AGENDA

TOWN OF FLOWER MOUND
ENVIRONMENTAL CONSERVATION COMMISSION

REGULAR MEETING

February 5, 2019

FLOWER MOUND TOWN HALL
2121 CROSS TIMBERS ROAD
FLOWER MOUND, TEXAS

6:30 P.M.

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AN AGENDA INFORMATION PACKET IS AVAILABLE ONLINE AT
HTTPS://TX-FLOWERMOUND.CIVICPLUS.COM/AGENDACENTER

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A. CALL REGULAR MEETING TO ORDER – 6:30 PM

B. INVOCATION AND PLEDGE OF ALLEGIANCE

C. CITIZENS/VISITORS COMMENTS

Please fill out an "Appearance Before Environmental Conservation Commission" form in order to address the Environmental Conservation Commission, and turn the form in prior to Citizens and Visitors Comments, or by 6:40 p.m. to the Town staff. Speakers are normally limited to three minutes. Time limits can be adjusted by the Chair as to accommodate more or fewer speakers.

D. SUBCOMMITTEE REPORT

Receive updates and status reports related to subcommittee's tasks, activities, and projects.

E. STAFF REPORT

Update and status report related to environmental issues and events, regulatory activities, and projects.

F. PRESENTATIONS

Receive annual report presentation from Republic Services

G. CONSENT AGENDA - CONSENT ITEMS

This agenda consists of non-controversial or "housekeeping" items and may be approved with a single motion. A member of the Environmental Conservation Commission may request an item(s) be withdrawn from the consent agenda and moved to regular agenda for discussion by making such request prior to a motion and vote on the Consent Agenda.

1. Consider approval of minutes from the regular meeting of the Environmental Conservation Commission held on December 4, 2018.

H. ADJOURNMENT - REGULAR SESSION

I. CALL WORK SESSION TO ORDER

J. WORK SESSION ITEMS

2. Receive a presentation on the Town's Land Development Regulations and Master Plan.

3. Review the Environmental Services Outreach Education Program.

4. Review the Town of Flower Mound's Stormwater Program and 2019 Annual Report..

K. COORDINATION OF FUTURE AGENDAS/MEETINGS

L. ADJOURNMENT- WORK SESSION

Matthew Woods
Director of Environmental Services

I do hereby certify that the Notice of Meeting was posted on the bulletin board in Town Hall of the Town of Flower Mound, Texas, a place convenient and readily accessible to the general public at all times and said Notice was posted on the following date and time: February 1, 2019, by 5:00 p.m., at least 72 hours prior to the schedule time of said meeting.

Emily Chapman
Administrative Assistant

The Flower Mound Town Hall and Council Chambers are wheelchair accessible. Requests for accommodations or interpretive services must be made at least 48 hours prior to this meeting by contacting Emily Chapman, Administrative Assistant, at (972) 874-6340.

ENVIRONMENTAL CONSERVATION COMMISSION AGENDA ITEM NO. 1

CONSENT ITEM

DATE: February 5, 2019

FROM: Emily Chapman, Administrative Assistant

ITEM: **Consider approval of minutes from the regular meeting of the Environmental Conservation Commission held on December 4, 2018.**

BACKGROUND INFORMATION: This agenda item is to consider approval of the minutes from the December 4, 2018, regular meeting of the Environmental Conservation Commission.

CITIZEN FEEDBACK: N/A

ALTERNATIVES/OPTIONS: N/A

FISCAL IMPACT: N/A

LEGAL REVIEW: N/A

ATTACHMENTS:

1. A copy of the draft minutes from the December 4, 2018, regular meeting of the Environmental Conservation Commission.

RECOMMENDATION: Move to approve the minutes from the December 4, 2018, regular meeting of the Environmental Conservation Commission.

THE FLOWER MOUND ENVIRONMENTAL CONSERVATION COMMISSION MEETING HELD ON THE 4TH DAY OF DECEMBER 2018, IN THE FLOWER MOUND TOWN HALL, LOCATED AT 2121 CROSS TIMBERS ROAD IN THE TOWN OF FLOWER MOUND, COUNTY OF DENTON, TEXAS, AT 6:30 PM.

The Environmental Conservation Commission met in regular session, with the following members present constituting a quorum:

Thomas Bailey	Chair
James Seastrom	Vice Chair
James Naylor	Commission Member, Place 1
Russell McNamer	Commission Member, Place 3
Marilyn Lawson	Commission Member, Place 4
Alton Bowman	Commission Member, Place 5
James Gerber	Commission Member, Place 7
Elaine Takacs	Commission Member, Place 8
Shery Layne	Commission Member, Place 9
Kathryn Wells	Commission Member, Place 10

Places 8, 9, and 10 of the Commission do not vote on items unless they sit in place of one of the regular members, Places 1-7.)

And the following members of Town staff present:

Emily Chapman	Administrative Assistant
James Hoefert	Environmental Review Analyst
Matthew Green	Environmental Review Analyst
Misty Adams	Environmental Programs Coordinator

A. CALL TO ORDER - REGULAR SESSION: 6:30 PM

B. INVOCATION AND PLEDGE OF ALLEGIANCE

C. PUBLIC COMMENT

None.

D. SUBCOMMITTEE REPORT & GREENBELT PLAN COMMITTEE RECOMENDATION

Receive updates and status reports related to subcommittee's tasks, activities, and projects; as well as, recommending an appointment to the Denton County Greenbelt Plan committee.

James Naylor was recommended to be appointed to the Denton County Greenbelt Plan committee.

E. STAFF REPORT

Update and status report related to environmental issues and events, regulatory activities, and projects.

F. CONSENT AGENDA

1. **Consider approval of minutes from the regular meeting of the Environmental Conservation Commission held on November 6, 2018.**

Commission Deliberation

Commission Member McNamer made a motion to approve the November 6, 2018, minutes as presented. Vice Chair Seastrom seconded the motion.

VOTE ON THE MOTION

AYES: **Gerber, Bowman, Lawson, Seastrom, McNamer, Naylor**
NAYS: **None**
ABSTAIN: **None**

The motion passed with a vote of 6-0-0

G. ADJOURNMENT- REGULAR SESSION AT 7:05 PM

H. CALL WORK SESSION TO ORDER AT 7:05 PM

I. WORK SESSION ITEMS

1. Discuss the Environmental Conservation Commission's powers, duties, and procedures.

2. Discuss the Town's tree preservation regulations.

J. COORDINATION OF FUTURE AGENDAS/MEETINGS

K. ADJOURNMENT- WORK SESSION – 8:09 PM

TOWN OF FLOWER MOUND, TEXAS

THOMAS BAILEY, CHAIR

ATTEST:

EMILY CHAPMAN, ADMINISTRATIVE ASSISTANT

ENVIRONMENTAL CONSERVATION COMMISSION AGENDA ITEM NO. 2

WORK SESSION ITEM

DATE: February 5, 2019

FROM: Lexin Murphy, Director of Planning Services

ITEM: **Receive a presentation on the Town's Land Development Regulations and Master Plan.**

BACKGROUND INFORMATION: Per Chairman Bailey's request, the purpose of this Work Session is to provide the Environmental Conservation Commission with a better understanding of the overall development process from the Planning Department's perspective. This presentation may assist the Commissioners when they consider environmental issues related to new developments. Planning Commission Vice Chair Laile Neal will also be present to answer questions regarding the role of the Planning Commission in the process.

The Master Plan for the Town of Flower Mound outlines the vision for the orderly growth and development of the Town related to land use, urban design, open space, parks and trails, public infrastructure and economic development. The Master Plan is also an important policy tool and serves as a framework for many of Flower Mound's governing policies, such as zoning regulations. The Town's Zoning and Land Development Regulations provide the method of implementation for the Master Plan by prescribing the use, density and development standards for each parcel of land. Also included within the Land Development Regulations are Flower Mound's SMARTGrowth standards, which have been in place since 2001 and, as a growth management program, help ensure there are adequate public facilities, services and infrastructure for any new proposed projects in the Town. The SMARTGrowth Program operates in concert with Land Development Regulations and the Master Plan to preserve and enhance Flower Mound's community character and quality of life.

ALTERNATIVES/OPTIONS:

N/A

ATTACHMENTS:

1. N/A

RECOMMENDATION: This item is for discussion purposes; therefore, no formal action is required.

ENVIRONMENTAL CONSERVATION COMMISSION AGENDA ITEM NO. 3

WORK SESSION ITEM

DATE: February 5, 2019

FROM: Misty Adams, Environmental Programs Coordinator

ITEM: **Review the Environmental Services Outreach Education Program.**

BACKGROUND INFORMATION: This work session item provides ECC the opportunity to review the Environmental Services Outreach Education Program and discuss opportunities to improve the program for 2019. Staff will provide the Commission with the 2018 status report and curriculum for the 2nd and 7th grade education programs.

Education topics will be reviewed to help determine how Commission members can be involved with this program. Additional outreach opportunities such as Stream Team, Earth Day, Arbor Day and America Recycles Day will also be reviewed.

ALTERNATIVES/OPTIONS:

N/A

ATTACHMENTS:

1. 2nd and 7th Grade Program Curriculum

RECOMMENDATION: This item is for discussion purposes; therefore, no formal action is required.

Stormwater Fun!

Objective

Using this acitivity, students will learn about what a watershed is and sources of pollination within a watershed. Students will also investigate stormwater and the importance of keeping debris out of roadways and storm drains.

Materials

- Butcher Paper
- Washable markers (4-5sets)
- Crayons (4-5 sets)
- Spray bottles (4-5)
- Trays (4-5)
- Trash bags

What is a watershed?

A watershed is the area of land where all of the water that falls in it will drains off to a common outlet. Watersheds can be as small as a footprint or large enough to encompass all the land that drains water into rivers that drain into Trinity River, where it enters the Gulf of Mexico. We are located in the **Elm Fork of the Trinity River Watershed**.

What is Stormwater?

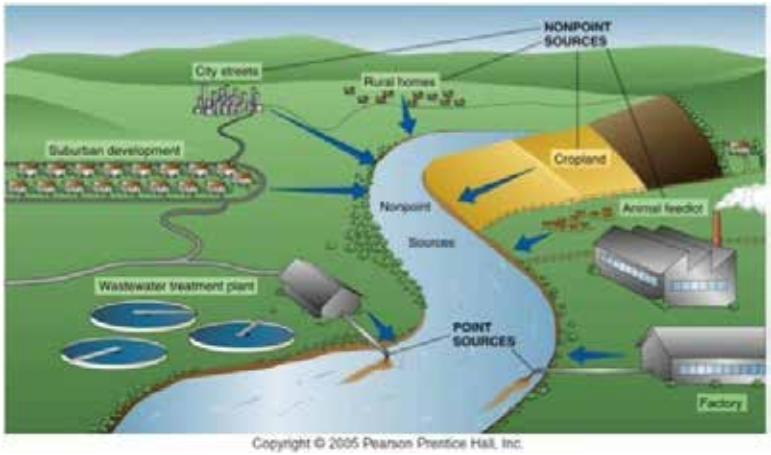
Stormwater runoff is water from **rain or melting snow** that runs off across the land flowing through the watershed. As stormwater flows through a watershed it picks up pollution along the way.

What is Pollution?

Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution.

What are point and non-point sources of pollution?

Point Source Pollution is the release of pollutants from a single identifiable location that can easily be traced back to its original source. An example of point source pollution would be Industrial pollution. Non-point sources of pollution are pollutant that cannot be easily traced back to a source. Examples of non-point pollutant are farmland, and city streets. See diagram below for more details.



What is Sources of Pollutants in our Waterways?

- Natural Erosion (sand)
  - Takes place when sediment runs off natural landscapes as a result of rainfall or snowmelt
- Industrial (green food coloring for point source pollution)
- Residential
  - Several pollutants associated with residential runoff
  - Pet Waste (sprinkles)
  - Fertilizer (yellow food coloring)
    - Parents may use fertilizer to keep the grass green
  - Motor oil (black food coloring)
- Farm
- Construction (Sand)
  - Many pollution concerns associated with construction activity
  - Main source of construction pollution is sediment from sites with insufficient erosion controls

Procedure Part 1- 15 minutes

1. Introduce yourself- Name, position and what you do for the Town of Flower Mound (<2 mins)
2. Now it's time to create your own Watershed (10 minutes)
   a. Split class into 4-5 groups depending on size of class (6 kids max per group)
   b. Had out supplies to groups (butcher paper, crayons, washable markers, spray bottle, and clear plastic tray and a watershed example)
3. Using **CARYONS** on the wax paper (Shiny side down), draw your city (houses, farms, factories, roads, schools, etc.)
4. Now using the **MARKERS** draw in the point and non-point sources of pollution.
5. Next ask students if the land is flat like the paper?
   a. NO! Have students crumple the paper to give it topography
   b. Have the gently un-crumple the paper.

6. Now, have students gently spray their city with a “rain storm”
    a. Ask students “What happened to the pollution?”
7. Wrap up with a discussion of what happened and where all the pollutants ended up
8. Clean-up

"I speak for the trees, for the trees have no tongues!"

Objective

To learn about the role of an Urban Forester and the tools needed to measure and study trees. The students will also learn the importance of preserving and protecting trees.

Materials

- 5-8 Forestry Kits
  - Diameter Tape
  - Tree Height Tool
  - Compass
  - Tree Cookie
  - Various Leaf Samples
  - Various Acorn Samples
- Large Tree Cookie
- Lorax Book

What Does Urban Forestry mean?

Urban Forestry is the management of trees in a city or town.

What is an urban forester?

Urban foresters help take care of the trees along our streets and in our parks and yards. They look after the health of the trees in a city or town. They also encourage tree planting and proper tree care.

What are different tools a forester would use?

Diameter tape – Used to measure around the trunk of the tree.

Tree height tool – Used to measure how tall a tree is.

Compass – Used for navigation.

Tree cookie – Shows how old a tree is. A tree cookie shows the rings inside the tree. Each ring represents one year.

Why is it important to have healthy native trees in a town?

Trees are very important to any environment, especially in a town. Trees produce oxygen and clean the air we breathe. They provide shade and are pretty to look at. Trees even help lower the temperature in the summer and block cold winds in the winter. The roots of trees help anchor the soil and prevent it from being washed away in a storm. Trees are also very important to the urban wildlife in a town. Trees provide homes and food for many different animals. They also provide a place for animals to hide from

predators. Imagine what the Town of Flower Mound would look like without any trees. There would be nothing to shade buildings, cars, and people from the bright, hot sun on summer days. The air would contain much more pollution, and more people would have respiratory issues. There would be no tree roots to anchor soil in places, and storms would wash away sediment into the creeks and rivers. There would be much less animals if there were no trees in Flower Mound. Birds would have no place for their nests, squirrels would have no acorns for food, and caterpillars would have no leaves to feed on.

Procedure

1. Introduce yourself- Name, position and what you do for the Town of Flower Mound
2. Begin a discussion about "The Lorax"
    a. Ask students if they have read the book
    b. Relate the Lorax book to a job as a forester
3. Ask the students "Why is it important to protect trees?" Talk briefly about each of the following points
    a. What do plants provide that we breathe? Oxygen
        i. Briefly talk about photosynthesis
    b. What types of food do we get from trees?
        i. Nuts, Fruit, Syrup, wood to cook food
    c. What types of products do we make out of trees
        i. Houses, furniture, cork, medicine, paper, rubber
    d. What do trees provide for animals?
        i. Food, shelter, hiding from animals
4. Divide the class in small groups (4-5 students each) and give them a forester tool box.
    a. Box contains:
        i. Diameter Tape
        ii. Tree Height Tool
        iii. Compass
        iv. Tree Cookie
        v. Various Leaf Samples
        vi. Various Acorn Samples
5. Give the students a couple of minutes to investigate what's in their Urban Forestry box.
6. After they have had time to investigate the tools, the presenter will have the groups take out one item at a time to look at while he/she explains the tool.
7. End presentation with a brief explanation of how to plant a tree.

REDUCE, REUSE, AND RECYCLE!

Objective

To be able to identify items that can be reused recycled, or landfill bound (trash). Identify ways to reduce, reuse and recycle within their home and community.

Materials

- Pictures of waste, compostable and recyclable items such as: aluminum can, plastic bottle, banana, apple core, glass bottle, drinking straw, cereal box, chip bag, newspaper, milk carton, paper coffee cup, shampoo bottle, metal items, steel food can, used facial tissue, paper clip, food products, bandage, pencil, paper grocery bag, rechargeable battery, rubber band, cellphone, and any other materials you see fit or have handy. You want to include at least 30-35 items to be sorted so that each student has the opportunity to sort.
- Sorting bins: Recycle bin, reuse bin and trash bin, respectively labeled.
- Examples of products made from recyclable materials, reuse items (things made of paper)

What is Trash or Garbage?

Municipal Solid Waste, Trash, consist of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, appliances, paint, and batteries It includes any items that come from our homes, schools, or businesses.

What is Source Reduction (aka Waste Prevention)?

Waste prevention, is designing products to reduce the amount of waste that will later be thrown away and also to make the resulting product less toxic.

What is Recycling?

Recycling is the recovery of useful materials, such as paper, glass, and metals from the trash to use to make new products, reducing the amount of virgin raw materials. Practically everything can be recycled, but only certain items are accepted in our curbside recycling program.

- Did you know that it takes just sixty (60) days for aluminum cans to be recycled and placed back on the supermarket shelf? Aluminum cans can also be infinitely recycled!
- Plastics can be recycled back into plastic products as well as into other products like carpet, cloth, and playground equipment.
- In 2013 Americans generated **254 million tons** of trash only **87 million** tons of this material was recycled or composted (34.3% recycling rate) L
- On average, each American produces 4.4 lbs. of trash EVERY day!
- Every month Americans throw away enough glass bottles and jars to fill up a giant skyscraper (like the Empire State Building).
- Recycling one aluminum can saves enough energy to run a TV for three hours.

