City of Loganville

Landscape Design Standards and Guidelines for Stormwater and Detention Facilities

AS ADOPTED 12/8/2022

INTRODUCTION

The following standards and guidelines have been developed to improve the aesthetic design and maintenance of landscaping within storm drainage and detention facilities in Loganville. Currently the City of Loganville follows written standards for the technical design of drainage and detention facilities found in the *Georgia Stormwater Management Manual* and in the *Loganville Development Regulations*. Stormwater detention is required when a project meets the criteria established in Section 8.2 of the *Loganville Development Regulations*. Stormwater Management facilities represent a significant portion of open space within both public and private developments in the city. With the City's participation in the NPDES Municipal Separate Storm Sewer System (MS4) program, and with the adoption of the Metro North Georgia Water Planning District's Post Construction Stormwater requirements, the City of Loganville has recognized the need to provide more innovative policies and practices for stormwater management. As a result, these standards and guidelines will improve the overall character of our community, storm drainage function, reduce irrigation demand, improve wildlife habitat, and promote maintenance of these open areas.

VISION AND GOALS

These standards and guidelines are part of a larger vision of the City of Loganville to improve the appearance of the community though more appealing site design practices for stormwater management ponds. In order to help achieve this vision, these standards and guidelines for landscaping have been developed with the following goals:

- Promote water infiltration and improved water quality
- Habitat value and plant conservation
- Improve aesthetic quality
- Promote better maintenance practices

STRUCTURE

This document includes background information and describes concepts and objectives for design of stormwater facilities to meet the goals of improving the aesthetic appeal of stormwater management facilities in the City as well as promoting better site design practices. It includes both **guidelines** (suggested recommendations for design improvements) and **standards** (mandatory requirements for design or documentation).

This document is intended to supplement, not supersede (except where specifically listed), current regulatory documents which may include:

- *Loganville Zoning Ordinance*
- *Loganville Development Regulations*
- *Georgia Stormwater Management Manual*
- Loganville GI/LID Program (MS4 Program)
- Army Corps of Engineers

BACKGROUND

CONCEPTS

The basic concepts of stormwater management are not complicated. The goal is to restore the hydrological cycle to the extent possible and to utilize the available precipitation to promote a naturalized environment in developed areas. This requires understanding the pre-development conditions so they can be an integrated system in the development.

Site stormwater design should not simply focus on basin sizing and outfall rates, but should address site drainage as an integrated multi-use hydrologic system. This system may include detention, water quality treatments, stream bank erosion control, habitat creation, infiltration, energy dissipation, and/or recreational use. The concepts here illustrate specific measures which affect landscape treatments within this overall, integrated stormwater design approach.

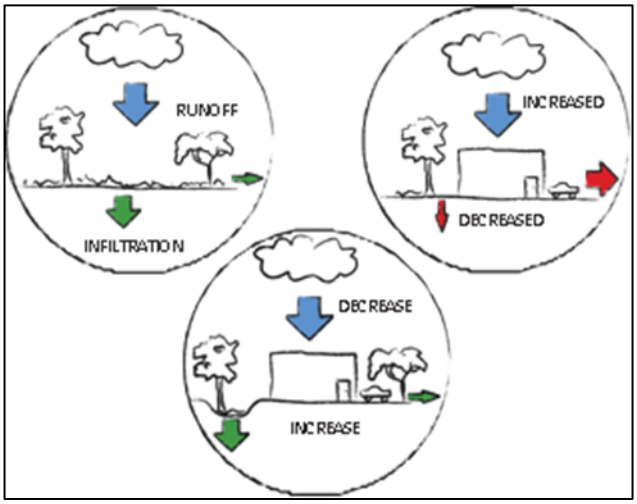
INFILTRATION VS. RUNOFF

Infiltration is a natural process by which precipitation is absorbed into the soil. Depending on the local soil type, some of the water remains in the top layers of soil and is used by vegetation. The rest of the water percolates through the soil and bedrock, recharging the groundwater system.

Runoff occurs when the soil is saturated, has become impermeable or when structures and impermeable materials are placed on the site. Runoff tends to contain silt and pollutants that require mitigation. Excessive runoff also contributes to adverse hydraulic downstream conditions causing unnatural stream bank erosion and limited groundwater recharge.

Appropriate site design promotes natural infiltration resulting in fewer downstream impacts including excessive steam flow, exaggerated geomorphology, and reduced stormwater capacity of natural systems.

