to plant is crucial to speeding the establishment of new plants. The best time to plant will vary from species to species. Some plants will thrive when planted in a dormant or inactive state. Others succeed when planted during the season when root generation is highest and sufficient moisture is available to support new growth (generally, spring is the best season, but check plant tags or consult with your local nursery for specific species).

Practical turf areas

How and where turf is placed in the landscape can significantly reduce the amount of irrigation water needed to support the landscape. Lawns require a large amount of supplemental water and generally greater maintenance than other vegetation. Use turf where it aesthetically highlights the house or buildings and where it has practical function, such as in play or recreation areas. Grouping turf areas can increase watering efficiency and significantly reduce evaporative and runoff losses. Select a type of grass that can withstand drought periods and become dormant during hot, dry seasons. Reducing or eliminating turf areas altogether further reduces water use.

Efficient irrigation

Efficient irrigation is a very important part of using water efficiently outdoors, and applies in any landscape—whether Xeriscape or conventional. For this reason, an entire section of this booklet addresses efficient irrigation; it can be found on page 6.

Use of mulches

Mulches aid in greater retention of water by minimizing evaporation, reducing weed growth, moderating soil temperatures, and preventing erosion. Organic mulches also improve the condition of your soil as they decompose. Mulches are typically composed of wood bark chips, wood grindings, pine straws, nut shells, small



Wine Cup (*Callitriche incolorata*) and Sunset Myscop (*Agastache rupestris*) in the Denver Water Xeriscape Garden

gravel, or shredded landscape clippings. Avoid using rock mulches in sunny areas or around non-arid climate plants, as they radiate large amounts of heat and promote water loss that can lead to scorching. Too much mulch can restrict water flow to plant roots and should be avoided.

Appropriate maintenance

Water and fertilize plants only as needed. Too much water promotes weak growth and increases pruning and mowing requirements. Like any landscape, a water-efficient yard will require regular pruning, weeding, fertilization, pest control, and irrigation. As your water-efficient landscape matures, however, it will require less maintenance and less water. Cutting turf grass only when it reaches two to three inches promotes deeper root growth and a more drought-resistant lawn. As a rule of thumb, mow your turf grass before it requires more than one inch to be removed. The proper cutting height varies, however, with the type of grass, so you should contact your county extension service or local nursery to find out the ideal cutting height for your lawn. Avoid shearing plants or giving them high nitrogen fertilizers during dry periods because these practices encourage water-demanding new growth.

Water-efficient Landscape Irrigation Methods

With common watering practices, a large portion of the water applied to lawns and gardens is not absorbed by the plants. It is lost through evaporation, runoff, or being pushed beyond the root zone because it is applied too quickly or in excess of the plants' needs. The goal of efficient irrigation is to reduce these losses by applying only as much water as is needed to keep your plants healthy. This goal is applicable whether you have a Xeriscape or a conventional landscape.

To promote the strong root growth that supports a plant during drought, water deeply and only when the plant needs water. For clay soils, watering less deeply and more often is recommended. Irrigating with consideration to soil

type, the condition of your plants, the season, and weather conditions—rather than on a fixed schedule—significantly increases your watering efficiency. Grouping plants according to similar water needs also makes watering easier and more efficient.

Irrigating lawns, gardens, and landscapes can be accomplished either manually or with an automatic irrigation system. Manual watering with a hand-held hose tends to be the most water-efficient method. According to the AWWA Research Foundation's outdoor end use study, households that manually water with a hose typically use 33 percent less water outdoors than the average household. The study also showed that households with in-ground sprinkler systems used 35 percent more water, those with automatic timers used 47 percent more water, and those with drip irrigation systems used 16 percent more water than households without these types of systems. These results show that in-ground sprinkler and drip irrigation systems must be operated properly to be water-efficient.

You can use a hand-held hose or a sprinkler for manual irrigation. To reduce water losses from evaporation and wind, avoid sprinklers that produce a fine mist or spray high into the air. Soaker hoses can also be very efficient and effective when used properly. Use a hand-held soil moisture probe to determine when irrigation is needed.