- Recycling one (1)-ton (approximately 2,000 pounds) of paper saves seventeen (17) trees, two (2) barrels of oil (enough to run the average car for 1,260 miles), 4,100 Kilowatts of energy (enough to power the average home for six (6) months) 3.2 Cubic-yards of landfill, and sixty (60) pounds of pollution.

What is compost?

Composting is nature's process of recycling decomposed organic materials (such as fruit peels, grass clippings etc.) into a rich soil known as compost. Anything that was once living will decompose. Basically, backyard composting is an acceleration of the same process nature uses. By composting your organic waste you are returning nutrients back into the soil in order for the cycle of life to continue. Finished compost looks like soil–dark brown, crumbly and smells like a forest floor.

Procedure

1. Introduce yourself- Name, position and what you do for the Town of Flower Mound
2. Begin a discussion about Recycling
    a. Ask students if they know the 3-R's (Reduce, Reuse and Recycle)
    b. Have them recite it with you.
    c. Why is Reduce first, Reuse 2nd, and Recycle last?
3. Go through each R and explain.
    a. Reduce- The ability to decrease the amount of trash you produce
        i. How can you reduce at home?
    b. Reuse- Using something more than once
        i. What are some items that you throw away but could actually reuse?
    c. Recycle- Items that cannot be reused but are in the form that is recyclable.
        i. What is recyclable in Flower Mound?
        ii. Display the Yes/ No chart on recyclables
        iii. What happens to an object once it is recycled?
        iv. If time permits, discuss how Composting is a form of recycling for organic materials (fruits, veggies, grass, leaves, coffee)
4. Discuss why it is important to Reduce, Reuse and Recycle
5. Divide the class in small groups (4-5 students each) and give them a sorting box.
    a. Sorting box contains- Pictures of items that can be Reused, Recycled or Trashed.
6. Have the groups work as a team to sort the items within their box.
7. After the group has completed the sorting process, discuss how each group sorted their items.
8. Ask the students to come up with a way to reduce waste in their homes and communities.

Leaves 2nd grade lesson

Objective

To learn about how leaves are important to trees and their function for the tree and the environment. Key concepts to cover: All trees have leaves, importance of photosynthesis and leaves are the most important identification aids for a tree or plants.

Leaf Rubbing

Materials

- **Leaf Rubbing box**
  - **Crayons**
  - **Leaf rubbing plates**
  - **Laminated leaves**
  - **Acorns, nuts, and other fruit**
- **Pressed leaves binder**
- **Laminated Leaves**

Background Information

What are Leaves?

A leaf is an above-ground plant organ. Its main functions are photosynthesis and gas exchange. A leaf is often flat, so it absorbs the most light, and thin, so that the sunlight can get to the chloroplasts in the cells. Most leaves have stomata, which open and close. They regulate carbon dioxide, oxygen, and water vapor exchange with the atmosphere.

Plants with leaves all year round are evergreens, and those that shed their leaves are deciduous. Deciduous trees and shrubs generally lose their leaves in autumn. Before this happens, the leaves change color. The leaves will grow back in spring.

Leaves come in many shapes and sizes.

Why do Plants have Leaves?

The main job of a leaf is to make food for a plant. Leaves do this by using sunlight for energy to take apart water from the ground and carbon dioxide from the air. Leaves use parts of water and carbon dioxide to make sugar. This food making is called photosynthesis, a large word which means making something new (synthesis) using light (photo).

Water gets to the leaf through a set of pipes inside the tree which goes all the way down to the roots. Roots take water in from the soil so that it can be used by the tree. There are also chemicals in the water which help the plant stay healthy, a lot like vitamins help people stay healthy. In winter, the ground freezes. This makes it hard for water to get into the soil. Roots can't get as much water from the soil in winter as in the warm seasons of the year.

Carbon dioxide mixed in the air comes into the leaf through small openings on the bottom side of the leaf. These small openings also let air back out, air which has a little extra oxygen in it from the leaf's using carbon dioxide and water to make food. The small openings also let moisture get out of the leaf. This can make problems for the plant in winter when water is not as easy to get. Many trees in New York State get rid of their leaves before the ground freezes. This helps protect them from losing too much water during the winter.

When leaves are making food, they use the chemical chlorophyll to get energy from sunlight. Chlorophyll is green. When the leaf is ready to stop making food in the fall, it stops making chlorophyll. Without chlorophyll, the other chemicals that are in leaves can be seen. These chemicals show up as different colors.

What are the parts of a leaf?

A leaf is a plant organ and is made up of a collection of tissues in a regular organization.
The major tissue systems present are:

- The epidermis that covers the upper and lower surfaces
- The mesophyll inside the leaf that is rich in chloroplasts
- The arrangement of veins (the vascular tissue)

Epidermis

The epidermis is the outer layer of cells covering the leaf. It forms the boundary separating the plant's inner cells from the external world. The epidermis is covered with pores called stomata. Opening and closing of the stoma complex regulates the exchange of gases and water vapor between the outside air and the interior of the leaf and plays an important role in allowing photosynthesis without letting the leaf dry out.

Mesophyll

Most of the interior of the leaf between the upper and lower layers of epidermis is a tissue called the mesophyll (Greek for "middle leaf"). This is the main place photosynthesis takes place in the plant. The products of photosynthesis are sugars, which can be turned into other products in plant cells.
Leaves are normally green in color, which comes from chlorophyll found in the chloroplasts. Plants that lack chlorophyll cannot photosynthesize.

Veins

The 'veins' are a dense network of xylem, which supply water for photosynthesis, and phloem, which remove the sugars produced by photosynthesis. The pattern of the veins is called 'venation'.

Why are leaves shaped differently?

Plants have different leaves because they live in different habitats

- Conifers – trees with needlelike leaves
  - Grow well in in places that have long, cold winters
  - Their small, needlelike leaves are not easily ripped off by strong winds
  - They also have a waxy coating that keeps them from drying out
  - Most conifers are evergreens – they keep their leaves year-round
- Broadleaves – trees with flat, wide leaves with veins
  - In areas where winter days are short and the weather is cold they shed their leaves
  - In the fall the leaves turn from green to red, orange, or yellow.
    - Why: stop producing chlorophyll
  - Shedding their leaves helps the trees save energy

What are some general characteristics of Leaves?

There are hundreds of different leaf shapes, colors, and arrangements to help identify trees. Looking at these different characteristics will help a scientist to identify what type of tree or plant they have.

- Size (small, medium, large)
- Shape (round, oval, needles, heart-shaped)
- Texture (smooth, rough, waxy, hairy)
- Color
- Broadleaved tree leaves have a network of veins
- Margin (smooth, serrated, lobed)

Why are leaves important for the tree or plant?

Leaves are important for a tree or plant because they undergo a process known as and is a process that plants go through to make food. The word "photosynthesis" comes from two words: 'photo' meaning 'light', and 'synthesis' meaning to make. The leaves absorb sunlight and use that energy to combine water and carbon dioxide to make food. This process adds oxygen to the air and removes carbon dioxide. This is good because humans and animals need oxygen to breathe.

http://www.botanical-online.com/hojastiposangles.htm

Procedure

1. Introduction- Introduce yourself and what you do for the Town of Flower Mound

2. Begin by asking what are leaves?
   a. Once you get a few responses, tell them "A leaf is an above ground organ of a plant."
   b. Provide them examples of what an organ is such as an arm, skin or eyes on a person.

3. Ask "What does the leaf do for a tree?" Are they there to just look pretty?

   a. Help them by asking about what plants need (important TEKS for K-2). When they get to sun ask them how plants take in sun. Through their leaves!

   b. The sun is this huge burning ball of gas in the sky, do you think there's a lot of energy up there? Can you feel the energy from the sun?

c. Talk about how leaves are the solar panels of the tree. They take in energy from the sun and transform it into… say what do they transform it into?
    i. Guide discussion by asking where plants get their food? Reveal that plants turn sunlight into sugar in a process called PHOTOSYNTHESIS. Help them remember PHOTO = light SYNTHESIS = make
    And do you know what plants do with that sugar? What do you do with sugar? That's right you eat it! And it turns into part of your body. Plants use the sugar they make from the sun their leaves collect to make…more plant parts! It helps them grow just like the food you eat helps you grow.

4. Ask the students what the different part of the leaf does?
    a. **Petiole** - the support structure and acts like a straw for water to travel through to nourish the leaf.
    b. **Epidermis** – collects sunlight
    c. **Chlorophyll** – that's what makes the leaf green! It's a cell that helps collect sunlight and works with other cells to make food.
    d.
5. Once students have looked at the different part of a leaf show students some examples of different leaves found here in Flower Mound, using the leaf book, and discuss the different characteristics the leaves have. Keep it Simple, I think we should only have the following leaves / tree specimen: Oak, Elm, Redbud, Cottonwood, Sweetgum, Cypress
    a. Introduce each tree while holding up a leaf
    b. Briefly discuss shape, margins, texture color and size, differences and similarities between each leaf. See if you can get them to realize the Post Oak and Black jack oaks are both Oak trees

6. Have students gather around the tables with "leaf rubbing" materials out.
    a. Have students, using crayons, take a few leaf rubbing of different leaves.
    b. Have students find the laminated leaf with that looks like theirs and copy the name down on their drawing.
7. If time permits, have students look over the leaf rubbing and ask if they notice any differences.

Tree Leaves .

Blackjack oak
- Wide at the top
- 3 lobes
- Bristles

Post oak
- Lobed

Redbud
- Heart shaped

Cottonwood
- Wide
- triangular

Cedar elm

- small
- toothed margins

American elm

- large
- toothed margins

Sweetgum

- star-shaped

JB Additions/Edits 2018:

Spring/Summer activity: Submerge a leaf in water for a couple of hours before the program; bubbles will form as leaf lets out oxygen. Kids can see the leaf actually "exhaling" just like they do. https://www.kcedventures.com/blog/how-do-leaves-breathe-a-simple-science-experiment-for-kids

2nd graders need to explore parts of a tree and sort them into seed, bark, leaf etc. We can get some interesting native specimens and hand lenses

Trees are a really important part of where FM residents live. This is the Cross Timbers! We could introduce the trees as characters. Oak, Elm, Redbud, Cottonwood, Sweetgum, Cypress.

We can make specimen bottles as seen here https://www.kcedventures.com/blog/name-that-tree-using-leaves-seeds-for-tree-identification and attach laminated leaves from each season (labeled) and a tag with name of tree and its picture.

Laminated Leaves / flower parts / bare twigs / fall colored leaves to reinforce the seasons and that trees have flowers too.

Human Impact on Watersheds

Objective

Students will create a model of a watershed. By observing the how surface water flow is determined by the shape of the land, students will visually observe the physical characteristics of a watershed, and investigate the impact of humans on that landscape. Students will then determine if the water in their watershed is healthy or polluted.

Materials

- Butcher Paper (One sheet per group: group of 3 to 4 students works best)
- Crayons
- Washable makers
- Spray bottles w/ water
- Water monitoring kits (D.O. test, pH test, temperature, and turbidity)
- Watershed maps (Trinity River Watershed)

What is a Watershed?

A watershed is an area of land that drains all the rain into a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. The word watershed is sometimes used interchangeably with drainage basin or catchment. Ridges and hills that separate two watersheds are called the drainage divide. The watershed consists of surface water--lakes, streams, reservoirs, and wetlands--and all the underlying ground water. Larger watersheds contain many smaller watersheds. It all depends on the outflow point; all of the land that drains water to the outflow point is the watershed for that outflow location. Watersheds are important because the streamflow and the water quality of a river are affected by things, human-induced or not, happening in the land area "above" the river-outflow point.

http://water.usgs.gov/edu/watershed.html

https://txpub.usgs.gov/DSS/streamer/web/

What is water quality and why is it important?

Is it safe for drinking? Can fish and other aquatic life thrive in streams and lakes that are affected by human activities? What is the water quality? To answer these questions, it is helpful to understand what "water quality" means, how it is determined, and the natural processes and human activities that affect water quality.

Water quality can be thought of as a measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics. To determine water quality, scientists' first measure and analyze characteristics of the water such as temperature, dissolved mineral content, and

number of bacteria. Selected characteristics are then compared to numeric standards and guidelines to decide if the water is suitable for a particular use.

What are sources of pollution in a watershed?

Urban and industrial development, farming, mining, combustion of fossil fuels, stream-channel alteration, animal-feeding operations, and other human activities can change the quality of natural waters. As an example of the effects of human activities on water quality, consider nitrogen and phosphorus fertilizers that are applied to crops and lawns. These plant nutrients can be dissolved easily in rainwater or snowmelt runoff. Excess nutrients carried to streams and lakes encourage abundant growth of algae, which leads to low oxygen in the water and the possibility of fish kills.

Chemicals such as pharmaceutical drugs, dry-cleaning solvents, and gasoline that are used in urban and industrial activities have been found in streams and ground water. After decades of use, pesticides are now widespread in streams and ground water, though they rarely exceed the existing standards and guidelines established to protect human health. Some pesticides have not been used for 20 to 30 years, but they are still detected in fish and streambed sediment at levels that pose a potential risk to human health, aquatic life, and fish-eating wildlife. There are so many chemicals in use today that determining the risk to human health and aquatic life is a complex task. In addition, mixtures of chemicals typically are found in water, but health-based standards and guidelines have not been established for chemical mixtures.

What is water quality?

Water quality refers to the condition of water based on biological, chemical and physical characteristics. It is used to measure the condition of water relative to the requirements of one or more biotic species or to any human need or purpose. A biological assessment would determine the presence of fish, insects, algae, plants and other organisms. Chemical assessments are used to measure chemical parameters in the water that include pH, and dissolved oxygen. Chemical measurements can be used to determine imbalances within an ecosystem and indicate the presence of a certain pollutant. Physical characteristics that can be used to help determine water quality include temperature and turbidity. To get an overall assessment of water quality physical, biological and chemical characteristics need to be taken into consideration.

What water quality measures will be covered in this activity?

pH: is the measure of how acidic or basic a liquid is. Acids and bases are determined by the type of ions present in the liquid. If there are a lot of hydrogen ion the liquid will be acidic if there are a lot of hydroxide ions the liquid will be more basic. A pH scale (0-14) is used to measure how acidic or basic a liquid is.

Dissolved Oxygen: is the amount of oxygen dissolved in the water. It is measured in ppm (parts per million) also called mg/L (milligrams per liter). Dissolved oxygen is important to the health of an aquatic ecosystem. All aquatic organisms need oxygen to survive.

Turbidity: is the cloudiness or "dirtiness" of water caused by individual particles that are too small to be seen by the naked eye. Turbidity measures the intensity of light passing though waster. Measured in JTU (Jackson Turbidity Units)

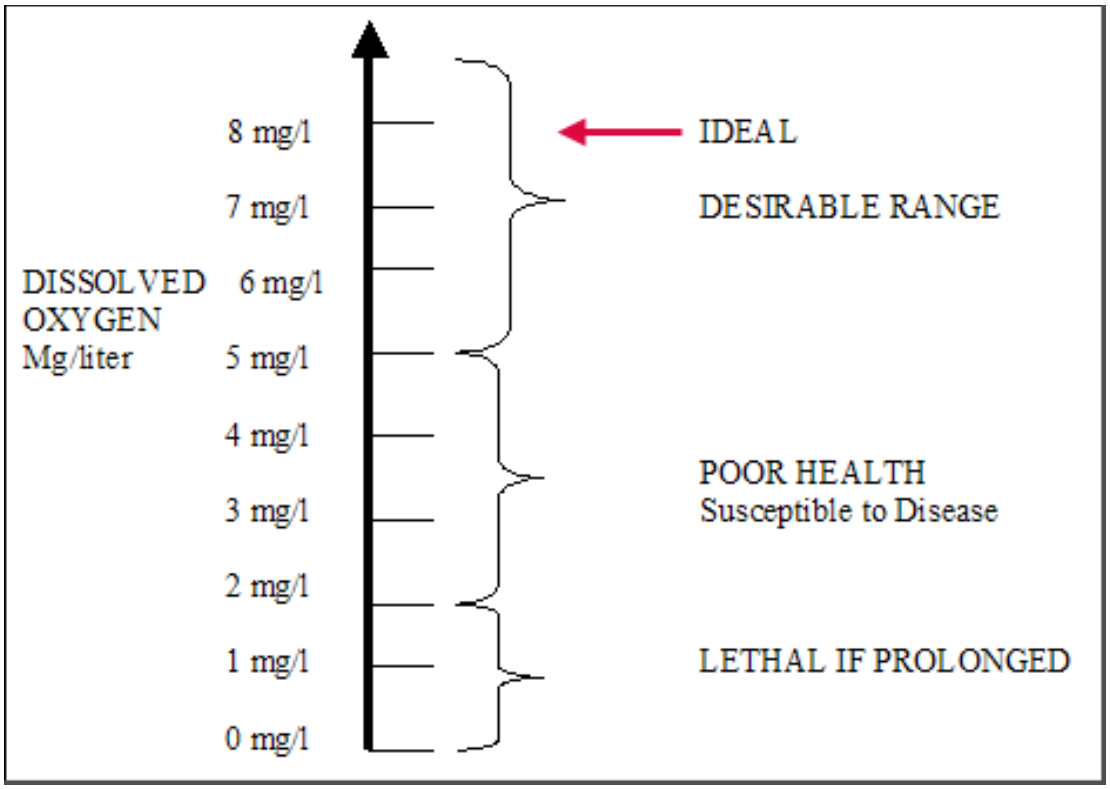
Temperature: exerts a major influence on biological activity and growth. Temperature governs the kinds of organisms that can live in rivers and lakes. Fish, insects, zooplankton, phytoplankton, and other aquatic species all have a preferred temperature range. As temperatures get too far above or below this preferred range, the number of individuals of the species decreases until finally there are none. Temperature is also important because of its influence on water chemistry. The rate of chemical reactions generally increases at higher temperature

Procedure

1. Give a brief introduction to watersheds. (5 mins)
    a. What is a watershed?
    b. Provide a good working definition of a watershed after they have given responses to your question.
        i. "An area of land where all the water that is under it, or drains off of it collects into the same place"
    c. How is the watershed connected to the water cycle?
        i. Discuss the difference between an urban water cycle and rural water cycle.
        ii. Show a diagram of the difference of the two.
2. Have students complete the crumpled watershed activity. (10 mins)
    a. Have students draw their city or town in crayon. Have them include houses, stores, farms, factories, and anything else they may find in their city.
    b. Next have students add potential sources of pollution in washable markers. Sources of pollution to include are oil, fertilizer, pesticides, soapy water, sediment, pet waste and any other sources they can think of.
    c. Next ask students if their landscape is flat? Have them gently crumple their landscape to give it some topography.
    d. Now have groups gently spray their paper down water to mimic rain.
        i. Discuss what happens and the impact humans have on the watershed and water systems in general.
    e. Visit https://txpub.usgs.gov/DSS/streamer/web/ and discuss which watershed the students live in and where their water goes.
3. Lead the class into a discussion on pollution and potential ways to measure the quality of water. (5 mins)
    a. How does pollution get in our water system?
    b. Provide examples of potential pollutants in the environment.
        i. Stormwater pollutants (sediment runoff, fertilizers, pesticides, etc.)
        ii. Animal Waste, Industrial waste,

iii. Acid rain production (through atmospheric pollutants such as sulfur dioxide and nitrogen oxides)

c. What are ways these pollutants can impact the water system?
    i. Changes in pH, turbidly, temperature and oxygen levels.
d. Why is it important to have clean water? Discuss ecosystems as a whole, including plants and animals. Discuss the importance for all life to have clean water.
e. Ask "What are ways to determine if a water system is clean?"
    i. Biological assessments (plants and animals present)
    ii. Chemical assessments (Oxygen and pH)
    iii. Physical Assessments (Temperature and Turbidity)
f. Discuss why each of the above is an important indicator of water quality.
g. Explain that they are now going to do a chemical and physical water quality assessment on a body of water found near their school. (5 mins)
    i. Dissolved oxygen
    ii. pH
    iii. Turbidity
    iv. Temperature
h. Have students complete the water quality analysis on the water sample provided. (15 mins)
i. Students will record their results on the data sheet provided.
j. Wrap up with a discussion in the water quality results. What does it tell us? Why is important? What can YOU do to make a difference in your watershed? (10 mins)


DISSOLVED OXYGEN Mg/liter
8 mg/l
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6 mg/l
5 mg/l
4 mg/l
3 mg/l
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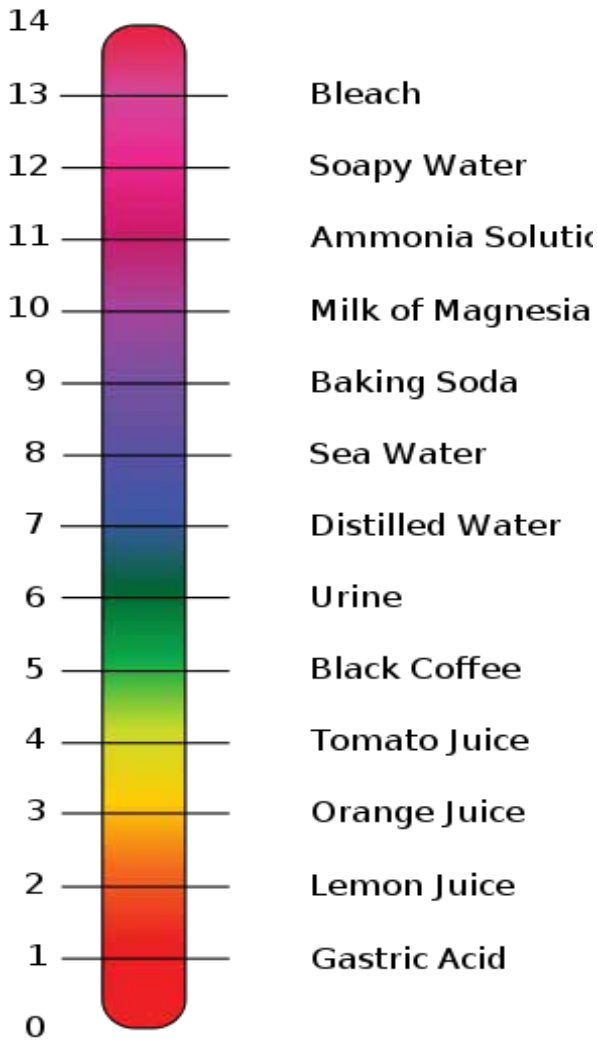
IDEAL
DESIRABLE RANGE
POOR HEALTH
Susceptible to Disease
LETHAL IF PROLONGED


14
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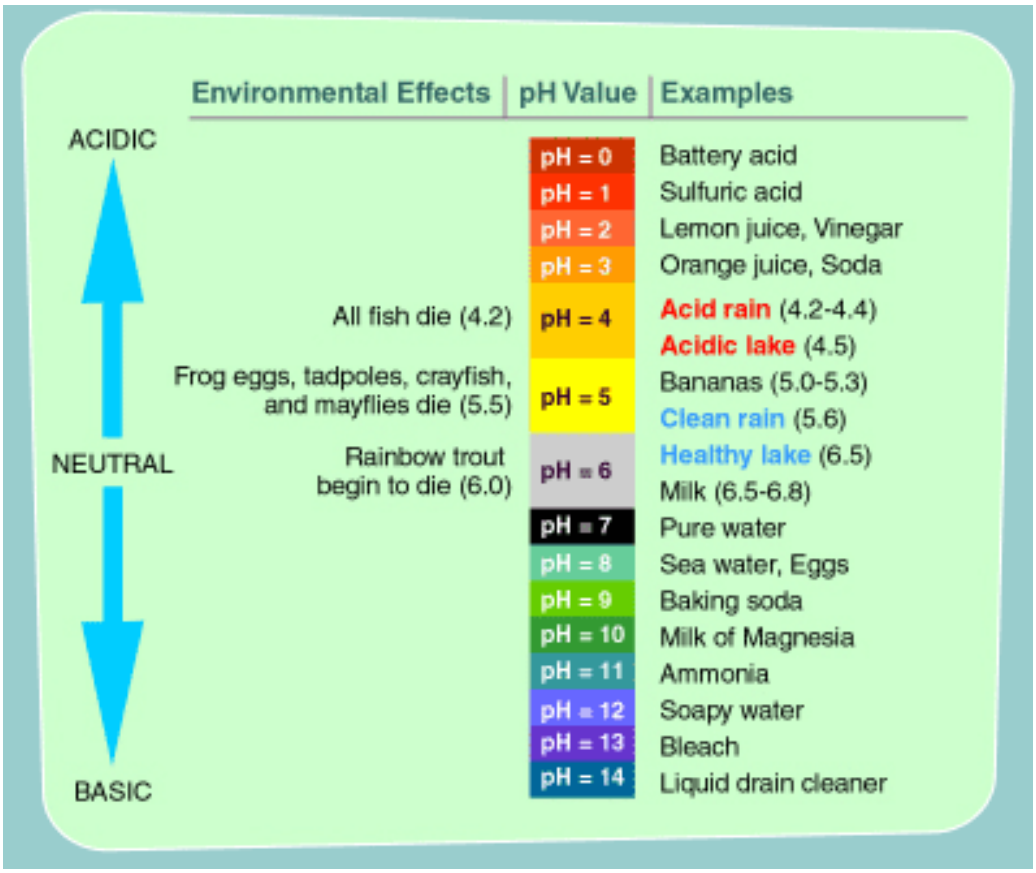
Bleach
Soapy Water
Ammonia Solutic
Milk of Magnesia
Baking Soda
Sea Water
Distilled Water
Urine
Black Coffee
Tomato Juice
Orange Juice
Lemon Juice
Gastric Acid


Environmental Effects
pH Value
Examples
ACIDIC
NEUTRAL
BASIC
All fish die (4.2)
Frog eggs, tadpoles, crayfish, and mayflies die (5.5)
Rainbow trout begin to die (6.0)
pH = 0
pH = 1
pH = 2
pH = 3
pH = 4
pH = 5
pH = 6
pH = 7
pH = 8
pH = 9
pH = 10
pH = 11
pH = 12
pH = 13
pH = 14
Battery acid
Sulfuric acid
Lemon juice, Vinegar
Orange juice, Soda
Acid rain (4.2-4.4)
Acidic lake (4.5)
Bananas (5.0-5.3)
Clean rain (5.6)
Healthy lake (6.5)
Milk (6.5-6.8)
Pure water
Sea water, Eggs
Baking soda
Milk of Magnesia
Ammonia
Soapy water
Bleach
Liquid drain cleaner

ENVIRONMENTAL CONSERVATION COMMISSION AGENDA ITEM NO. 4

WORK SESSION ITEM

DATE: February 5, 2019

FROM: Matthew Green, Environmental Review Analyst

ITEM: **Review the Town of Flower Mound's Stormwater Program and 2019 Annual Report.**

BACKGROUND INFORMATION: This work session item provides ECC the opportunity to discuss the Town's stormwater program and to review the annual report which will be provided to the TCEQ for calendar year 2018.

The Town is covered by the Texas Pollutant Discharge Elimination System (TPDES) MS4 General Permit which covers all large and small municipal separate storm sewer systems (MS4). The permit provides guidelines to MS4s on how to properly regulate and control stormwater runoff for municipal construction activities and also provides a framework for the Town's Stormwater Management Program.

The Town is required under the permit to submit an annual report to the TCEQ within 90 days of the end of each reporting year. The Town has selected the calendar year option which runs from January 1st through December 31st with the annual report due on March 31, 2019.

ALTERNATIVES/OPTIONS:

N/A

ATTACHMENTS:

1. 2019 TCEQ Annual Report DRAFT
2. Town Stormwater Management Program

RECOMMENDATION: This item is for discussion purposes; therefore, no formal action is required.

Phase II (Small) MS4 Annual Report Form

TPDES General Permit Number TXR040000

A. General Information

Authorization Number: TXR040542

Reporting Year (year will be either 1, 2, 3, 4, or 5): 4

Annual Reporting Year Option Selected by MS4: 2018

Calendar Year: 2019

Permit Year: 2018

Fiscal Year: 2017-2018 Last day of fiscal year: September 30th

Reporting period beginning date: (month/date/year): (January/01/2018)

Reporting period end date (month/date/year): (December/31st/2018)

MS4 Operator Level: 3 Name of MS4: Town of Flower Mound

Contact Name: Matthew Green Telephone Number: 972-874-6354

Mailing Address: 2121 Cross Timbers Road, Flower Mound, Texas 75028

E-mail Address: Matthew.Green@Flower-Mound.com

A copy of the annual report was submitted to the TCEQ Region YES ✓ NO

Region the annual report was submitted. TCEQ Region 4 Dallas/Fort Worth

B. Status of Compliance with the MS4 GP and SWMP

1. Provide information on the status of complying with permit conditions: (TXR040000 Part IV Section B.2.):

	Yes	No	Explain
Permittee is currently in compliance with the SWMP as submitted to and approved by the TCEQ.	✓		No changes have been made to the SWMP. The SWMP will be reviewed this year and any necessary changes will be made prior to submitting

			NOI for the new MS4 permit
Permittee is currently in compliance with recordkeeping and reporting requirements.	✓		Town staff maintains records for all datasets referenced within the annual reports.
Permittee meets the eligibility requirements of the permit (e.g., TMDL requirements, Edwards Aquifer limitations, compliance history, etc.)	✓		The Town has met all permittee requirements.

2. Provide a general assessment of the appropriateness of the selected BMPs. You may use the table below (**See Example 1 in instructions**):

MCM(s)	**BMP**	**BMP is appropriate for reducing the discharge of pollutants in stormwater (Answer Yes or No, and explain.)**
1: Public Education, Outreach and Involvement	Municipal Channel Stormwater Quality Messages	Yes, the feedback we receive from residents indicates that the FMTV municipal channel BMP is still an effective education and outreach tool.
1: Public Education, Outreach and Involvement	Municipal website and stormwater quality information	Yes, the feedback we receive from residents indicates the BMP is still effective.
1: Public Education, Outreach and Involvement	Anti-Littering/Dumping Brochure	Yes, the feedback we receive from residents indicates the BMP is effective. Brochures continue to be periodically disseminated at events and with notices of violation and/or citations.
1: Public Education, Outreach and Involvement	Watershed Address Program	Yes, areas where watershed signs are located are effective at reducing illegal dumping and illicit discharges.
1: Public Education, Outreach and Involvement	Storm Drain Labeling	Yes, the BMP serves as an effective public education tool. New storm drain labels are added as new inlets are constructed.

MCM(s)	BMP	BMP is appropriate for reducing the discharge of pollutants in stormwater (Answer Yes or No, and explain.)
1: Public Education, Outreach and Involvement	Comply with State and Local Public Notice Requirements	Yes, the Town of Flower Mound continues to comply with State and Local Public Notice Requirements.
1: Public Education, Outreach and Involvement	Community Source Water Protection Program	Yes, the BMP provides valuable and quantifiable water quality data. This data is a tool used by Texas State University and the Town to evaluate the overall health of the surface water in the state of Texas. Staff continues to run the program for sampling locations within city limits.
2: Illicit Discharge Detection and Elimination	Storm Sewer System Map	Yes, the map continues to be updated as new outfalls and inlets are built. It is a useful tool to identify and eliminate illicit discharges.
2: Illicit Discharge Detection and Elimination	Develop an Illicit Discharge Detection and Elimination (IDDE) Program	A dry-weather sampling program has been created to establish baseline water quality parameters. Locations throughout the watershed are being sampled on a monthly basis. The Town is in the process of hiring full-time staff for the dry-weather sampling program.
2: Illicit Discharge Detection and Elimination	Develop and Maintain an Illicit Discharge Document	Yes, illicit discharges and other stormwater related violations are tracked and documented through our internal TRAKiT database. TRAKiT is also being used to generate documents for our stormwater reports.
3: Construction Site Stormwater Runoff Control	Evaluate and Update Regulatory Authority and Procedures	Yes, our process has allowed for the evaluation of procedures and provides staff with the regulatory authority to enforce stormwater ordinances. The Town has recently divided stormwater oversight between our Environmental Services, Construction/Building Inspections, and Public Works Departments. Environmental Services and Construction/Building Inspections oversee new private development and Public Works is responsible for the oversight of Capital Improvement Projects (CIP).
3: Construction Site Stormwater Runoff Control	Construction Site Reporting Hotline	Yes, the construction site reporting hotline continues to receive calls about stormwater non-compliance items at construction sites.

MCM(s)	BMP	BMP is appropriate for reducing the discharge of pollutants in stormwater (Answer Yes or No, and explain.)
3: Construction Site Stormwater Runoff Control	Develop and Maintain a Construction Site Inventory Document	Yes, Town staff currently has a construction site inventory document that is updated as developments are permitted and/or completed. Our TRAKiT database has had a custom report created that will automatically compile all ground disturbing activity within the Town.
4: Post-Construction Stormwater Management in New Development and Redevelopment	Comprehensive Stormwater Ordinance	Yes, since the adoption of the Stormwater Ordinance staff has used it to enforce stormwater violations through notices and citations. Cases are created and filed using our TRAKiT system.
4: Post-Construction Stormwater Management in New Development and Redevelopment	Evaluate and Update Stormwater Inspections Programs	As previously mentioned, we have also delegated stormwater oversight for CIP to our Public Works Department. Our Environmental Services Department and Construction/Building Inspections Division will continue to have oversight of private development. Having Public Works regulate CIP will increase the effectiveness of stormwater inspection program.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	Facility Specific Standard Operating Procedures (SOPs)	Currently, we have SOPs created for our Fleet Services and Operations and Maintenance facilities. Standard operating procedures for additional facilities and their related activities are currently in progress.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Facility and Stormwater Controls Map	Yes, the Town currently has a layer in ArcReader dedicated to Town facilities and their associated stormwater controls. The previously mentioned map is updated as new facilities and controls are constructed.

MCM(s)	BMP	BMP is appropriate for reducing the discharge of pollutants in stormwater (Answer Yes or No, and explain.)
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Operations and Maintenance (O&M) Program	Yes, Town staff undergoes training to recognize pollutants of concern from O&M activities.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Facility Inventory	Yes, Town staff has an inventory of all Town facilities. Updates to the facility inventory are made as needed.

3. Describe progress towards reducing the discharge of pollutants to the maximum extent practicable. Summarize any information used (such as visual observation, amount of materials removed or prevented from entering the MS4, or if required monitoring data, etc.) to evaluate reductions in the discharge of pollutants. You may use the table (**See Example 2 in instructions**):

MCM	BMP	Information Used	Quantity	Units	Does the BMP Demonstrate a Direct Reduction in Pollutants?
1: Public Education, Outreach and Involvement	Municipal Channel Stormwater Quality Messages	Stormwater messages through FMTV	There were four stormwater related messages in 2018	Number of messages	Yes, FMTV allows residents to educate themselves about stormwater quality and water conservation.