To make automatic irrigation systems more efficient, install system controllers such as rain sensors that prevent sprinkler systems from turning on during and immediately after rainfall, or soil moisture sensors that activate sprinklers only when soil moisture levels drop below pre-programmed levels. You can also use a weather-



Purple Fountain Grass (*Pennisetum setaceum* "Rubrum") and Marigold (*Tagetes officinalis*) in planter bed

driven programming system. Drip-type irrigation systems are considered the most efficient of the automated irrigation methods because they deliver water directly to the plants' roots. It is also important to revise your watering schedule as the seasons change. Over-watering is most common during the fall when summer irrigation schedules have not been adjusted to the cooler temperatures.

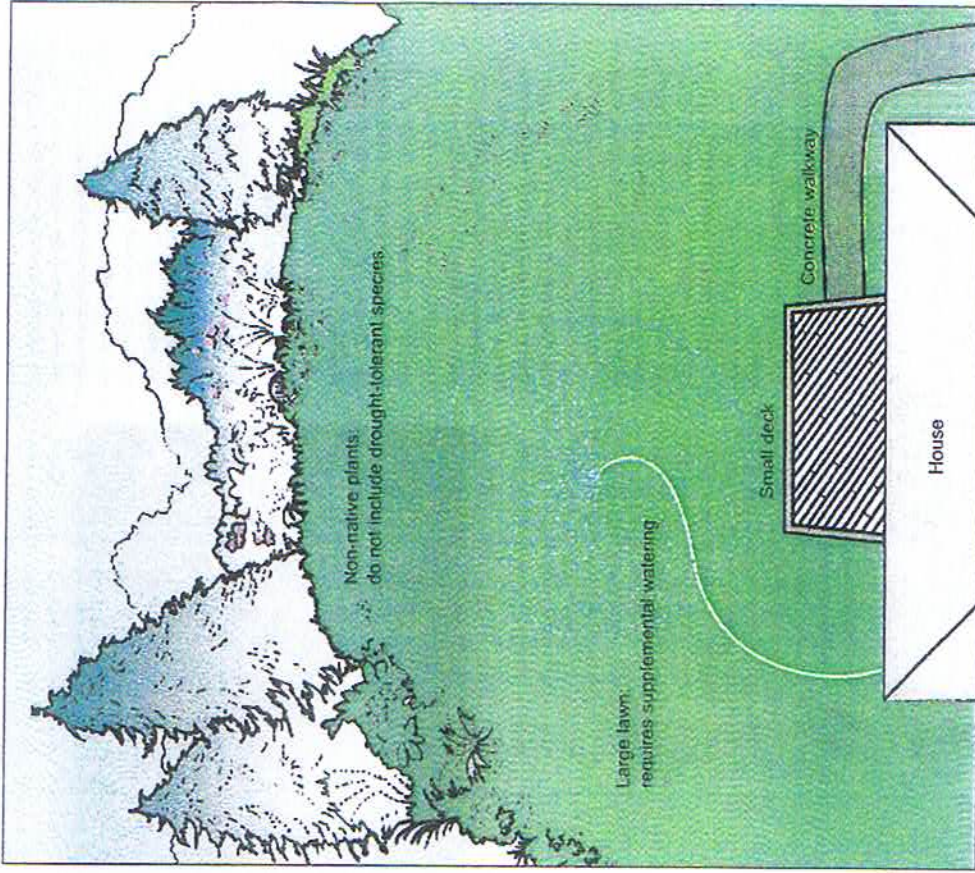
To further reduce your water consumption, consider using alternative sources of irrigation water, such as gray water, reclaimed water, and collected rainwater. According to the AWWA Research Foundation, homes with access to alternative sources of irrigation reduce their water bills by as much as 25 percent.* Graywater is untreated household waste water from bathroom sinks, showers, bathtubs, and clothes washing machines. Graywater systems pipe this used water to a storage tank for later outdoor watering use. State and local graywater laws and policies vary, so you should investigate what qualifies as gray water and if any limitations or restrictions apply. Reclaimed water is waste water that has been treated to levels suitable for nonpotable uses. Check with local water officials to determine if it is available in your area. Collected rainwater is rainwater collected in cisterns, barrels, or storage tanks. Commercial rooftop collection systems are available, but simply diverting your downspout into a covered



Red Yolepis (*Centranthus ruber*)