1: Public Education, Outreach and Involvement	Municipal Website and Stormwater Quality Information	Stormwater education and information through municipal website	Flower Mound's Stormwater webpage was viewed 544 times in 2018	Webpage views	Yes, the website allows residents to educate themselves about stormwater quality and water conservation.
1: Public Education, Outreach and Involvement	Anti-Littering/ Dumping Brochure	Brochure distribution through education events and enforcement	We conducted (10) 2nd grade events reaching 901 students and (5) 7th grade events reaching 1,313 students. Two (2) environmental fairs were also conducted	Number of education events	Yes, staff hands out brochures and educates the public about stormwater quality and watershed protection during education events and through the public education process.
1: Public Education, Outreach and Involvement	Watershed Address Program	Placement of watershed signs	Ten (10) signs were added in 2018	Illegal dumping; Illicit discharges	Yes, signs help make public cognizant of local watersheds.
1: Public Education, Outreach and Involvement	Storm Drain Labeling	Storm Drain labeling as new inlets are added	Inlets were inspected and 235 new labels were added	Illegal dumping; Illicit discharges	Yes, storm drain labels make public cognizant of local creeks.

1: Public Education, Outreach and Involvement	Community Source Water Protection Program	Continued monthly sampling	6 active volunteers.	pH; DO; conductivity; temperature	Yes however, a numerical value cannot be assigned. Samples are taken once a month and the same time and date. To date, all samples have returned indicating healthy water bodies.
2: Illicit Discharge Detection and Elimination	Storm Sewer System Map	Updating map, if necessary	In 2017, 4.6 miles of gravity mains, 67 storm manholes and 142 storm inlets were added	Inlets; outfalls;	Yes, this allows staff to recognize potential areas for illegal dumping and illicit discharges.
2: Illicit Discharge Detection and Elimination	Develop an Illicit Discharge Detection and Elimination Program	Periodic dry weather sampling	Locations throughout the Town are sampled monthly	pH; DO; conductivity; temperature; turbidity, odor, color, floatables	Yes, our dry weather sampling program allows us to establish baseline water quality parameters for locations throughout the Town of Flower Mound.

2: Illicit Discharge Detection and Elimination	Develop and Maintain an Illicit Discharge Document	Create cases and add to document, when needed.	16 cases related to Stormwater – Illicit Discharges. 13 were residential/ commercial and 3 were construction.	Number of cases	Yes, this document allows staff to track illicit discharges.
3: Construction Site Stormwater Runoff Control	Evaluate and Update Regulatory Authority and Procedures	Update stormwater policy & procedures, if necessary	Updated process for handling BMP deficiencies at construction sites	Updates	Yes, staff continues to evaluate internal policies to reduce discharges.
3: Construction Site Stormwater Runoff Control	Construction Site Reporting Hotline	Continue monitoring hotline	3 calls in 2018	Number of calls from the hotline	Yes, staff continues to use the hotline to monitor illegal dumping/illicit discharge calls.
3: Construction Site Stormwater Runoff Control	Develop and Maintain a Construction Site Inventory Document	Continue to update the construction site inventory document, when needed.	A custom database report is used to quickly view all active sites.	Updates to the document	Yes, this inventory allows for a more efficient inspection process.

4: Post-Construction Stormwater Management in New Development and Redevelopment	Comprehensive Stormwater Ordinance	Continue enforcement of stormwater ordinance through notices and citations.	2 citations and 4 notices of violation were issued relating to stormwater – illicit discharge in 2018	Number of citations	Yes, staff continued enforcement of the ordinance in 2018.
4: Post-Construction Stormwater Management in New Development and Redevelopment	Evaluate and Update Stormwater Inspections Programs	Continued evaluation of the program through meetings and update, if needed.	Two meetings were held in 2018.	Number of meetings	Yes, meetings were held periodically throughout the year.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	Facility Specific Standard Operating Procedures (SOPs)	Continue to create Standard Operating Procedures	One (1) new SOP was created in 2018	Number of SOP's completed for a facility	Yes, staff has developed an SOP template for town facilities.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Facility and Stormwater Controls Map	Create a map of town facilities with associated stormwater controls for each facility.	Stormwater control inventory was added to map.	Facilities and stormwate r controls added to the map	No, this BMP does not directly relate to activities taken in the field or training of staff.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Operations and Maintenance Program	Develop an O&M program through training materials and procedures.	13 training sessions.	Training sessions	Yes, there were 13 training sessions in 2018 with 136 participants.
5: Pollution Prevention/Good Housekeeping for Municipal Operations	MS4 Facility Inventory	Develop a spreadsheet document an inventory of all Town of Flower	The old Town Hall was demolished and a new Town Hall was constructed	Facilities added to the inventory	Yes, this allows staff to document potential stormwater

		Mound facilities.			impacts from town facilities.

4. Provide the measurable goals for each of the MCMs, and an evaluation of the success of the implementation of the measurable goals (**See Example 3 in instructions):**

MCM(s)	Measurable Goal(s)	Explain progress toward goal or how goal was achieved If goal was not accomplished please explain
1	Post 3 stormwater quality messages.	Met goal- 4 stormwater quality messages
1	Update and maintain the stormwater website.	Met goal - The stormwater webpage was updated as needed.
1	Anti-littering/dumping brochure.	Met goal- Town Staff conducted education and outreach events in 2018
1	Continue sign placement.	Met goal- 10 signs were placed.
1	Continue the storm drain labeling program.	235 new storm drain labels were placed. 253 inlets, 29 manholes, and 27 outfalls were inspected.
1	Comply with state & local rules.	Met goal- Town continues to comply with state and local rules.
1	Continue program, training and providing technical services.	Met goal- Town staff has continued conducting education and outreach events
2	Periodically update map.	Met goal- Updates continue to be made.
2	Research and develop an Illicit Discharge Program.	Met goal- Dry-weather sampling locations have been identified around the Town which are currently being sampled monthly.

MCM(s)	Measurable Goal(s)	Explain progress toward goal or how goal was achieved If goal was not accomplished please explain
2	Develop and maintain an Illicit Discharges document.	Met goal- TRAKiT is currently used to track all stormwater non-compliance cases in Flower Mound.
3	Update inspection program and ordinance, if necessary.	Met goal- Updates are added to our inspection program when issues arise in the current process.
3	Monitor hotline.	Met goal- Calls continue to be received by residents that have observed stormwater violations within Town limits.
3	Maintain and update stormwater inventory document.	Met goal- A custom TRAKiT report was created to enable staff to easily obtain data on current stormwater activity.
4	Enforce all provisions of the stormwater ordinance. Update, if necessary.	Met goal- Ordinance is continuously reviewed and amendments will be made when deemed necessary.
4	Provide for periodic inspections for targeted locations.	Met goal- Sites are continuously inspected by Town staff. Non-compliance items are often caught during inspections and corrective measures are enacted.
5	Develop SOP(s) annually for dedicated facilities.	Met goal- One (1) new SOP was developed in 2018 and additional SOPs will be created and updated when necessary.
5	Collect data and start developing map.	Met goal- Map has been created. Updates are made when new controls are constructed within the Town
5	Develop Operations and Maintenance Program training materials.	Met goal- Town staff was trained to increase general stormwater awareness.
5	Develop a MS4 Facility Inventory.	Met goal- Facility Inventory has been developed. Updates are made when new facilities are added.

C. Stormwater Data Summary

Sampling was conducted by the Town of Flower Mound in 2018 as part of the implementation of a dry weather screening program. In addition, Citizen Scientists from our Texas Stream Team program provide our Stormwater Department with water quality data.

During 2018 the Town inspected 253 inlets, 27 outfalls, and 29 manholes. No items of concern were noted during infrastructure inspections. Staff also responded to several reports from citizens of illicit discharges in local waterways from residential and construction-related sources. Biological processes, such as a bio-sheens and algae growth, are often mistaken by our residents as water pollution.

D. Impaired Waterbodies

1. If applicable, explain below any activities taken to address the discharge to impaired waterbodies, including any sampling results and a summary of the small MS4's BMPs used to address the pollutant of concern:

   The Town of Flower Mound directly discharges stormwater into an impaired segment known as 0826 – Grapevine Lake. The Pollutant of Concern (POC) for the impaired segment is identified in the *2012 Texas Integrated Report Index of Water Quality Impairments* as pH. The pH level for this segment has been consistently high.

   In 2018 the Town continued its dry weather sampling program. Our dry weather sampling program consists of strategically chosen sampling locations throughout the Town that will monitor seven (7) water quality parameters. The dry weather sampling will allow us to determine baseline values for each location, as well as providing continuous monitoring of pH levels for streams which discharge into Grapevine Lake.

2. Describe the implementation of targeted controls if the small MS4 discharges to an impaired water body with an approved TMDL (Refer to the MS4 General permit TXR040000; Part II Section D.4.(a)):

   Dry Weather sampling locations have been established throughout the Town and the locations are monitored monthly for seven (7) water quality parameters: Odor, Color, Floatables, Flow, pH, Temperature, and Conductivity. The dry weather sampling allows us to determine baseline values for each location and provides continuous monitoring of pH levels for streams which discharge into Grapevine

Lake. So far the data we have collected has not indicated any cause for concern regarding the water quality in streams located within the Town.

3. Report the benchmark identified by the MS4 and assessment activities (Refer to the MS4 General permit TXR040000; Part II Section D.4.(a)(6)):

Benchmark Parameter	Benchmark Value	Description of additional sampling or other assessment activities	Year(s) conducted
pH level	<9	According to the 2014 Texas Integrated Report Index of Water Quality Impairments, Grapevine Lake has been listed as impaired due to the pH level since 2012. Streams discharging into Grapevine Lake will continually be monitored at predetermined sampling sites under our Dry Weather Sampling Program to ensure that the Town is not contributing to the pH impairment.	3

4. Provide an analysis of how the selected BMPs will be effective in contributing to achieving the benchmark (Refer to the MS4 General permit TXR040000; Part II Section D.4.(a)(4)):

Benchmark Parameter	Selected BMP	Contribution to achieving Benchmark
pH level	Sampling/monitoring and public education.	Water quality information will continue to be disseminated by multiple methods and will allow for the determination of baseline levels of pH in the streams discharging into Grapevine Lake. If any streams are found to have consistently high pH

Benchmark Parameter	Selected BMP	Contribution to achieving Benchmark
		this will help us to determine potential sources of pollution.

5. If applicable, report on focused BMPs to address impairment for bacteria (Refer to the MS4 General Permit TXR040000; Part II Section D.4.(a)(5)):

Description of bacteria-focused BMP	Comments/Discussion
N/A	

6. Assess the progress to determine BMP's effectiveness in achieving the benchmark (Refer to the MS4 General Permit TXR040000; Part II.D.4.(a)(6)):

For example, the MS4 may use the following benchmark indicators:

- number of sources identified or eliminated;
- decrease in number of illegal dumping;
- increase in illegal dumping reporting;
- number of educational opportunities conducted;
- reductions in sanitary sewer flows (SSOs)
- increase in illegal discharge detection through dry screening

Benchmark Indicator	Description/Comments
N/A	

E. Stormwater Activities

Describe stormwater activities the MS4 operator plans to undertake during the next reporting year. You may use the table below (Refer to the MS4 General Permit TXR040000 Part IV Section B.2.(d)):

2: Illicit Discharge Detection and Elimination	Illicit Discharge Detection and Elimination Program	Periodic dry weather sampling	Continue sampling monthly

Presented in the table below is a series of MCM's that our Stormwater Department will review during the process of submitting an NOI and SWMP for the recently renewed MS4 permit, as well as replacement MCM's that would eliminate items that the Town believes should already be enacted regardless of SWMP requirements.

1: Public Education, Outreach and Involvement	Municipal Channel Stormwater Quality Messages	Review MCM and amend SWMP if approval is granted.	Include the Stormwater Department's participation in public Town meetings. The MCM will also be revised to include social media messaging related to stormwater quality.
1: Public Education, Outreach and Involvement	Anti-Littering/Dumping Brochure	Review MCM and amend SWMP if approval is granted.	Change current MCM to include all stormwater outreach promoted through our elementary and middle school education programs.
1: Public Education, Outreach and Involvement	Comply with State and Local Public Notice Requirements	Review MCM and amend SWMP if approval is granted.	Change current MCM to include our bi-annual environmental fairs.

F. SWMP Modifications

1. Changes have been made or are proposed to the SWMP since the NOI or the last annual report, including changes in response to TCEQ's review.
   _____Yes_✓_No

If 'Yes', report on changes made to measurable goals and BMPs (Refer to the MS4 General Permit TXR040000 Part IV Section B.2.(e)):

MCM(s)	Measurable Goal(s) or BMP(s)	Implemented or Proposed Changes (Submit NOC as needed)
N/A		

Note: If changes include additions or substitutions of BMPs, include a written analysis explaining why the original BMP is ineffective or not feasible and why the replacement BMP is expected to achieve the goals of the original BMP.

2. Explain additional changes or proposed changes not previously mentioned (i.e. dates, contacts, procedures, annexation of land etc.):

G. Additional BMPs for TMDLs and I-Plans

Provide a description and schedule for implementation of additional BMPs that may be necessary, based on monitoring results, to ensure compliance with applicable TMDLs and implementation plans (Refer to the MS4 General permit TXR040000 Part IV Section B.2.(f)).

BMP	Description	Implementation Schedule (Start Date etc.)	Status / Completion Date (completed, in progress, not started)
Stream Monitoring/ Testing	The town will continue to periodically sample tributaries that discharge into Grapevine Lake through our IDDE program. If at any point, we determine that we are contributing to segment 0826's high pH then we will implement additional BMP's.	2015-2019	In progress

H. Additional Information

1. Is the permittee relying on another entity to satisfy some of its permit obligations? (refer to the MS4 General Permit TXR040000 Part IV Section B.2.(g))

   ___ Yes _✓_ No

   If 'Yes," provide the name(s) of other entities and an explanation of their responsibilities (add more spaces or pages if needed):

Name and Explanation:

Name and Explanation:

Name and Explanation:

Name and Explanation:

2.a. Is the permittee part of a group sharing a SWMP with other entities?

___ Yes _✓_ No

2.b. If 'yes,' is this a system-wide annual report including information for all permittees?

___ Yes _✓_ No

If 'Yes,' list all associated authorization numbers, permittee names, and SWMP responsibilities of each member. (add additional spaces or pages if needed):

Authorization Number: _____ Permittee:_____

Authorization Number: _____ Permittee: _____

Authorization Number: _____ Permittee: _____

Authorization Number: _____ Permittee: _____

I. Construction Activities

1. The number of construction activities that occurred in the jurisdictional area of the MS4 (Notices if intent and site notices received; Refer to the MS4 General Permit TXR040000 Part IV Section B.2.(h)) _____58_____

2a. Does the permittee utilize the optional 7th MCM related to construction?

___ Yes _✓_ No

2b. If 'yes,' then provide the following information for this permit year (refer to the MS4 General Permit TXR040000 Part IV Section B.2.(i)):

The number of municipal construction activities authorized under this general permit	
The total number of acres disturbed for municipal construction projects	

Note: *Though the seventh MCM is optional, implementation must be requested on the NOI or on a NOC and approved by the TCEQ.*

J. 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 submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name (printed):_____ Title:_____

Signature: _____ Date:_____

Name of MS4_____

Name (printed): _____ Title:_____

Signature: _____ Date:_____

Name of MS4

Name (printed):_____ Title:_____

Signature: _____ Date:_____

Name of MS4

Name (printed): _____ Title:_____

Signature: _____ Date:_____

Name of MS4

Name (printed): _____ Title:_____

Signature: _____ Date:_____

Name of MS4

Note: If this is this a system-wide annual report including information for all permittees, each permittee shall sign and certify the annual report in accordance with 30 TAC §305.128 (relating to Signatories to Reports).

Town of Flower Mound

Stormwater Management Program

AS REQUIRED PURSUANT TO:

TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM GENERAL PERMIT FOR STORMWATER FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s) [TXR040000]

Table of Contents

PART I PREFACE

Stormwater Management Plan Overview

Regulatory Requirement

Phase I of the U.S. Environmental Protection Agency's (EPA) Stormwater program was promulgated in 1990 under the Clean Water Act (CWA). Phase I relies on National Pollutant Discharge Elimination System (NPDES) permit coverage to address Stormwater runoff from: (1) "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater, (2) construction activity disturbing 5 acres of land or greater, and (3) ten categories of industrial activity.

The Stormwater Phase II Final Rule is the next step in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted Stormwater runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted Stormwater runoff.

Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of Stormwater discharges that have the greatest likelihood of causing continued environmental degradation.

On September 14, 1998, EPA authorized Texas to develop and implement the Texas Pollutant Discharge Elimination System (TPDES) permit. Under the terms of this authority, the Texas Commission on Environmental Quality (TCEQ) assumes the role of Stormwater permitting authority for industrial activities, small and large construction activities, and all regulated MS4s.

On August 13, 2007, TCEQ issued TPDES General Permit TXR040000 authorizing the discharge of Stormwater to surface water in the state from small municipal separate storm sewer systems (MS4s). Small MS4 operators that choose to obtain authorization under this general permit must submit a Stormwater management program (SWMP) and a completed notice of intent (NOI) form to the Texas Commission on Environmental Quality (TCEQ) on or before February 11, 2008. This permit expired on December 13, 2013.

On December 13, 2013, the TCEQ issued the new TPDES General Permit TXR040000 authorizing the discharge of Stormwater to surface water in the state from small municipal separate storm sewer systems (MS4s). Small MS4 operators that are required to obtain authorization under this general permit must submit a Stormwater management program (SWMP) and a completed notice of intent (NOI) form to the TCEQ by June 13, 2014.

Minimum Control Measures

To meet the requirements for the TPDES general permit, the Town's Stormwater Management Program (SWMP) must provide minimum control measures for the following subject areas:

- Public Education, Outreach and Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management in New Development and Redevelopment
- Pollution Prevention and Good Housekeeping for Municipal Operations

After extensive research and review, Town staff has selected the following specific BMPs for implementation during the five (5) year permit period.