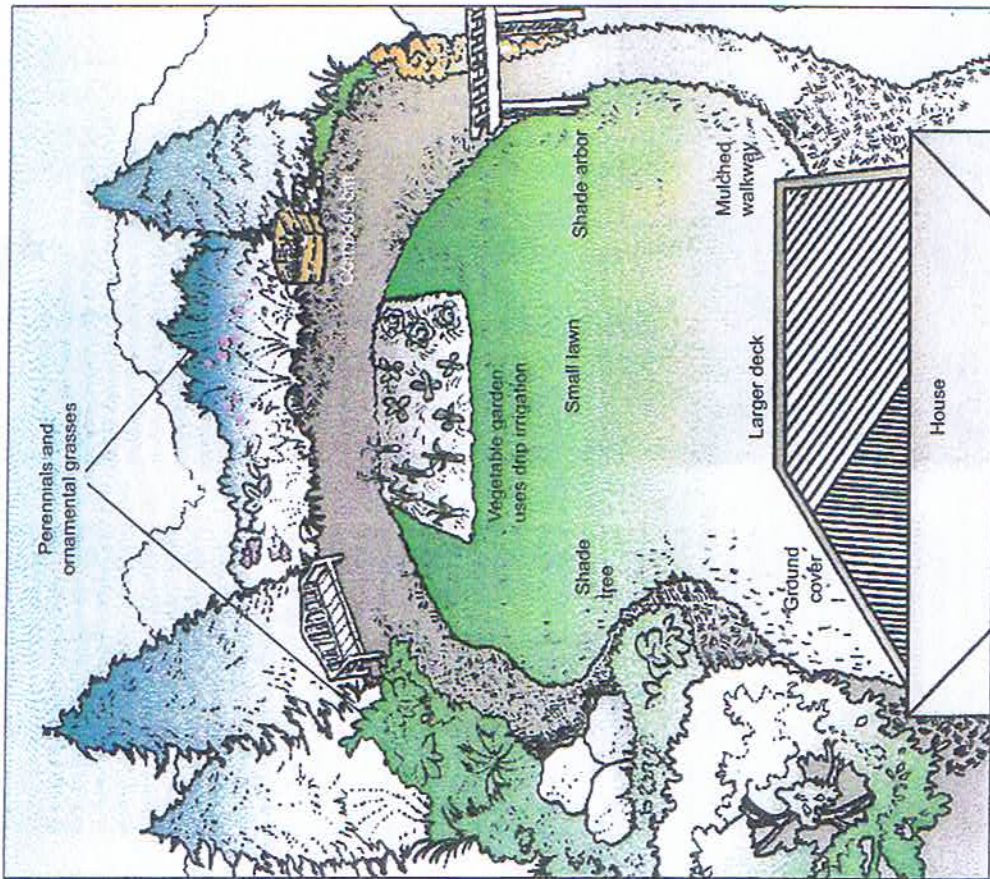
barrel is an easy, low-cost approach. When collecting rainwater, cover all collection vessels to prevent animals and children from entering and to prevent mosquito breeding. Some states might have laws which do not allow collection of rainwater, so be sure to check with your state's water resource agency before implementing a rainwater collection system.

Non-xeriscaping



* AWWA Research Foundation, 1999, *Reclaimed and Gray Water*, www.wwara.org

Xeriscaping



Examples of Successful Water-efficient Landscaping Projects

Water-efficient landscaping techniques can be used by individuals, companies, state, tribal, and local governments, and businesses to physically enhance their properties, reduce long-term maintenance costs, and create environmentally conscious landscapes. The following examples illustrate how water-efficient landscapes can be used in various situations.

and money. The showcase yard (selected from 70 applicants) had a history of heavy water use—more than 90,000 gallons per month. After the retrofit, the yard's aesthetic value was enhanced; plus it now uses 75 percent less water and relies on yard trimmings for mulch and compost.

- The Southwest Florida Water Management District (SWFWMD), the City of St. Petersburg, and Pinellas County, Florida, produced a video called "Xeriscape It!" It shows a landscape being installed using the seven Xeriscape principles. The SWFWMD also funded several Xeriscape demonstration sites and maintains a Xeriscape demonstration garden at its Brooksville, Florida, headquarters. The garden features a variety of native and non-native plants and is available for public viewing, along with a landscape plant identification guide.