Stormwater Program Best Management Practices	
1.1	**Municipal Channel Stormwater Messages**
1.2	**Municipal Website with Stormwater Quality Information**
1.3	**Anti-Littering/Dumping Brochure**
1.4	**Watershed Address Program**
1.5	**Storm Drain Labeling**
1.6	**Comply with State and Local Public Notice Requirements**
1.7	**Community Source Water Protection Program**
2.1	**Illicit Discharge Detection and Elimination/Storm Sewer System Map**
2.2	**Program to Detect and Address Illicit Discharges**
2.3	**Develop and Maintain an Illicit Discharge Document**
3.1	**Evaluate and Enforce Regulatory Authority and Procedures**
3.2	**Construction Site Reporting Hotline**
3.3	**Develop and Maintain a Construction Site Inventory Document**
4.1	**Comprehensive Stormwater Ordinance**
4.2	**Evaluate and Enforce Stormwater Inspections Program**
5.1	**Facility Specific Standard Operating Procedures**
5.2	**MS4 Facility and Stormwater Controls Map**
5.3	**MS4 Operations and Maintenance Training**
5.4	**MS4 Facility Inventory**

Definitions

Arid Areas - Areas with an average annual rainfall of less than ten (10) inches.

Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, structural controls, local ordinances, and other management practices to prevent or reduce the discharge of pollutants. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spills or leaks, waste disposal, or drainage from raw material storage areas.

Classified Segment - refers to a water body that is listed and described in Appendix A or Appendix C of the Texas Surface Water Quality Standards, at 30 TAC § 307.10.

Clean Water Act (CWA) - The Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 et.seq.

Common Plan of Development or Sale - A construction activity that is completed in separate stages, separate phases, or in combination with other construction activities. A common plan of development or sale is identified by the documentation for the construction project that identifies the scope of the project, and may include plats, blueprints, marketing plans, contracts, building permits, a public notice or hearing, zoning requests, or other similar documentation and activities.

Construction Site Operator - The person or persons associated with a small or large construction project that meets either of the following two criteria:

(a) The person or persons that have operational control over construction plans and specifications (including approval of revisions) to the extent necessary to meet the requirements and conditions of this general permit; or

(b) The person or persons that have day-to-day operational control of those activities at a construction site that are necessary to ensure compliance with a Stormwater pollution prevention plan for the site or other permit conditions (e.g. they are authorized to direct workers at a site to carry out activities required by the Stormwater Pollution Prevention Plan or comply with other permit conditions).

Control Measure - Any BMP or other method used to prevent or reduce the discharge of pollutants to water in the state.

Conveyance - Curbs, gutters, man-made channels and ditches, drains, pipes, and other constructed features designed or used for flood control or to otherwise transport Stormwater runoff.

Daily Maximum - For the purposes of compliance with the numeric effluent limitations contained in this permit, this is the maximum concentration measured on a single day, by grab sample, within a period of one calendar year.

Discharge - When used without a qualifier, refers to the discharge of Stormwater runoff or certain non-Stormwater discharges as allowed under the authorization of this general permit.

Final Stabilization - A construction site where either of the following conditions are met:

(a) All soil disturbing activities at the site have been completed and a uniform (e.g., evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(b) For individual lots in a residential construction site by either:

(1) The homebuilder completing final stabilization as specified in condition (a) above;

or

(2) The homebuilder establishing temporary stabilization for an individual lot prior to the time of transfer of the ownership of the home to the buyer and after informing the homeowner of the need for, and benefits of, final stabilization.

(c) For construction activities on land used for agricultural purposes (e.g. pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturbed that were not previously used for agricultural activities, such as buffer strips immediately adjacent to a surface water and areas which are not being returned to their preconstruction agricultural use must meet the final stabilization conditions of condition (a) above.

(d) In arid, semi-arid, and drought-stricken areas only, all soil disturbing activities at the site have been completed and both of the following criteria have been met:

(1) Temporary erosion control measures (e.g., degradable rolled erosion control product) are selected, designed, and installed along with an appropriate seed base to provide erosion control for at least three years without active maintenance by the operator, and

(2) The temporary erosion control measures are selected, designed, and installed to achieve 70 percent vegetative coverage within three years.

Ground Water Infiltration - For the purposes of this permit, groundwater that enters a municipal separate storm sewer system (including sewer service connections and foundation drains) through such means as defective pipes, pipe joints, connections, or manholes.

Illicit Connection - Any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.

Illicit Discharge - Any discharge to a municipal separate storm sewer that is not entirely composed of Stormwater, except discharges authorized under this general permit or a separate authorization and discharges resulting from firefighting activities.

Indian Country - Defined in 18 USC Section 1151, means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation; (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. This definition includes all land held in trust for an Indian tribe.

Industrial Activities - Manufacturing, processing, material storage, and waste material disposal areas (and similar areas where Stormwater can contact industrial pollutants related to the industrial activity) at an industrial facility described by the TPDES Multi Sector General Permit, TXR050000, or by another TCEQ or TPDES permit.

Large Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than five (5) acres of land. Large construction activity also includes the disturbance of less than five (5) acres of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than five (5) acres of land. Large construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, and original purpose of a ditch, channel, or other similar Stormwater conveyance. Large construction activity does not include the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.

Maximum Extent Practicable (MEP) - The technology-based discharge standard for municipal separate storm sewer systems to reduce pollutants in Stormwater discharges that was established by CWA §402(p). A discussion of MEP as it applies to small MS4s is found at 40 CFR 122.34.

MS4 Operator - For the purpose of this permit, the public entity, and/ or the entity contracted by the public entity, responsible for management and operation of the small municipal separate storm sewer system that is subject to the terms of this general permit.

Municipal Separate Storm Sewer System (MS4) - A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(a) Owned or operated by the U.S., a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to state law) having jurisdiction over the disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under the CWA §208 that discharges to the surface water in the state;

(b) That is designed or used for collecting or conveying stormwater;

(c) That is not a combined sewer; and

(d) That is not part of a publicly owned treatment works (POTW) as defined in 40 CFR §122.2.

Notice of Change (NOC) - Written notification from the permittee to the executive director providing changes to information that was previously provided to the agency in a notice of intent.

Notice of Intent (NOI) - A written submission to the executive director from an applicant requesting coverage under this general permit.

Notice of Termination (NOT) - A written submission to the executive director from a permittee authorized under a general permit requesting termination of coverage under this general permit.

Outfall - For the purpose of this permit, a point source at the point where a municipal separate storm sewer discharges to waters of the United States (U.S.) and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances that connect segments of the same stream or other waters of the U.S. and are used to convey waters of the U.S.

Permittee - The MS4 operator authorized under this general permit.

Permitting Authority - For the purposes of this general permit, the TCEQ.

Point Source - (from 40 CFR § 122.22) Any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural Stormwater runoff.

Pollutant(s) of Concern - Include biochemical oxygen demand (BOD), sediment or a parameter that addresses sediment (such as total suspended solids, turbidity or siltation), pathogens, oil and grease, and any pollutant that has been identified as a cause of impairment of any water body that will receive a discharge from an MS4. (Definition from 40 CFR Section 122.32(e)(3)).

Redevelopment - alterations of a property that changes the "footprint" of a site or building in such a way that there is a disturbance of equal to or greater than 1 acre of land. This term does not include such activities as exterior remodeling.

Semiarid Areas - Areas with an average annual rainfall of at least ten (10) inches, but less than 20 inches.

Small Construction Activity - Construction activities including clearing, grading, and excavating that result in land disturbance of equal to or greater than one (1) acre and less than five (5) acres of land. Small construction activity also includes the disturbance of less than one (1) acre of total land area that is part of a larger common plan of development or sale if the larger common plan will ultimately disturb equal to or greater than one (1) and less than five (5) acres of land. Small construction activity does not include routine maintenance that is performed to maintain the original

line and grade, hydraulic capacity, and original purpose of a ditch, channel, or other similar Stormwater conveyance. Small construction activity does not include the routine grading of existing dirt roads, asphalt overlays of existing roads, the routine clearing of existing right-of-ways, and similar maintenance activities.

Small Municipal Separate Storm Sewer System (MS4) - A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(a) Owned or operated by the United States, a state, city, town, borough, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, Stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under § 208 of the CWA;

(b) Designed or used for collecting or conveying Stormwater;

(c) Which is not a combined sewer;

(d) Which is not part of a publicly owned treatment works (POTW) as defined at 40 CFR § 122.2; and

(e) Which was not previously authorized under a NPDES or TPDES individual permit as a medium or large municipal separate storm sewer system, as defined at 40 CFR §122.26(b)(4) and (b)(7).

This term includes systems similar to separate storm sewer systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. This term does not include separate storm sewers in very discrete areas, such as individual buildings. For the purpose of this permit, a very discrete system also includes storm drains associated with certain municipal offices and education facilities serving a nonresidential population, where those storm drains do not function as a system, and where the buildings are not physically interconnected to an MS4 that is also operated by that public entity.

Stormwater and Stormwater Runoff - Rainfall runoff, snow melt runoff, and surface runoff and drainage.

Stormwater Associated with Construction Activity - Stormwater runoff from an area where there is either a large construction activity or a small construction activity.

Stormwater Management Program (SWMP) - A comprehensive program to manage the quality of Stormwater discharged from the municipal separate storm sewer system.

Structural Control (or Practice) - A pollution prevention practice that requires the construction of a device, or the use of a device, to capture or prevent pollution in Stormwater runoff. Structural controls and practices may include but are not limited to: wet ponds, bioretention, infiltration basins, Stormwater wetlands, silt fences, earthen dikes, drainage swales, vegetative lined ditches, vegetative filter strips, sediment traps, check dams, subsurface drains, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins.

Surface Water in the State - Lakes, bays, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, wetlands, marshes, inlets, canals, the Gulf of Mexico inside the territorial limits of the state (from the mean high water mark (MHWM) out 10.36 miles into the Gulf), and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, navigable or non-navigable, and including the beds and banks of all water-courses and bodies of surface water, that

are wholly or partially inside or bordering the state or subject to the jurisdiction of the state; except that waters in treatment systems which are authorized by state or federal law, regulation, or permit, and which are created for the purpose of waste treatment are not considered to be water in the state.

Total Maximum Daily Load (TMDL) - The total amount of a substance that a water body can assimilate and still meet the Texas Surface Water Quality Standards.

Traditional Small MS4 - A small MS4 that can pass ordinances and have the enforcement authority to enforce the stormwater management program. An example of traditional MS4s includes cities.

Urbanized Area (UA) - An area of high population density that may include multiple MS4s as defined and used by the U.S. Census Bureau in the 2000 decennial census.

Waters of the United States - (from 40 CFR Section 122.2) Waters of the United States or waters of the U.S. means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate wetlands;

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds that the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

(h) Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR § 423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Commonly Used Acronyms

BMP	Best Management Practice
CFR	Code of Federal Regulations
CGP	Construction General Permit, TXR150000
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
FR	Federal Register
IP	Implementation Procedures
MCM	Minimum Control Measure
MSGP	Multi-Sector General Permit, TXR050000
MS4	Municipal Separate Storm Sewer System
NOC	Notice of Change
NOD	Notice of Deficiency
NOI	Notice of Intent
NOT	Notice of Termination (to terminate coverage under a general permit)
NPDES	National Pollutant Discharge Elimination System
SWMP	Stormwater Management Program
SWP3, SWPPP	Stormwater Pollution Prevention Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TWC	Texas Water Code

Allowable Non-Stormwater Discharges

The following non-Stormwater sources may be discharged from the small MS4 and are not required to be addressed in the small MS4's Illicit Discharge and Detection or other minimum control measures, unless they are determined by the permittee or the TCEQ to be significant contributors of pollutants to the small MS4:

a) Water line flushing (excluding discharges of hyperchlorinated water, unless the water is first dechlorinated and discharges are not expected to adversely affect aquatic life);

b) Runoff or return flow from landscape irrigation, lawn irrigation, and other irrigation utilizing potable water, groundwater, or surface water sources;

c) Discharges from potable water sources;

d) Diverted stream flows;

e) Rising ground waters and springs;

f) Uncontaminated ground water infiltration;

g) Uncontaminated pumped ground water;

h) Foundation and footing drains;

i) Air conditioning condensation;

j) Water from crawl space pumps;

k) Individual residential vehicle washing;

l) Flows from wetlands and riparian habitats;

m) Dechlorinated swimming pool discharges;

n) Street wash water;

o) Discharges or flows from firefighting activities (firefighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, and similar activities);

p) Other allowable non-Stormwater discharges listed in 40 CFR § 122.26(d)(2)(iv)(B)(1);

q) Non-Stormwater discharges that are specifically listed in the TPDES Multi Sector General Permit (MSGP) or the TPDES Construction General permit (CGP); and

(r) Other similar occasional incidental non-Stormwater discharges, unless the TCEQ develops permits or regulations addressing these discharges.

Document Organization

The Town of Flower Mound's Stormwater Management Program is organized to aid development and implementation of the programs required by the TPDES MS4 Phase II general permit, and to aid in completion of permit notification documents (NOI) and tracking progress for annual reports.

Part II of the SWMP addresses the five (5) minimum control measures required under the TPDES permit. For each minimum control measures, the following are discussed:

- **Regulatory Requirement**

  The specific regulatory citation from the TCEQ TPDES MS4 general permit is provided for each minimum control measure.

- **Current Programming**

  A description of current programming, regulations, procedures, and/or documents that already meet the minimum control measure requirements is provided.

- **Selected BMPs**

  A description of the best management practices the Town will implement to address the regulatory requirement.

- **Measurable Goal(s)**

  The Town must designate measurable goal(s) for each BMP.

- **Schedule**

  The implementation schedule for each BMP is described.

- **Responsible Divisions**

  The division(s) responsible for implementation of each BMP is provided.

The appendices provide additional information and copies of documents, regulations, procedures, training materials, and samples of public education/outreach communication items.

PART II MINIMUM CONTROL MEASURES

1. Public Education, Outreach and Involvement

Public Education, Outreach and Involvement

(a) The permittee shall develop, implement, and maintain a comprehensive storm water education and outreach program to educate public employees, businesses, and the general public of hazards associated with the illegal discharges and improper disposal of waste and about the impact that stormwater discharges can have on local waterways, as well as the steps that the public can take to reduce pollutants in stormwater.

Current Programs

The Town of Flower Mound provides general public education, outreach and involvement by several means of communication through the Town's Community Affairs, Keep Flower Mound Beautiful, Public Works, and Environmental Services divisions. Specifically, the Town has and will continue to provide education to the public about the impacts of stormwater run-off on water quality, proper disposal of waste, and changes they can implement to reduce pollutants in stormwater runoff. This education is offered through the following programs:

- Spring and Fall Waterway Cleanup Events
- Bi-annual Environmental Fair
- Household Hazardous Waste Curbside pickup
- Major Rivers Curriculum Provided to the Lewisville Independent School District
- Second Grade Education Events
- Arbor Day Event
- Implementation of a Water Conservation and Education Program
- Utility Billing Inserts
- Encouragement of Conservation Developments
- Operation of the Town's Tree Farm and Outdoor Learning Area

The program must, at a minimum:

(a) Define the goals and objectives of the program based on high priority community-wide issues (for example, reduction of nitrogen in discharges from the small MS4, promoting previous techniques used in the small MS4, or improving the quality of discharges to the Edwards Aquifer);

(b) Identify the target audience(s);

(c) Develop or utilize appropriate educational materials, such as printed materials, billboard and mass transit advertisements, signage at select locations, radio advertisements, television advertisements, and websites;

(d) Determine cost effective and practical methods and procedures for distribution of materials;

(1) Throughout the permit term, the permittee shall make the educational materials available to convey the program's message to the target audience each year.

(2) All permittees shall review and update as necessary, the SWMP and MCM implementation procedures required by the TPDES General Permit. Any changes must be reflected in the annual report. Such written procedures must be maintained, either on site or in the SWMP and made available for inspection by the TCEQ.

(3) MS4 operators may partner with other MS4 operators to maximize the program and cost effectiveness of the required outreach.

(b) Public Involvement

All permittees shall involve the public, and, at minimum, comply with any state and local public notice requirements in the planning and implementation activities related to developing and implementing the SWMP, except that correctional facilities are not required to implement this portion of the MCM.

Current Programs

The Town of Flower Mound has a public Environmental Conservation Commission, which, in part, receives periodic updates on various environmental and stormwater quality related activities conducted by Town staff. This process provides all members of the public an initial opportunity to participate in the SWMP development through public comment. Public involvement/participation opportunities are also associated with the following current Town sponsored programs:

- Partnership with Keep Flower Mound Beautiful
- Neighborhood Cleanup Events
- Spring and Fall Waterway Cleanup Events in conjunction with bi-annual Environmental Fair
- Bi-annual Environmental Fair
- Adopt-a-Spot/Adopt-a-Stream Program
- Second Grade Education Events
- Arbor Day Event
- Operation of the Town's Tree Farm and Outdoor Learning Area
- Native Grass/Tree Transplanting From Development Sites

At a minimum, the permittee shall:

(1) If feasible, consider using public input (for example, the opportunity for public comment, or public meetings) in the implementation of the program;

(2) If feasible, create opportunities for citizens to participate in the implementation of control measures, such as stream clean-ups, storm drain stenciling, volunteer monitoring, volunteer "Adopt-A-Highway" programs, and educational activities;

(3) Ensure the public can easily find information about the SWMP.

Selected BMPs for Public Education, Outreach and Involvement

1.1 Municipal Channel Stormwater Quality Messages

The Town of Flower Mound will use the municipal television channel and other communication services to post messages about the stormwater management program that are of interest to all stakeholders within the Town's jurisdictional authority. The Town will relay important information related to stormwater quality and upcoming events, training seminars, and other resources related to the Town's SWMP.

Measurable Goals

The measurable goal for implementation of this BMP is to post three (3) stormwater quality related messages per year during the permit term. Description of development and final product of each stormwater quality message will be provided in the annual report. The number of inquiries related to the educational or event information provided through the municipal channel will be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Municipal Channel Stormwater Quality Messages	Post 3 stormwater quality messages.	Year 1-5

Responsible Division(s)

The Community Affairs and Environmental Services Divisions have responsibility for implementation of this BMP to meet Measurable Goal 1.1.

1.2 Municipal Website Stormwater Information

The Town of Flower Mound will use the municipal website to inform the public and other interested stakeholders about the SWMP. It will include general stormwater quality information as well as topics of interest to the general public such as litter control, pet waste management, water conservation, and proper management of pesticides, fertilizer, used oil and household hazardous waste. Information will also be included to educate businesses and construction site personnel about the impacts of stormwater run-off on water quality and steps they can use to reduce their contribution to stormwater pollution.

Measurable Goals

The measurable goal for implementation of this BMP is to provide continuous updates as needed throughout the duration of the permit. Description of updates to the website will be provided in the annual report. The number of inquiries related to the educational information provided through the municipal website will be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Municipal website with stormwater quality information	Update and maintain the Stormwater website.	Year 1-5

Responsible Division(s)

The Environmental Services & Community Affairs Divisions have responsibility for implementation of this BMP to meet Measurable Goal 1.2.

1.3 Anti-Littering/Dumping Brochure

The Town of Flower Mound Environmental Services Department is responsible for providing information regarding illegal dumping and related environmental crimes to the general public, local businesses, commercial and industrial facilities, and construction site operators. In cooperation with the Environmental Services Department, the Town's SWMP will include the development and distribution of an Anti-Littering/Dumping Brochure, which will be made available through various Town Departments.

Measurable Goals

The measurable goal for implementation of this BMP is to print and ensuring continuous availability of the brochures throughout the remainder of the permit. Description of the distribution of the brochure will be provided in the annual report. The number of brochures distributed to the public will also be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Anti-Littering/Dumping Brochure	Print and distribute, as needed	Year 1-5

Responsible Division(s)

The Environmental Services Division has responsibility for developing and implementing this BMP to meet Measurable Goal 1.3.

1.4 Watershed Address Program

The Town of Flower Mound has delineated all sub-watershed basins within the Town's jurisdictional authority and, to the maximum extent practical, will place "watershed address" signs within public road and street right-of-ways. The sign will include identification of a watershed as well as a short water quality related social marketing message that is directed to the general public.

Measurable Goal

The Town of Flower Mound will continue to assess and determine the best locations for the "watershed address" signs this permit cycle. The signs will be installed throughout the remainder of the permit. Description of research and development along with the number of signs installed will be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Watershed Address Program	Continue sign placement.	Year 1-5

Responsible Division(s)

The Environmental Services, Public Works, and Streets Divisions are responsible for developing and implementing this BMP to meet Measurable Goal 1.4.

1.5 Storm Drain Labeling

The Town of Flower Mound will continue the program for all new residential and commercial developments to provide storm drain labels for storm sewer inlets. Additionally, the Town will provide storm drain labeling kits for use by volunteers on existing storm sewer inlets.

Measurable Goal

The Town will also label existing storm sewer inlets during permit years one through five to promote the proper disposal of waste. Labels will identify the local stream or lake destination of each inlet requiring all new residential and commercial development to provide storm drain markers on all storm sewer inlets and related structures. Description of research and development of the labels will be provided in the annual report. The number of labels installed will also be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Storm Drain Labeling	Continue the storm drain labeling program.	Year 1-5

Responsible Division(s)

The Environmental Services and Public Works Divisions are responsible for developing and implementing this BMP to meet Measurable Goal 1.5.

1.6 Comply with State and Local Public Notice Requirements

The Town of Flower Mound will comply with all applicable state and local public notice requirements when implementing a public involvement/participation program.

Measurable Goals

The measurable goal for implementation of this BMP is to provide state and local required public notice in the process of implementing a public involvement/participation program. Implementation will be according to the schedule below and will be provided in an open forum in order for citizens to participate in the public process.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Public Notice	Comply with state and local rules.	Year 1-5

Responsible Division(s)

The Community Affairs and Environmental Services Divisions have responsibility for this BMP to meet Measurable Goal 1.6.

1.7 Community Source Water Protection Program

The Town of Flower Mound has initiated a community-wide water quality public education and participation program designed to involve local residents, businesses, neighborhood associations, and students in the implementation of the Town's SWMP. Utilizing the Texas Stream Team program, the Town will continue develop, train, and manage a network of volunteer water quality monitors, who will take monthly water quality samples at designated monitoring stations. The data will be submitted online by trained volunteers and collected in the Texas Stream Team Data Viewer database. Town staff will have the ability to monitor volunteer progress by having admin rights to the Stream Team Data Viewer.

Measurable Goals

The Town will determine appropriate sampling locations, provide training to volunteer monitors, and provide general support services to the monitors. Implementation will follow the schedule below. Description of research and development of the program will be provided in the annual report. The number of volunteers trained and/or participating will also be documented and provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Public Education, Outreach and Involvement	Community Source Water Protection Program	Continue program, training and providing technical services.	Year 1-5

Responsible Division(s)

The Environmental Services Division is responsible for developing and implementing this BMP to meet Measurable Goal 1.7.

2. Illicit Discharge Detection and Elimination

Regulatory Requirement

(a) Program Development

(1) All permittees shall develop, implement and enforce a program to detect, investigate, and eliminate illicit discharges into the small MS4. The program must include a plan to detect and address non-stormwater discharges, including illegal dumping to the MS4 system.

The Illicit Discharge Detection and Elimination (IDDE) program must include the following:

An up-to-date MS4 map;

Methods for informing and training MS4 field staff;

a) Procedures for tracing the source of an illicit discharge;

b) Procedures for removing the source of the illicit discharge;

c) For Level 2, 3 and 4 small MS4s, if applicable, procedures to prevent and correct any leaking on-site sewage disposal systems that discharge into the small MS4;

d) For Level 4 small MS4s, procedures for identifying priority areas within the small MS4 likely to have illicit discharges, and a list of all such areas identified in the small MS4 (Not applicable);

(e) For Level 4 small MS4s, field screening to detect illicit discharges (Not applicable);

(2) For non-traditional small MS4s, if illicit connections or illicit discharges are observed related to another operator's small MS4, the permittee shall notify the other MS4 operator within 48 hours of discovery. If notification to the other MS4 operator is not practicable, then the permittee shall notify the appropriate TCEQ regional office of the possible illicit connection.

(3) If another MS4 operator notifies the permittee of an illegal connection or illicit discharge to the small MS4, then the permittee shall follow the requirements specified in the TPDES General Permit.

(3) All permittees shall review and update as necessary, the SWMP and MCM implementation procedures requires by the TPDES General Permit. Any changes must be reflected in the annual report. Such written procedures must be maintained, either on site or in the SWMP and made available for inspection by the TCEQ.

(b) Allowable Non-Stormwater Discharges

Non-stormwater flows listed in the TPDES General Permit do not need to be considered by the permittee as an illicit discharge requiring elimination unless the permittee or the TCEQ identifies the flows a significant source of pollutants to the small MS4.

(c) Requirements for all permittees

All permittees shall include the requirements described below:

(1) MS4 mapping

The permittee shall maintain an up-to-date MS4 map, which must be located onsite and available for review by the TCEQ. The MS4 map must show at a minimum the following information:

a) The location of all small MS4 outfalls that are operated by the permittee and that discharge into waters of the U.S;

b) The location and name of all surface waters receiving discharges from the small MS4 outfalls;

c) Priority areas identified in the TPDES General Permit.

(2) Education and Training

The permittee shall implement a method for informing or training all the permittee's field staff that may come into contact with or otherwise observe an illicit discharge or illicit connection to the small MS4 as part of their normal job responsibilities. Training program materials and attendance lists must be maintained on site and made available for review by the TCEQ.

(3) Public Reporting of Illicit Discharges and Spills

To the extent feasible, the permittee shall publicize and facilitate public reporting of illicit discharges or water quality impacts associated with discharges into or from the small MS4. The permittee shall provide a central contact point to receive reports; for example by including a phone number for complaints and spill reporting.

(4) The permittee shall develop and maintain on site procedures for responding to illicit discharges and spills.

(5) Source Investigation and Elimination

(a) Minimum Investigation Requirements – Upon becoming aware of an illicit discharge, the permittee shall conduct an investigation to identify and locate the source of such illicit discharge as soon as practicable.

(i) The permittee shall prioritize the investigation of discharges based on their relative risk of pollution. For example, sanitary sewage may be considered a high priority discharge.

(ii) The permittee shall report to the TCEQ immediately upon becoming aware of the occurrence of any illicit flows believed to be an immediate threat to human health or the environment.

(iii) The permittee shall track all investigations and document, at a minimum, the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

(b) Identification and Investigation of the Source of the Illicit Discharge –The permittee shall investigate and document the source of illicit discharges where the permittee has jurisdiction to complete such an investigation. If the source of illicit discharge extends outside the permittee's boundary, the permittee shall notify the adjacent permitted MS4 operator or TCEQ's Field Operation Support Division according to the TPDES General Permit.

(b) Corrective Action to Eliminate Illicit Discharge

If and when the source of the illicit discharge has been determined, the permittee shall immediately notify the responsible party of the problem, and shall require the responsible party to perform all necessary corrective actions to eliminate the illicit discharge.

(6) Inspections –The permittee shall conduct inspections, as determined appropriate, in response to complaints, and shall conduct follow-up inspections as needed to ensure that corrective measures have been implemented by the responsible party.

(d) Additional Requirements for Level 3 and 4 small MS4s

In addition to the requirements described above, permittees who operate level 3 and 4 small MS4s shall meet the following requirements:

(1) Source Investigation and Elimination

Permittees who operate level 3 and 4 small MS4 shall upon being notified that the discharge has been eliminated, conduct a follow-up investigation or field screening, consistent with the TPDES General Permit, to verify that the discharge has been eliminated. The permittee shall document its follow-up investigation. The permittee may seek recovery and remediation costs from responsible parties consistent with the TPDES General Permit, and require compensation related costs. Resulting enforcement actions must follow the procedures for enforcement action in the TPDES General Permit. If the suspected source of the illicit discharge is authorized under an NPDES/TPDES permit or the discharge is listed as an authorized non-stormwater discharge no further action is required.

Current Programs

Currently, the Town of Flower Mound is in the process of mapping the Town's MS4 infrastructure and jurisdictional waters in a GIS database system. Mapping of the existing and future drainage system will be included in this project. The Town's Environmental Services Division and Fire Chief's Office investigate reported or discovered illicit discharges and spills and works with the responsible party to resolve all situations. All responsible divisions have the authority to investigate and enforce against any hazardous and non-hazardous illegal dumping activities. Additional programs currently implemented that are related to illicit discharge detection and elimination include:

- Neighborhood Cleanup Events in conjunction with the bi-annual Environmental Fair
- Household Hazardous Waste Curbside Pickup
- Town Code of Ordinances provisions:
    - Authority to control and regulate waste discharge and require pretreatment
    - Enforcement by authority to disconnect service or access penalties for violations
    - Reporting requirements by industrial waste pretreatment permittees
    - Prohibit persons to dump, or permit to be dumped, knowingly or intentionally, upon any sidewalk, alley, street, into or adjacent to water, or any other public or private property, any unwholesome water, refuse, rubbish, trash, debris, filth, carrion, junk, garbage, impure or unwholesome matter of any kind or other objectionable or unsightly matter of whatever kind
    - Enforcement by accessing penalties for illegal dumping violations

Selected BMPs for Illicit Discharge Detection and Elimination

2.1 Storm Sewer System Map

The Town of Flower Mound has developed a GIS-based storm sewer system map, showing the location of all outfalls and the names and locations of all water of the U.S. that receive discharges from those outfalls. Additionally, the storm sewer map identifies the location of storm sewer pipes, ditches, and other conveyances owned by the Town, or at a minimum, the drainage area for each outfall.

Measurable Goals

The measurable goal for implementation of this BMP is to periodically update the map throughout the remainder of the permit. Description of the annual updates to the Storm Sewer System Map will be provided in the annual report.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Illicit Discharge Detection and Elimination	Storm Sewer System Map	Periodically update map.	Year 1-5

Responsible Division(s)

Public Works, Environmental Services, and Information Technology Divisions are responsible for implementation of the storm sewer system map to meet Measurable Goal 2.1.

2.2 Develop an Illicit Discharge Detection and Elimination Program

The Town of Flower Mound will develop and implement an Illicit Discharge Detection and Elimination Program that incorporates important components including IDDE training, mapping, inspection, and procedures for locating, tracing and eliminating illicit discharges.

Upon being notified that the discharge has been eliminated, Flower Mound staff will conduct a follow-up investigation or field screening, consistent with the TPDES General Permit, to verify that the discharge has been eliminated.

Flower Mound currently utilizes an On-Site Sewage Disposal Ordinance to prevent and correct leaking on-site sewage disposal systems.

Measurable Goals

The measurable goal for this BMP is to develop and implement an Illicit Discharge Detection and Elimination (IDDE) Program by year two. The implementation of this BMP follows the schedule below. Additional measureable goals may be developed as a product of the IDDE program implementation.

Schedule

PROGRAM	BMP	ACTIVITY	DATE DUE
Illicit Discharge Detection and Elimination Program	Program to Detect and Address Illicit Discharges	Research and develop an Illicit Discharge Program.	Year 1
		Complete IDDE Program.	Year 2
		Implement IDDE Program.	Year 3
		Maintain and audit IDDE Program.	Year 4
		Maintain and audit IDDE Program.	Year 5

Responsible Division(s)

The Public Works Division is responsible for developing and maintaining this BMP to meet Measurable Goal 2.2.

2.3 Develop and Maintain an Illicit Discharge Document

The Town of Flower Mound will develop and maintain a list of all illicit discharges resulting from municipal and commercial operations. The document will include project name and records of inspection and enforcement (if applicable).

Measurable Goals

The measurable goal for this BMP is to develop and maintain an Illicit Discharge document beginning in permit year one. The implementation of this BMP follows the schedule below. The number and description of illicit discharges will be provided in the permit year annual reports.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Illicit Discharge Detection and Elimination	Develop and Maintain an Illicit Discharge Document	Develop and maintain an Illicit Discharges document.	Year 1
		Maintain and update an Illicit Discharge document.	Year 2
		Maintain and update an Illicit Discharge document.	Year 3
		Maintain and update an Illicit Discharge document.	Year 4
		Maintain and update an Illicit Discharge document.	Year 5

Responsible Division(s)

The Environmental Services, Engineering Services and Public Works Divisions are responsible for developing and maintaining this BMP to meet Measurable Goal 2.3.

3. Construction Site Stormwater Runoff Control

Regulatory Requirement

(a) Requirements and Control Measures

(1) The permittee shall develop and implement a program requiring operators of small and large construction activities, as defined in Part I of this general permit, to select, install, implement, and maintain storm water control measures that prevent illicit discharges to the MEP. The program must include the development and implementation of an ordinance or other regulatory mechanism, as well as sanctions to ensure compliance to the extent allowable under state, federal, and local law, to require erosion and sediment control.

(2) If TCEQ waives requirements for stormwater discharges associated with small construction from a specific site(s), the permittee is not required to enforce the program to reduce pollutant discharges from such site(s).

(b) Requirements for all Permittees

All permittees shall include the requirements described below:

(1) All permittees shall review and update as necessary, the SWMP and MCM implementation procedures required by Part III.A.2. Any changes must be included in the annual report. Such written procedures must be maintained on site or in the SWMP and made available for inspection by the TCEQ.

(2) All permittees shall require that construction site operators implement appropriate erosion and sediment control BMPs. The permittee's construction program must ensure the following minimum requirements are effectively implemented for all small and large construction activities discharging to its small MS4.

(a) Erosion and Sediment Controls - Design, install and maintain effective erosion controls and sediment controls to minimize the discharge of pollutants.

(b) Soil Stabilization - Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Stabilization must be completed within a period of time determined by the permittee. In arid, semiarid, and drought-stricken areas, as determined by the permittee, where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures must be employed as specified by the permittee.

(c) BMPs – The permittee shall require that construction site operators design, install, implement, and maintain effective BMPs to minimize the discharge of pollutants to the small MS4. At a minimum, such BMPs must be designed, installed, implemented and maintained to:

(i) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters;

(ii) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to storm water; and

(iii) Minimize the discharge of pollutants from spills and leaks.

(d) As an alternative to (1) through (3) above, the permittee shall ensure that all small and large construction activities discharging to the small MS4 have developed and implemented a storm water pollution prevention plan (SWP3) in accordance with the TPDES CGP TXR150000. In arid, semiarid, and drought-stricken areas, as determined by the permittee, where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures must be employed as specified by the permittee. As an alternative, vegetative stabilization measures may be implemented as soon as practicable.

(3) Prohibited Discharges - The following discharges are prohibited:

(a) Wastewater from washout of concrete and wastewater from water well drilling operations, unless managed by an appropriate control;

(b) Wastewater from washout and cleanout of stucco, paint, from release oils, and other construction materials;

(c) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and,

(d) Soaps or solvents used in vehicle and equipment washing;

(e) Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed by appropriate BMPs.

(4) Construction Plan Review Procedures

To the extent allowable by state, federal, and local law, the permittee shall maintain and implement site plan review procedures that describe which plans will be reviewed as well as when an operator may begin construction. For those permittees without legal authority to enforce site plan reviews, this requirement is limited to those sites operated by the permittee and its contractors and located within the permittee's regulated area. The site plan procedures must meet the following minimum requirements:

(a) The site plan review procedures must incorporate consideration of potential water quality impacts.