- Residents of Glendale, Arizona, can receive a \$100 cash rebate for installing or converting more than half of their landscapable area to non-grass vegetation. The Glendale Water Conservation Office conducts an inspection of the converted lawn to ensure compliance with rebate requirements and then issues a rebate check to the homeowner. The purpose of the Landscape Rebate Program is to permanently reduce the amount of water used to irrigate grass throughout Glendale.

State government

- Although perceived as a water-rich state, Florida became the first to enact a statewide Xeriscape law. Florida's legislature recognized that its growing population and vulnerable environment necessitated legal safeguards for its water resources. The Xeriscape law requires Florida's Departments of Management Ser-



Oriental Poppies (Papaver orientale)

Homeowner-public/private partnership

- The South Florida Water Management District, the Florida Nurserymen and Growers Association, the Florida Irrigation Society, and local businesses worked together to produce a television video called "Plant It Smart with Xeriscape." The video shows how a typical Florida residential yard can be retrofitted with Xeriscape landscaping to save energy, time,

vices and Transportation to use Xeriscape landscaping on all new public properties and to develop a 5-year program to phase in Xeriscape on properties constructed before July 1992. All local governments must also consider requiring the use of Xeriscape and offering incentives to install Xeriscaping.

- Texas also developed legislation requiring Xeriscape landscaping on new construction projects on state property beginning on or after January 1994. Additional legislation, enacted in 1995, requires the Department of Transportation to use Xeriscape practices in the construction and maintenance of roadside parks. All municipalities may consider enacting ordinances requiring Xeriscape to conserve water.

City government

In Las Vegas, Nevada, homeowners can receive up to \$1,000 for converting their lawn to Xeriscape, while commercial landowners can receive up to a \$50,000 credit on their water bill. The city and several other surrounding communities hope these eye-catching figures will help Las Vegas meet its goal of saving 25 percent of the water it would otherwise have used by the year 2010; to date, it has saved 17 percent. Local officials plan to reach the target with the assistance of incentive programs encouraging Xeriscape, a city ordinance limiting turf to no more than 50 percent of new landscapes, grassroots information programs, and a landscape awards program specifically for Xeriscaped properties. Preliminary results of a five-year study show that residents who converted a portion of their lawns to Xeriscape reduced total water consumption by an average of 33 percent. The xeric vegetation required less than a quarter of the water typically used and one-third the maintenance (both in labor and expenditures) compared to traditional turf.



Yellow Ice Plant (*Delosperma nubigenum*) close-up

Developers

Howard Hughes Properties (HHP), a developer and manager of more than 25,000 acres of residential, commercial, and office development property, has enthusiastically used drought-tolerant landscaping on all of its properties since 1990. Most of the company's properties are located in Las Vegas, one of the country's fastest growing metropolitan areas. To conserve resources, the city and county have implemented regulations requiring developers to employ certain Xeriscape principles in new projects. Specifically, a limited percentage of grass can be used on projects, and it must be kept away from streets. As the area's first large-scale developer to recognize the need and value in incorporating drought-tolerant landscaping in parks, streetscapes, and open spaces, HHP uses native and desert-adaptive plants that survive and thrive in the Las Vegas climate with minimal to moderate amounts of water.

Drip system irrigation controllers are linked to weather stations that monitor the evapotranspiration rate. This allows HHP to determine the correct amount of water to be applied to plants at any given time. HHP tests the irrigation systems regularly and adds appropriate soil amendments to promote healthy plant growth. The maintenance program also includes pest management, the use of mulching mowers, and the use of rock mulch top dressing on all non-turf planting areas. These measures combine to ensure a beautiful, healthy, and responsible landscape.

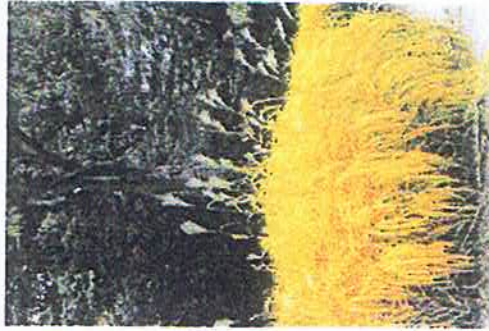
Public/private partnerships

Even the most water-conscious homeowners in Southern California are over-watering by 50 to 70 gallons per day. The excess water washes away fertilizers and pesticides, which pollute natural waterways. The quantity of water wasted (and the dollars that pay for it) are even more substantial for large-scale commercial properties and developments.

An innovative partnership in Orange County links landscape water management, green mate-

rial management, and non-point source pollution prevention goals into one program—the Landscape Performance Certification Program. This program emphasizes efficient landscape irrigation and features a "landscape irrigation budget" based on a property's landscape area, type, and the daily weather. The Municipal Water District monitors actual water use through a system of 12,000 dedicated water meters installed by participating landscape managers.

Participants, including landscapers, property managers, and homeowner associations, can compare the actual cost of water used on their property with the calculated budget. Those staying within budget are awarded certification, a proven marketing tool. This new voluntary program is implemented by the Municipal Water District with input from the California Landscape Contractors' Association, the Orange County Integrated Management Department, the Metropolitan Water District of Southern California, and local nurseries and has the support of 32 retailing water suppliers. The program is already credited with increasing the use of arid-climate shrubs and landscaping to accommodate drip irrigation, and has resulted in cost savings to water customers.



Miscanthus sinensis (Miscanthus grass, also called Maiden grass) variety with leaves turning yellow for fall.

For More Information

The following list of organizations can provide more information on water-efficient landscaping. This is not meant to be an exhaustive list, rather it is intended to help you locate local information sources and possible technical assistance.

Water Management Districts or Utilities

Your local water management district often can provide information on water conservation, including water-efficient landscaping practices. Your city, town, or county water management district can be found in the Blue Pages section of your local phone book or through your city, town, or county's Web site if it has one. If you do not know your city, town, or county's Web site, check for a link on your state's Web site. Web site URLs for state Web sites typically follow this format: <www.state.(two letter state abbreviation).us>.

State/COUNTY EXTENSION SERVICES

Your state or county extension service is also an excellent source of information. Many extension services provide free publications and advice on home landscaping issues including tips on plant selection and soil improvement. Some also offer a soil analysis service for a nominal fee. Your county extension service can be found in the Blue Pages section of your local phone book under the county government section or through your county's Web site if it has one. The U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service (www.research.statepartners.us) provides an online directory of land-grant universities which can help you locate your state extension service. Government Guide (www.governmentguide.com) is yet another online resource that might prove helpful in locating state or local agencies.

Organizations

The following is a partial list of organizations located across the United States that provide helpful information on water-efficient landscaping.

American Water Works Association (AWWA)

6666 West Quincy Avenue
Denver, CO 80235
Telephone: 303 794-7711

and

1401 New York Avenue, NW, Suite 640
Washington, DC 20005
Telephone: 202 628-8303
Web: <www.awwa.org>

Arizona Municipal Water Users Association (AMWUA)

Web: <www.amwua.org/program/xertscape.htm>

BASIN

City of Boulder Environmental Affairs
P.O. Box 791
Boulder, CO 80306
Phone: 303 441-1964

E-mail: basin@bcm.boulder.co.us

Web: <bcm.boulder.co.us/basin/local/seven.html>

Denver Water

1600 West 12th Avenue
Denver, CO 80204
Phone: 303 628-6000
Fax: 303 628-6199

TDD: 303 534-4116

Office of Water Conservation hotline:
303 628-6343

E-mail: jane.carle@denverwater.org

Web: <www.water.denver.co.gov/conservation/conservframe.html>

New Mexico Water Conservation Program/Water Conservation Clearinghouse

P. O. Box 25102
Santa Fe, NM 87504
Phone: 800 WATER-NM
E-mail: waternm@nwc.state.nm.us
Fax: 505 827-3813

Web: <www.nwc.state.nm.us/water-info/conservation/index.html>

Project WET - Water Education for Teachers

201 Calhoun Hall
Montana State University
Bozeman, MT 59717

Phone: 406 994-5392

Web: <www.montana.edu/wwet>

Rocky Mountain Institute

1739 Snowmass Creek Road
Snowmass, CO 81654-9199
Phone: 970 927-3851
Web: <www.rmi.org>

Southern Nevada Water Authority
1001 S. Valley View Boulevard, Mailstop #440
Las Vegas, NV 89153
Phone: 702 258-3930
Web: <www.snwa.com>

Southeast Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

Phone: 352 786-7211 or 800 423-1476 (Florida only)
Web: <www.sfwmd.state.fl.us/waterec/
xerts/wfcrs.html>