(b) The permittee may not approve any plans unless the plans contain appropriate site specific construction site control measures that, at a minimum, meet the requirements described in TPDES General Permit, or in the TPDES CGP, TXR150000.

The permittee may require and accept a plan, such as a SWP3, that has been developed pursuant to the CGP, TXR150000.

(5) Construction Site Inspections and Enforcement

To the extent allowable by state, federal, and local law, the permittee shall implement procedures for inspecting large and small construction projects. Permittees without legal authority to inspect construction sites shall at a minimum conduct inspection of sites operated by the permittee or its contractors and that are located in the permittee's regulated area.

(a) Inspections must occur at a frequency determined by the permittee, based on the evaluation of factors that are a threat to water quality, such as: soil erosion potential; site slope; project size and type; sensitivity of receiving waterbodies; proximity to receiving waterbodies; non-storm water discharges; and past record of non-compliance by the operators of the construction site.

(b) Inspections must occur during the active construction phase.

(i) The permittee shall develop, implement, and revise as necessary, written procedures outlining the inspection and enforcement requirements. These procedures must be maintained on site or in the SWMP and be made available to TCEQ.

(ii) Inspections of construction sites must, at a minimum:

(1) Determine whether the site has appropriate coverage under the TPDES CGP, TXR150000. If no coverage exists, notify the permittee of the need for permit coverage.

(2) Conduct a site inspection to determine if control measures have been selected, installed, implemented, and maintained according to the small MS4's requirements.

(3) Assess compliance with the permittee's ordinances and other regulations.

(4) Provide a written or electronic inspection report.

(c) Based on site inspection findings, the permittee shall take all necessary follow-up actions (for example, follow-up-inspections or enforcement) to ensure compliance

with permit requirements and the SWMP. These follow-up and enforcement actions must be tracked and maintained for review by the TCEQ.

For non-traditional small MS4s with no enforcement powers, the permittee shall notify the adjacent MS4 operator with enforcement authority or the TCEQ's Field Operations Support Division according to the TPDES General Permit.

(6) Information submitted by the Public

All permittees shall develop, implement and maintain procedures for receipt and consideration of information submitted by the public.

(7) MS4 Staff Training

The permittee shall ensure that all staff whose primary job duties are related to implementing the construction storm water program (including permitting, plan review, construction site inspections, and enforcement) are informed or trained to conduct these activities. The training may be conducted by the permittee or by outside trainers.

(c) Additional Requirements for Level 3 and 4 small MS4s

In addition to the requirements described in the TPDES General Permit, permittees who operate level 3 and 4 small MS4s shall meet the following requirements

(1) Construction Site Inventory

Permittees who operate level 3 and 4 small MS4s shall maintain an inventory of all permitted active public and private construction sites, that result in a total land disturbance of one or more acres or that result in a total land disturbance of less than one acre if part of a larger common plan or development or sale. Notification to the small MS4 should be made by submittal of a copy of an NOI or a small construction site notice. The permittee shall make this inventory available to the TCEQ upon request.

Current Programs

Currently, the Town of Flower Mound requires construction sites comply with all federal and/or state stormwater permits. Additionally, the Town currently has existing rules and regulations related to erosion control and stormwater quality requirements related to new residential and/or commercial developments. Stormwater and erosion controls are included in Town ordinances, engineering standards, and enforced through inspections by various departments during all phases of construction related activities. Noncompliance can be grounds for the Town to stop inspections and issue citations. The Town also has staff and procedures for site plan review that incorporates consideration of potential water quality impacts as well as procedures to receive and consider information submitted by the public during the development review process.

Selected BMPs for Construction Site Stormwater Runoff Controls

3.1 Evaluate and Update Regulatory Authority and Procedures

The Town of Flower Mound will evaluate the existing legal authority to enforce the requirements for erosion and sediment controls and proper waste management at construction sites, and sanctions to ensure compliance with the requirements. If necessary, ordinances or other regulatory mechanisms will be updated to provide the formal authority.

Measurable Goals

The measurable goal for implementation of this BMP is continued enforcement of erosion and sediment control procedures and compliance for construction sites for years one through five. Updates to ordinances will be done, if necessary.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Construction Site Stormwater Controls	Evaluate and Enforce Regulatory Authority and Procedures	Update inspection program and ordinance, if necessary.	Year 1-5

Responsible Division(s)

The Environmental Services, Public Works, Building Inspections and Engineering Services Divisions are responsible for developing and implementing this BMP to meet Measurable Goal 3.1.

3.2 Construction Site Reporting Hotline

The Town of Flower Mound will maintain a construction site reporting hotline for the public to report construction site problems and/or potential violations. This hotline will be combined with a general illegal dumping and environmental crimes hotline managed by members of the Town's Environmental Services department. This will facilitate the ability of the public to provide information that will assist in detection of problem discharges.

Measurable Goals

The measurable goal will be to continue the use of the hotline and respond as violations are reported.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Construction Site Stormwater Controls	Construction Site Reporting Hotline	Monitor hotline.	Year 1-5

Responsible Division(s)

The Environmental Services Division is responsible for implementation of this BMP to meet Measurable Goal 3.2.

3.3 Develop and Maintain a Construction Site Inventory Document

Town staff shall maintain an inventory of all permitted active public and private construction sites, that result in a total land disturbance of one or more acres or that result in a total land disturbance of less than one acre if part of a larger common plan or development or sale. The document will include an individual permit number, general permit authorization number, project identification, acceptance date, acreage disturbed, and records of inspection and enforcement(if applicable).

Measurable Goals

The measurable goal for this BMP is to maintain a Stormwater Permits document from permit year one through permit year five. The implementation of this BMP follows the schedule below.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Pollution Prevention/Good Housekeeping	Maintain a Stormwater Permits Document	Maintain and update Stormwater Permits document.	Year 1-5

Responsible Division(s)

The Environmental Services, Engineering Services and Public Works Divisions are responsible for developing and maintaining this BMP to meet Measurable Goal 3.3.

4. Post-Construction Stormwater Management in New Development and Redevelopment

Regulatory Requirement

(a) Post-Construction Stormwater Management Program

(1) The permittee shall develop, implement and enforce a program, to the extent allowable under state, federal, and local law, to control stormwater discharges from new development and redeveloped sites that discharge into the small MS4 that disturb one acre or more, including projects that disturb less than one acre that are part of a larger common plan of development or sale. The program must be established for private and public development sites. The program may utilize an offsite mitigation and payment in lieu components to address this requirement.

Existing permittees shall assess program elements that were described in the previous permit, modify as necessary, to continue reducing the discharge of pollutants from the MS4 to the MEP. New elements must be fully implemented by the end of this permit term and newly regulated permittees shall have the program fully implemented by the end of the permit term.

(2) All permittees shall use, to the extent allowable under state, federal, and local law and local development standards, an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects. The permittees shall establish, implement, and enforce a requirement, which owners or

operators of new development and redeveloped sites design, install, implement, and maintain a combination of structural and non-structural BMPs appropriate for the community and that protects water quality. If the construction of permanent structures is not feasible due to space limitations, health and safety concerns, cost effectiveness, or highway construction codes, the permittee may propose an alternative approach to TCEQ. Newly regulated permittees shall have the program element fully implemented by the end of the permit term.

(b) Requirements for all Permittees

The permittee shall include the requirements described below.

(1) All permittees shall review and update as necessary, the SWMP and MCM implementation procedures required by TPDES General Permit. Any changes must be included in the annual report. Such written procedures must be maintained either on site or in the SWMP and made available for inspection by TCEQ.

(2) All permittees shall document and maintain records of enforcement actions and make them available for review by the TCEQ.

(3) Long-Term Maintenance of Post-Construction Storm Water Control Measures

The permittee shall, to the extent allowable under state, federal, and local law, ensure the long-term operation and maintenance of structural stormwater control measures installed through one or both of the following approaches:

(a) Maintenance performed by the permittee.

(b) Maintenance performed by the owner or operator of a new development or redeveloped site under a maintenance plan. The maintenance plan must be filed in the real property records of the county in which the property is located. The permittee shall require the owner or operator of any new development or redeveloped site to develop and implement a maintenance plan addressing maintenance requirements for any structural control measures installed on site. The permittee shall require operation and maintenance performed is documented and retained on site, such as at the offices of the owner or operator, and made available for review by the small MS4.

Current Programs

Currently, the Town of Flower Mound has several ordinances and regulatory requirements to protect water quality by requiring the use of best management practices on all new residential and commercial development projects. Under the Town's SMARTGrowth Program, all new developments are required to address water quality protection measures through the use of structural and/or non-structural BMPs. Additional guidance and ordinances currently implemented that are related to post-construction stormwater management in new development and redevelopments include:

- Adoption of the Town's SMARTGrowth Management Plan that includes an environmental quality category related to the: "preservation of open space, farmland, natural beauty, and sensitive environmental areas is achieved by criteria pertaining to watershed protection, wetlands, water body protection, topographical slope protection, environmental surveys, environmental protection plans, conservation development, rural development, visual impact, and agricultural resource protection easements."

- Town of Flower Mound Engineering Services Design Criteria and Construction Standards manual, which provides a list of potential BMPs for watershed protection.

Selected BMPs for Post Construction Stormwater Management for New Developments and Redevelopment

4.1 Comprehensive Stormwater Ordinance

The Town of Flower Mound will evaluate all existing regulations, ordinances, procedures, and rules related to the protection of stormwater quality and make appropriate revisions, as necessary. Additionally, the Town will continue to enforce the existing Stormwater Ordinance. The Town will continue to require all new residential and commercial developments to utilize BMPs to ensure proper long-term operation and maintenance of structures and activities to protect stormwater quality.

The Town will continue to document and maintain records of enforcement utilizing our TRAKiT database system. Reports referencing all records of enforcement will be made to evaluate effectiveness and efficiency.

Measurable Goals

The measurable goal for this BMP of the comprehensive Stormwater Ordinance is to continue to enforce all provisions of the ordinance. Cased created resulting from enforcement action citing the Stormwater Ordinance will be documented in our TRAKiT database system.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Post-Construction Controls for New Development and Redevelopment	Comprehensive Stormwater Ordinance	Enforce all provisions of the Stormwater ordinance. Update, if necessary.	Year 1-5

Responsible Division(s)

The Environmental Services, Public Works, Engineering Services, and Building Inspections Divisions are responsible for implementing this BMP to meet Measurable Goal 4.1.

4.2 Evaluate and Update Stormwater Inspection Programs

The Town of Flower Mound will integrate inspections of post-construction stormwater quality into existing inspections conducted by various divisions. The Town will evaluate existing procedures and identify needed changes and implement the revised program.

Town staff, when necessary, will require developers to maintain and/or repair stormwater controls measures installed on site. In addition, Town staff will perform regular maintenance of all municipally owned stormwater controls.

Measurable Goals

The measurable goal for implementation of this BMP is to provide for periodic inspections of targeted locations in the Town. Evaluations of the existing requirements will be document when and if changes are necessary.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Post-Construction Controls for New Development and Redevelopment	Evaluate and Enforce the Stormwater Inspections Program	Provide for periodic inspections of targeted locations.	Year 1-5

Responsible Division(s)

The Environmental Services, Public Works, Building Inspections and Engineering Services Divisions are responsible for implementing this BMP to meet measurable goal 4.2.

5. Pollution Prevention/Good Housekeeping for Municipal Operations

Regulatory Requirement

(a) Program development

(1) All permittees shall develop and implement an operation and maintenance program, including an employee training component that has the ultimate goal of preventing or reducing pollutant runoff from municipal activities and municipally owned areas including but not limited to park and open space maintenance; street, road, or highway maintenance; fleet and building maintenance; stormwater system maintenance; new construction and land disturbances; municipal parking lots; vehicle and equipment maintenance and storage yards; waste transfer stations; and salt/sand storage locations.

Existing permittees shall assess program elements that were described in the previous permit, modify as necessary, and develop and implement new elements, as necessary, to continue reducing the discharges of pollutants from the MS4 to the MEP. New elements must be fully implemented by the end of this permit term and newly regulated permittees shall have the program fully implemented by the end of this permit term.

(b) Requirements for all Permittees

The permittee shall include the requirements described below.

(1) Permittee-owned Facilities and Control Inventory

The permittee shall develop and maintain an inventory of facilities and stormwater controls that it owns and operates within the regulated area of the small MS4. If feasible, the inventory may include all applicable permit numbers, registration numbers, and authorizations for each facility or controls. The inventory must be available for review by TCEQ and must include, but is not limited, to the following, as applicable:

(a) Composting facilities;

(b) Equipment storage and maintenance facilities;

(c) Fuel storage facilities;

(d) Hazardous waste disposal facilities;

(e) Hazardous waste handling and transfer facilities;

(f) Incinerators;

(g) Landfills;

(h) Materials storage yards;

(i) Pesticide storage facilities;

(j) Buildings, including schools, libraries, police stations, fire stations, and office buildings;

(k) Parking lots;

(l) Golf courses;

(m) Swimming pools;

(n) Public works yards;

(o) Recycling facilities;

(p) Salt storage facilities;

(q) Solid waste handling and transfer facilities;

(r) Street repair and maintenance sites;

(s) Vehicle storage and maintenance yards;

(t) Structural stormwater controls.

(2) Training and Education

The permittee shall inform or train appropriate employees involved in implementing pollution prevention and good housekeeping practices. The permittee shall maintain a training attendance list for inspection by TCEQ when requested.

(3) Disposal of Waste Material -Waste materials removed from the small MS4 must be disposed of in accordance with 30 TAC Chapters 330 or 335, as applicable.

(4) Contractor Requirements and Oversight

(a) Any contractors hired by the permittee to perform maintenance activities on permittee-owned facilities must be contractually required to comply with all of the

stormwater control measures, good housekeeping practices, and facility-specific stormwater management operating procedures described above.

(b) The permittee shall provide oversight of contractor activities to ensure that contractors are using appropriate control measures and SOPs. Oversight procedures must be developed before the end of the permit term and maintained on site and made available for inspection by TCEQ.

(5) Municipal Operation and Maintenance Activities

(a) Assessment of permittee-owned operations

All permittees shall evaluate operation and maintenance (O&M) activities for their potential to discharge pollutants in stormwater, including but not limited to:

(i) Road and parking lot maintenance may include such areas as pothole repair, pavement marking, sealing, and re-paving;

(ii) Bridge maintenance may include such areas as re-chipping, grinding, and saw cutting;

(iii) Cold weather operations, including plowing, sanding, and application of deicing and anti-icing compounds and maintenance of snow disposal areas; and

(iv) Right-of-way maintenance, including mowing, herbicide and pesticide application, and planting vegetation.

(b) All permittees shall identify pollutants of concern that could be discharged from the above O&M activities (for example, metals; chlorides; hydrocarbons such as benzene, toluene, ethyl benzene, and xylenes; sediment; and trash).

(c) All permittees shall develop and implement a set of pollution prevention measures that will reduce the discharge of pollutants in stormwater from the above activities. These pollution prevention measures may include the following examples:

(i) Replacing materials and chemicals with more environmentally benign materials or methods;

(ii) Changing operations to minimize the exposure or mobilization of pollutants to prevent them from entering surface waters; and

(iii) Placing barriers around or conducting runoff away from deicing chemical storage areas to prevent discharge into surface waters.

(d) Inspection of pollution prevention measures – All pollution prevention measures implemented at permittee-owned facilities must be visually inspected at a frequency determined by the permittee to ensure they are working properly. A log of inspections must be maintained and made available for review by the TCEQ upon request.

(6) Structural Control Maintenance

If BMPs include structural controls, maintenance of the controls must be performed at a frequency determined by the permittee and consistent with maintaining the effectiveness of the BMP.

(c) Additional Requirements for Level 3 and 4 small MS4s:

In addition to the requirements above, the permittee who operate level 3 or 4 small MS4s shall meet the following requirements:

(1) Storm Sewer System Operation and Maintenance

(a) Permittees who operate level 3 or 4 small MS4s shall develop implement an O&M program to reduce to the maximum extent practicable the collection of pollutants in catch basins and other surface drainage structures.

(b) Permittees who operate level 3 or 4 small MS4s shall develop a list of potential problem areas. The permittee shall identify and prioritize problem areas for increased inspection (for example, areas with recurrent illegal dumping).

(2) Operation and Maintenance Program to Reduce Discharges of Pollutants from Roads

Permittees who operate level 3 or 4 small MS4s shall implement an O&M program that includes, if feasible and practicable, a street sweeping and cleaning program, or an equivalent BMP such as an inlet protection program, which must include an implementation schedule and a waste disposal procedure. The basis for the decision must be included in the SWMP. If a street sweeping and cleaning program is implemented, the permittee shall evaluate the following permittee-owned and operated areas for the program: streets, road segments, and public parking lots including, but not limited to, high traffic zones, commercial and industrial districts, sport and event venues, and plazas, as well as areas that consistently accumulate high volumes of trash, debris, and other stormwater pollutants.

(a) Implementation schedules – If a sweeping program is implemented, the permittee shall sweep the areas in the program (for example, the streets, roads, and public parking lots) in accordance with a frequency and schedule determined in the permittee's O&M program.

(b) For areas where street sweeping is technically infeasible (for example, streets without curbs), the permittee shall focus implementation of other trash and litter control procedures, or provide inlet protection measures to minimize pollutant discharges to storm drains and creeks.

(c) Sweeper Waste Material Disposal – If utilizing street sweepers, the permittee shall develop a procedure to dewater and dispose of street sweeper waste material and shall ensure that water and material will not reenter the small MS4.