Sustainable Sources Green Building Program: Sustainable Building Source Book
E-mail: info@greenbuilder.com
Web: <www.greenbuilder.com/sourcebook/xertscape.html>

Water Conservation Garden - San Diego County
12122 Cuyamaca College Drive West
El Cajon, CA 92019
Phone: 619 660-0614
Fax: 619 660-1687

E-mail: info@hegandem.org
Web: <www.hegandem.org/garden/xertscape/index.html> and <www.sdewa.org/financing/conservation/xertscape.plhtml>

WaterWiser: The Water Efficiency Clearing House
(Operated by AWWA in cooperation with the U.S. Bureau of Reclamation)

6666 West Quincy Avenue
Denver, CO 80235
Phone: 800 559-9855
Fax: 303 794-6303
E-mail: bestuser@waterwiser.org
Web: <www.waterwiser.org>

Xertscape Colorado!, Inc.
P.O. Box 40202
Denver, CO 80204-0202
Web: <www.xertscape.org>

Resources

The following is a partial list of publications on resource efficient landscaping. For even more information, particularly on plants suited to your locale, consult your local library, county extension service, nursery, garden clubs, or water utility.

Ball, Ken and American Water Works Association Water Conservation Committee: *Xertscape Programs for Water Utilities*. Denver: American Water Works Association, 1990.

Bennett, Jennifer. *Dry-Land Gardening: A Xertscape Guide for Dry-Summer, Cold-Winter Climates*. Buffalo: Firefly, 1998.

Bennett, Richard E. and Michael S. Hainaki. *Water-Efficient Landscape Guidelines*. Denver: American Water Works Association, 1993.

Brenzel, Kathleen N., ed. *Western Garden Book, 2001 Edition*. Menlo Park: Samsat Publishing Corporation, 2001.

City of Aurora, Colorado Utilities Department. *Landscaping for Water Conservation: Xertscape!*. Aurora: Colorado Utilities Department, 1989.

Johnson, Eric and Scott Millard. *The Low-Water Flower Gardener: 270 Unobtrusive Plants for Color, Including Perennials, Ground Covers, Grasses & Shrubs*. Tucson: Ironwood Press, 1993.

Knopf, James M. *The Xertscape Flower Gardener*. Boulder: Johnson Books, 1991.

Knopf, James M., ed. *Waterwise Landscaping with Trees, Shrubs, and Vines: A Xertscape Guide for the Rocky Mountain Region, California, and the Desert Southwest*. Boulder: Chama Books, 1999.

Knox, Kim, ed. *Landscaping for Water Conservation: Xertscape*. Denver: City of Aurora and Denver Water, 1989.

Nellis, David W. *Seashore Plants of South Florida and the Caribbean: A Guide to Identification and Propagation of Xertscape Plants*. Sarasota: Pineapple Press, Inc., 1994.

Perry, Bob. *Landscape Plants for Western Regions: An Illustrated Guide to Plants for Water Conservation*. Claremont: Land Design Publishing, 1992.

Phillips, Judith. *Natural by Design: Beauty and Balance in Southwest Gardens*. Santa Fe: Museum of New Mexico Press, 1995.



Turkish Speedwell (Veronica leuconotus) in background and tulips in foreground.


- Phillips, Judith. *Plants for Natural Gardens: Southwestern Native & Adaptive Trees, Shrubs, Wildflowers & Grasses*. Santa Fe: Museum of New Mexico Press, 1995.
- Robinette, Gary O. *Water Conservation in Landscape Design and Maintenance*. New York: Nostrand Reinhold, 1984.
- Rumary, Mark. *The Dry Garden*. New York: Stirling Publishing Co., Inc., 1995.
- Springer, Lauren. *The Undeveloped Garden: Planning for Weather-Resilient Beauty*. Golden: Fulcrum Publishing, 1994.
- Springer, Lauren. *Waterwise Gardening*. New York: Frontice Hill Gardening, 1994.
- Stephens, Tom, Doug Welch, and Connie Ellefson. *Xeriscape Gardening, Water Conservation for the American Landscape*. New York: Macmillan Publishing, 1992.
- Sunset Books, eds. *Waterwise Gardening: Beautiful Gardens with Less Water*. Menlo Park: Lane Publishing Company, 1989.
- Vickers, Amy. *Handbook of Water Use and Conservation*. Amherst, MA: WaterFlow Press, 2001.
- Weinstein, Gayle. *Xeriscape Handbook: A How-To Guide to Natural, Resource-Wise Gardening*. Golden: Fulcrum Publishing, 1998.
- Williams, Sara. *Creating the Prairie Xeriscape*. Saskatchewan: University Extension Press, 1997.
- Winger, David, ed. *Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes*. Golden: Fulcrum Publishing, 1998.
- Winger, David, ed. *Xeriscape Color Guide*. Golden: Fulcrum Publishing, 1998.
- Winger, David, ed. *Evidence of Care: The Xeriscape Maintenance Journal*, 2002, Vol. 1, Colorado WaterWise Council, 2001.

Acknowledgments

Technical advice provided by Alice Darilek, Elizabeth Gardner, and David Winger. Cover photograph from Tom Brahl Photography. Interior photographs have been provided courtesy of Denver Water and David Winger. Illustrations by Linda Cook.

For copies of this publication contact:
 EPA Water Resources Center (RC-4100)
 U.S. Environmental Protection Agency
 Ariel Rios Building, 1200 Pennsylvania Avenue, NW,
 Washington, DC 20460

For more information regarding water efficiency, please contact:
 Water Efficiency Program (4204M)
 U.S. Environmental Protection Agency
 Ariel Rios Building, 1200 Pennsylvania Avenue, NW,
 Washington, DC 20460
www.epa.gov/OWM/water-efficiency/index.htm

 United States
 Environmental Protection Agency (4204M)
 Washington, DC 20460
 Official Business
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COORESPONDANCE BETWEEN

VILLAGE, EPA &

GLEISNER ENGINEERING



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 NORTH GRAND AVENUE EAST, P.O. BOX 19276, SPRINGFIELD, ILLINOIS 62794-9276 • (217) 782-3397

PAT QUINN, GOVERNOR

JOHN J. KIM, DIRECTOR

February 28, 2013

David Phillips
Village of Tilton
1001 Tilton Road
Tilton, IL 61833

Re: Village of Tilton Small Municipal Separate Storm Sewer System (MS4) Audit
Noncompliance Advisory Response

Dear Mr. Phillips:

On February 22 the Agency's Champaign Regional Office received a letter from Gleisner Engineering in response to the noncompliance advisory issued to you on January 7, 2013. Your response to the issues addressed in the aforementioned noncompliance advisory is found to be acceptable.

Be advised that future inspections will be performed to ensure compliance pertaining to the issues addressed in the noncompliance advisory letter. Should you need future assistance or have any remaining questions pertaining to our recent correspondences, please contact Holly Hirchert in the Champaign Field Office at 217/278-5800.

Sincerely,

ENVIRONMENTAL PROTECTION AGENCY

A handwritten signature in black ink, appearing to read "Jay Patel".

Jay Patel, Acting Region Manager
Field Operation Section-Champaign
Division of Water Pollution Control

JP: HNH

CC: BOW/DWPC/FOS-Champaign
BOW/DWPC/FOS/RU #15

GLEISNER ENGINEERING

327 NORTH FLETCHER HILLS DRIVE
DANVILLE, ILLINOIS 61832

217-213-2022

josephgleisner@att.net

February 21, 2013

RE: WRITTEN RESPONSE TO VILLAGE OF TILTON SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) AUDIT NONCOMPLIANCE ADVISORY

Ms. Holly Hirschert
Illinois EPA-DWPC
2125 South First Street
Champaign, IL 61820

In response to the MS4 Audit Noncompliance Advisory Letter the Village retained Gleisner Engineering to assist in complying with the ILR40 permit requirements. The village has submitted copies of previous MS4 and storm water management documentation to Gleisner Engineering for review. Gleisner Engineering prepared a service agreement to achieve seven recommended tasks. The agreement was approved by the Village Board of Trustees. We are currently communicating and coordinating to obtain information, inspect facilities, draft documentation and complete tasks. The following is a list describing proposed tasks and approximate timeline to complete:

TASK 1: SUBMIT NEW NOTICE OF INTENT TO THE ILLINOIS EPA BEFORE SEPTEMBER 30, 2013.