(3) Mapping of Facilities

Permittees who operate level 3 or 4 small MS4s shall, on a map of the area regulated under this general permit, identify where the permittee-owned and operated facilities and stormwater controls are located.

(4) Facility Assessment

Permittees who operate level 3 or 4 small MS4s shall perform the following facility assessment in the regulated portion of the small MS4 operated by the permittee:

(a) Assessment of Facilities' Pollutant Discharge Potential - The permittee shall review the facilities identified in TPDES General Permit once per permit term for their potential to discharge pollutants into stormwater.

(b) Identification of *high priority* facilities - Based on the assessment above, the permittee shall identify as *high priority* those facilities that have a high potential to

generate stormwater pollutants and shall document this in a list of these facilities. Among the factors that must be considered in giving a facility a high priority ranking are the amount of urban pollutants stored at the site, the identification of improperly stored materials, activities that must not be performed outside (for example, changing automotive fluids, vehicle washing), proximity to waterbodies, proximity to sensitive aquifer recharge features, poor housekeeping practices, and discharge of pollutant(s) of concern to impaired water(s). High priority facilities must include, at a minimum, the permittee's maintenance yards, hazardous waste facilities, fuel storage locations, and any other facilities at which chemicals or other materials have a high potential to be discharged in stormwater.

(c) Documentation of Assessment Results – The permittee shall document the results of the assessments and maintain copies of all site evaluation checklists used to conduct the assessments. The documentation must include the results of the permittee's initial assessment, and any identified deficiencies and corrective actions taken.

(5) Development of Facility Specific SOPs

Permittees who operate level 3 or 4 small MS4s shall develop facility specific stormwater management SOPs. The permittee may utilize existing plans or documents that may contain the following required information:

(a) For each high priority facility identified, the permittee shall develop a SOP that identifies BMPs to be installed, implemented, and maintained to minimize the discharge of pollutants in stormwater from each facility.

(b) A hard or electronic copy of the facility-specific stormwater management SOP (or equivalent existing plan or document) must be maintained and be available for review by the TCEQ. The SOP must be kept on site when possible and must be updated as necessary.

(6) Stormwater Controls for High Priority Facilities

Permittees who operate level 3 or 4 small MS4s shall implement the following stormwater controls at all high priority facilities. A description of BMPs developed to comply with this requirement must be included in each facility specific SOP:

(a) General good housekeeping – Material with a potential to contribute to stormwater pollution should be sheltered from exposure to stormwater when feasible.

(b) De-icing and anti-icing material storage – The permittee shall ensure, to the MEP, that stormwater runoff from storage piles of salt and other de-icing and anti-icing materials is not discharged; or shall ensure that any discharges from the piles are authorized under a separate discharge permit.

(c) Fueling operations and vehicle washing – The permittee shall develop SOPs (or equivalent existing plans or documents) which address spill prevention and spill control at permittee-owned and operated vehicle fueling, vehicle maintenance, and bulk fuel delivery facilities.

(d) Equipment and vehicle washing - The permittee shall develop SOPs that address equipment and vehicle washing activities at permittee-owned and operated facilities. The discharge of equipment and vehicle wash water to the small MS4 or directly to receiving waters from permittee-owned facilities is not authorized under this general permit. To ensure that wastewater is not discharged under this general permit, the permittee's SOP may include installing a vehicle wash reclaim system,

capturing and hauling the wastewater for proper disposal, connecting to sanitary sewer (where applicable and approved by local authorities), ceasing the washing activity, or applying for and obtaining a separate TPDES permit.

(7) Inspections

Permittees who operate level 3 or 4 small MS4s shall develop and implement an inspection program, which at a minimum must include periodic inspections of high priority permittee-owned facilities. The results of the inspections and observations must be documented and available for review by the TCEQ.

Current Programs

Currently the Town of Flower Mound's individual divisions ensure that applicable pollution prevention controls are in place and effectively maintained. The Environmental Services Division provides technical services to other divisions, as needed. Current pollution prevention/good housekeeping programs include:

- Fleet vehicle maintenance/washing
- Parking lot and street cleaning
- Storm drain system cleaning/maintenance
- Water materials management
- Road salt/sand application and storage practices
- Used oil recycling
- Pest management practices
- Roadway and bridge maintenance policies
- Park maintenance provisions

Selected BMPs for Pollution Prevention/Good Housekeeping for Municipal Operations

5.1 Facility Specific Standard Operating Procedures (SOPs)

The Town of Flower Mound will develop, implement, and maintain internal standard operating procedures (SOPs) for each Town facility, which will identify potential stormwater quality impairments resulting from municipal operations and activities. The internal SOPs will function similar to an Environmental Management System and will provide structural and non-structural pollution prevention options through a series of best management practices that are specific to each Town facility.

Each facility specific SOP will contain at a minimum the following procedures:

- Proper removal and disposal methods for waste from the MS4
- Contractor oversight procedures
- Pollution prevention inspection procedures for all MS4 facilities
- Structural BMPs will be maintained where applicable

- Staff assessments for each facility to determine the potential to discharge pollutants into stormwater
- Documenting the results of the staff assessments
- Identification of "high profile" facilities. Implement stormwater controls for high profile facilities that address the following:
    - De-icing and anti-icing storage
    - Fueling operations and vehicle maintenance
    - Equipment and vehicle washing

Measurable Goals

The measurable goal for implementation of the SOPs will be to develop a set of SOPs for designated Town facilities annually. A complete description of the Town's Facility Specific SOPs will be documented and provided in the annual report. Any progress achieved and/or necessary updates will be provided in subsequent annual reports.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Pollution Prevention/Good Housekeeping	Facility Specific Standard Operating Procedures	Develop SOP(s) annually for dedicated facilities.	Year 1-5

Responsible Division(s)

All applicable divisions are responsible for implementing the SOP program to meet Measurable Goal 5.1.

5.2 MS4 Facility and Stormwater Controls Map

The Town of Flower Mound will develop a Facility and Stormwater Controls map that will identify areas of municipal operations in order to determine areas that may be contributing to stormwater runoff to the MS4.

Measurable Goals

The measurable goal for this BMP will be to collect the necessary data and being to develop the framework of the map for permit year one. In permit year two, the goal will be to finalize and complete the map. Permit years three through five will be used to update the Facility and Stormwater Controls map, if necessary.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Pollution Prevention/Good Housekeeping	MS4 Facility and Stormwater Controls Map	Collect data and start developing map.	Year 1
		Finalize map.	Year 2
		Update map, if necessary.	Year 3-5

Responsible Division(s)

The Environmental Services, Public Works, Engineering and GIS divisions are responsible for developing and maintaining this BMP to meet Measurable Goal 5.2.

5.3 MS4 Operations and Maintenance Program

The Town of Flower Mound will develop a program for all employees responsible for municipal operations that potentially pose an impact to stormwater quality, including discharges into the MS4. The training program will include training materials directed at preventing and reducing stormwater pollution from municipal operations. A list of training completed by Town staff will be provided in the annual report.

The O&M Program will contain at a minimum the following procedures:

- Evaluation of potential stormwater impacts from O&M activities
- Identification of pollutants of concern that may be discharged from O&M activities
- Development and implantation of pollution prevention measures that will reduce discharge of pollutants from O&M activities
- Development of a list of potential problem areas for increased inspection frequency

Measurable Goals

The measurable goal for this BMP will be to develop the training materials in conjunction with the Facility Specific SOPs during permit years six. All designated employees will undergo annual training beginning in permit year seven and continue through permit year ten. Description of research and development of the training materials will be provided in the year six annual report. The total number of employees trained will be documented and provided in the subsequent annual reports.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Pollution Prevention/ Good Housekeeping	MS4 Operations and Maintenance Program	Develop Operations and Maintenance Program training materials.	Year 1
		Ensure all designated employees receive annual training. Enforce O&M program.	Year 2-5

Responsible Division(s)

All applicable divisions are responsible for implementing the training program to meet Measurable Goal 5.3.

5.4 MS4 Facility Inventory

The Town of Flower Mound will develop and maintain an inventory of facilities and stormwater controls that it owns and operates within the regulated area of the small MS4. If feasible, the inventory may include all applicable permit numbers, registration numbers, and authorizations for each facility or controls.

Measurable Goals

The measurable goal for this BMP will be to develop and inventory of facilities and stormwater controls during permit years six. The facility inventory will be completed in permit year seven and maintained through permit year ten. Updates to the inventory will be completed as necessary. Details of the map and updates will be provided in the annual reports.

Schedule

PROGRAM	*BMP*	*ACTIVITY*	*DATE DUE*
Pollution Prevention/Good Housekeeping	MS4 Facility Inventory.	Develop a MS4 Facility Inventory.	Year 1
		Maintain a Facility Inventory. Update, if necessary.	Year 2-5

Responsible Division(s)

All applicable divisions are responsible for implementing the training program to meet Measurable Goal 5.4.

PART III IMPAIRED WATER BODIES AND TOTAL MAXIMUM DAILY LOAD (TMDL) REQUIREMENTS

Discharges of the pollutant(s) of concern to impaired water bodies for which there is a TCEQ and EPA approved total maximum daily load (TMDL) are not eligible for this general permit unless they are consistent with the approved TMDL. A water body is impaired for purposes of the permit if it has been identified, pursuant to the latest TCEQ and EPA approved CWA §303(d) list, as not meeting Texas Surface Water Quality Standards.

The permittee shall control the discharges of pollutant(s) of concern to impaired waters and waters with approved TMDLs as provided in sections (a) and (b) below, and shall assess the progress in controlling those pollutants.

(a) Discharges to Water Quality Impaired Water Bodies with an Approved TMDL

If the small MS4 discharges to an impaired water body with an approved TMDL, where stormwater has the potential to cause or contribute to the impairment, the permittee shall include in the SWMP controls targeting the pollutant(s) of concern along with any additional or modified controls required in the TMDL and this section.

The SWMP and required annual reports must include information on implementing any targeted controls required to reduce the pollutant(s) of concern as described below:

(1) Targeted Controls

The SWMP must include a detailed description of all targeted controls to be implemented, such as identifying areas of focused effort or implementing additional Best Management Practices (BMPs) to reduce the pollutant(s) of concern in the impaired waters.

(2) Measurable Goals

For each targeted control, the SWMP must include a measurable goal and an implementation schedule describing BMPs to be implemented during each year of the permit term.

(3) Identification of Benchmarks

The SWMP must identify a benchmark for the pollutant(s) of concern. Benchmarks are designed to assist in determining if the BMPs established are effective in addressing the pollutant(s) of concern in stormwater discharge(s) from the MS4 to the maximum extent practicable (MEP). The BMPs addressing the pollutant of concern must be re-evaluated on an annual basis for progress towards the benchmarks and modified as necessary within an adaptive management framework. These benchmarks are not numeric effluent limitations or permit conditions but intended to be guidelines for evaluating progress towards reducing pollutant discharges consistent with the benchmarks. The exceedance of a benchmark is not a permit violation and does not in itself indicate a violation of instream water quality standards.

The benchmark must be determined based on one of the following options:

a. If the MS4 is subject to a TMDL that identifies a Waste Load Allocation(s)

(WLA) for permitted MS4 stormwater sources, then the SWMP may identify it as the benchmark. Where an aggregate allocation is used as a benchmark, all affected MS4 operators are jointly responsible for progress in meeting the benchmark and shall

(jointly or individually) develop a monitoring/assessment plan as required in Part II.D.4(a)(6).

b. Alternatively, if multiple small MS4s are discharging into the same impaired water body with an approved TMDL, with an aggregate WLA for all permitted stormwater MS4s, then the MS4s may combine or share efforts to determine an alternative sub-benchmark for the pollutant(s) of concern (e.g., bacteria) for their respective MS4. The SWMP must clearly define this alternative approach and must describe how the sub-benchmark would cumulatively support the aggregate WLA. Where an aggregate benchmark has been broken into sub-benchmarks for individual MS4s, each permittee is only responsible for progress in meeting its sub-benchmark.

(4) Annual Report

The annual report must include an analysis of how the selected BMPs will be

effective in contributing to achieving the benchmark.

(5) Impairment for Bacteria

If the pollutant of concern is bacteria, the permittee shall include focused BMPs addressing the below areas, as applicable, in the SWMP and implement as appropriate. If a TMDL Implementation Plan (I-Plan) is available, the permittee may refer to the I-Plan for appropriate BMPs. The SWMP and annual report must include the selected BMPs. Permittees may not exclude BMPs associated with the minimum control measures required under 40 CFR §122.34 from their list of proposed BMPs. Proposed BMPs will be reviewed by the executive director during the NOI and SWMP review and approval process.

The BMPs shall, as appropriate, address the following:

a. Sanitary Sewer Systems

(i) Make improvements to sanitary sewers to reduce overflows;

(ii) Address lift station inadequacies;

(iii) Improve reporting of overflows; and

(iv) Strengthen sanitary sewer use requirements to reduce blockage from fats, oils, and grease.

b. On-site Sewage Facilities (for entities with appropriate jurisdiction)

(i) Identify and address failing systems; and

(ii) Address inadequate maintenance of On-Site Sewage Facilities (OSSFs).

c. Illicit Discharges and Dumping

Place additional effort to reduce waste sources of bacteria; for example, from septic systems, grease traps, and grit traps.

d. Animal Sources

Expand existing management programs to identify and target animal sources such as zoos, pet waste, and horse stables.

e. Residential Education

Increase focus to educate residents on:

(i) Bacteria discharging from a residential site either during runoff events or directly;

(ii) Fats, oils, and grease clogging sanitary sewer lines and resulting overflows;

(iii) Decorative ponds; and

(iv) Pet waste.

(6) Monitoring or Assessment of Progress

The permittee shall monitor or assess progress in achieving benchmarks and determine the effectiveness of BMPs, and shall include documentation of this monitoring or assessment in the SWMP and annual reports. In addition, the SWMP must include methods to be used.

a. The permittee may use either of the following methods to evaluate progress towards the benchmark and improvements in water quality as follows:

(i) Evaluating Program Implementation Measures

The permittee may evaluate and report progress towards the benchmark by describing the activities and BMPs implemented, by identifying the appropriateness of the identified BMPs, and by evaluating the success of implementing the measurable goals.

The permittee may assess progress by using program implementation indicators such as: (1) number of sources identified or eliminated; (2) decrease in number of illegal dumping; (3) increase in illegal dumping reporting; (4) number of educational opportunities conducted; (5) reductions in sanitary sewer flows (SSOs); or, (6) increase in illegal discharge detection through dry screening, etc.; or

(ii) Assessing Improvements in Water Quality

The permittee may assess improvements in water quality by using available data for segment and assessment units of water bodies from other reliable sources, or by proposing and justifying a different approach such as collecting additional instream or outfall monitoring data, etc. Data may be acquired from TCEQ, local river authorities, partnerships, and/or other local efforts as appropriate.

b. Progress towards achieving the benchmark shall be reported in the annual report. Annual reports shall report the benchmark and the year(s) during the permit term that the MS4 conducted additional sampling or other assessment activities.

(b) Discharges Directly to Water Quality Impaired Water Bodies without an Approved TMDL

The permittee shall also determine whether the permitted discharge is directly to one or more water quality impaired water bodies where a TMDL has not yet been approved by TCEQ and EPA. If the permittee discharges directly into an impaired water body without an approved TMDL, the permittee shall perform the following activities:

(1) Discharging a Pollutant of Concern

a. Within the first year following the permit effective date, the permittee shall

determine whether the small MS4 may be a source of the pollutant(s) of concern by referring to the CWA §303(d) list and then determining if discharges from the MS4 would be likely to contain the pollutant(s) of concern at levels of concern.

b. If the permittee determines that the small MS4 may discharge the pollutant(s) of concern to an impaired water body without an approved TMDL, the permittee shall, no later than two years following the permit effective date, ensure that the SWMP includes focused BMPs, along with corresponding measurable goals, that the permittee will implement, to reduce, the discharge of pollutant(s) of concern that contribute to the impairment of the water body.

c. In addition, no later than three years following the permit effective date, the permittee shall submit an NOC to amend the SWMP to include any additional BMPs to address the pollutant(s) of concern.

(2) Impairment of Bacteria

Where the impairment is for bacteria, the permittee shall identify potential significant sources and develop and implement focused BMPs for those sources. The permittee may implement the BMPs listed in Part II.D.4(a)(5) or proposed alternative BMPs as appropriate.

(3) The annual report must include information on compliance with this section, including results of any sampling conducted by the permittee.

Impaired Water Body Mitigation Requirements

The Town of Flower Mound directly discharges into an impaired segment known as 0826 – Grapevine Lake. The Pollutant of Concern (POC) for the impaired segment is identified in the *2012 Texas Integrated Report Index of Water Quality Impairments* as pH. The pH level for this segment has been consistently high. The Town of Flower Mound will investigate the impaired water body segment to determine what if any contribution the Town is adding to the stream. If after a year of investigation it is determined that the Town is a source of high pH, appropriate best practices will be evaluated and implemented.

Measurable Goals

The measurable goal for this BMP will be to determine if the Town is a contributor to the high pH levels of the impaired segment of Grapevine Lake in year one. If it determined by staff that the Town is a source of high pH levels, staff will implement a BMP with specific activities designed to mitigate the impact of the POC. Years two through five will be used to implement public education and stream monitoring programs to lessen the impacts of the pollutants causing the high pH level.

Schedule

PROGRAM	***BMP***	***ACTIVITY***	***DATE DUE***
Impaired Water Bodies And Total Maximum Daily Load (TMDL) Requirements	Public Education and Stream Monitoring/Testing	Determine if the MS4 is a source of the POC.	Year 1
		If the MS4 is a source of the POC, implement a stream monitoring location to observe pH level of impaired segment.	Year 2-5
		Print and distribute education material, as needed.	Year 2-5

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