We communicated with Holly Hirschert with Illinois EPA to obtain digital NOI MS4 permit application. We are now saving digital text on the application as it is developed.

TASK 2: Submit annual reports by June 1, 2013

We are currently gathering information and inspecting village facilities regarding storm water management and pollution prevention then intend to submit inspection report to Illinois EPA by June 1, 2013

TASK 3: POST THE NOTICE OF INTENT (NOI), STORM WATER MANAGEMENT PLAN AND THE ANNUAL REPORTS ON THE VILLAGE WEBSITE

We are communicating with Village website managing consultant John Duddly to coordinate posting Notice of Intents, Storm Water Management Plan and/or Ordinance; also Annual Reports on the Village website. We approximate pre-existing Notice of Intents and Annual Reports will be posted on the Village website prior to June 1, 2013 then posting the 2013 Notice of Intent, Annual Reports and updated Storm Water Management Ordinance on website when reviewed and approved by Illinois EPA and Village Board of Trustees. Mr. John Duddly contact information is telephone # 217-260-3218 and e-mail jduddly@duddlymiller.com

TASK 4: UPDATE CHAPTER 13.25 “EROSION, SEDIMENT CONTROL AND STORM SEWER” OF VILLAGE CODE OF ORDINANCES

Gleisner Engineering has obtained an existing copy of the subject village ordinance. We are revising and updating the ordinance for review then approval by Village Board of Trustees. The updated ordinance would then be posted on website and intend to e-mail a copy to Holly Hirschert with Illinois EPA for review. We anticipate this task being completed in May 2013.

TASK 5: DEVELOP A SYSTEM TO TRACK ILLICIT DISCHARGES. PREPARE A PROCEDURE TO ACCOMPANY THE CHECKLIST FOR CLEANING UP SPILLS

We anticipate this will coincide with the compilation of digital storm sewer map between March and August 2013. This may require communication with fire district, HAZMAT and emergency management agencies.

TASK 6: PREPARE AN ELECTRONIC VERSION OF THE STORM SEWER MAP THAT CAN BE COPIED AND USED FOR FIELD INSPECTION

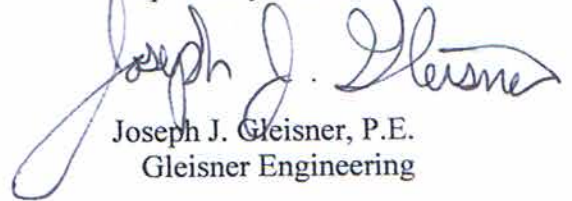
We reviewed existing hand drawn map of storm drainage system in the village jurisdiction. Also have As-Built plans on file of village drainage system improvements. Utilizing an existing digital mapping system we intend to compile a layer depicting storm drainage facility locations and size. We intend to save the information in pdf format allowing the village to print map for utilization during maintenance, inspection, spill clean-up management operations, improvement planning and various tasks. We anticipate development of digital map between March and September 2013.

TASK 7: EXPAND THE FORMAT OF THE ANNUAL REPORT TO INCLUDE DESCRIPTIONS OF INDIVIDUAL ACTIVITIES THAT HAVE TAKEN PLACE TO ACHIEVE THE MEASURABLE GOALS. SUMMARIZE ACTIVITIES THAT ARE PLANNED FOR THE COMING REPORTING PERIOD

During preparation of Annual Inspection Report we intend to expand format to include descriptions of storm water management activities that have taken place to achieve measurable goals also communicate and/or implement measurable future activities. Things being considered are improved street sweeping operations and accountability, accountability of storm sewer maintenance operations, road salt application rate efficiency and accountability, communication with local, state and/or federal enforcement agencies to develop plan to inspect solid waste disposal transportation routes and equipment mobilizing through village jurisdiction to minimize their contribution to storm water pollution. We estimate this will be completed and documented along with the Inspection Report for submission to IL EPA by June 1, 2013

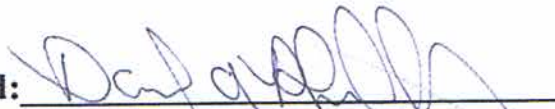
We appreciate your communication in helping us develop an improved storm water management and pollution prevention system for the village.

Respectfully Submitted;



Joseph J. Gleisner, P.E.
Gleisner Engineering

Reviewed and Approved:



Mayor David Phillips