PRE-DEVELOPMENT POST- DEVELOPMENT
(TYPICAL)



GOAL: POST -DEVELOPMENT DESIGNED FOR INFILTRATION

HABITAT VALUE

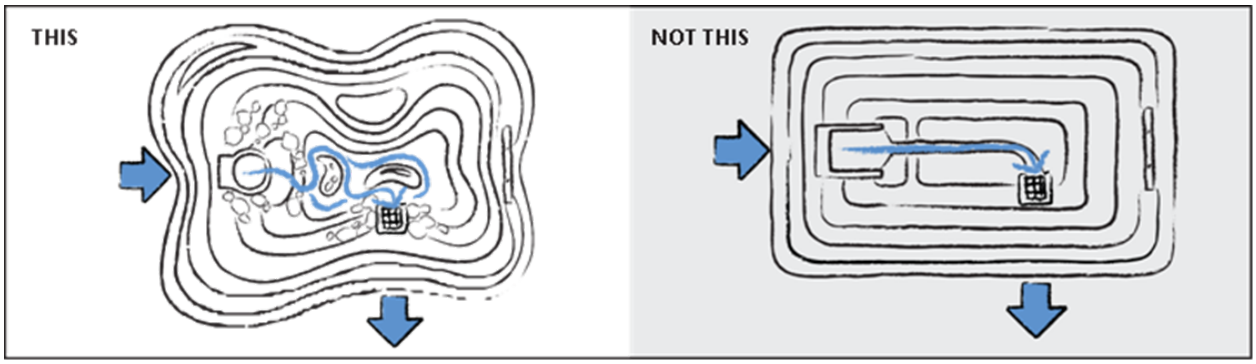
Historically, the area that is now Loganville was a pine forest with a large variety of plant and animal species. Many of these species have been displaced by the onset of development. Natural waterways and drainage patterns are altered by development. This decreases the functionality of existing hydrologic systems. It is beneficial to reasonably accommodate and/or reestablish the hydrologic systems that existed prior to development through the site and landscape design process.

STORMWATER IS AN AMENITY

Stormwater facilities have a reputation for being functional site features without natural qualities. The basic design parameters for a detention pond design is capacity or volume and rate of discharge. These parameters combined with economic factors typically result in designs that maximize the amount of stormwater detention within the smallest possible area.

These parameters are typically accomplished by the creation of geometric basins with calculated volume and outflow rates, connected to site and local utilities through standard gray concrete and steel structures. The typical detention basin is functional as a facility, yet, provides little or no aesthetic or habitat benefits. In many cases detention basins of this kind detract from the overall project image or appeal and adversely affect surrounding properties.

Detention ponds and waterways can instead be designed to both meet the engineering requirements and provide an attractive diverse space. A detention pond can serve as a multi-use area, wildlife habitat, picturesque scene, entry experience or educational opportunity while maintaining the necessary functions of stormwater detention and water quality improvement. Stormwater facilities should be considered an opportunity for aesthetic interest and natural integration rather than solely necessary features of a development. Section 2.3 of the *Georgia Stormwater Management Manual*, adopted by the City of Loganville, provides a comprehensive list of better site design practices which are encouraged to be used within the City limits, including Green Infrastructure and Low Impact Development (GI/LID) BMPs. GI/LID practices are also required to be considered as a part of the City's MS4 NPDES permit.



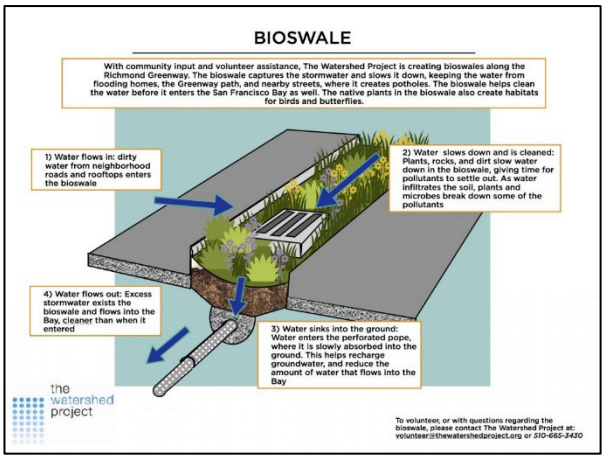
OBJECTIVES

In order to achieve the overall goals in better stormwater management pond design and development, the following objectives must be met:

1. INFILTRATION AND WATER QUALITY

Reduce excess runoff and downstream pollution by and showy flowers, fall leaf color, winter texture, and grasses that persist through the winter while they provide good wildlife habitat.

- Use vegetation to frame viewsheds and enhance the natural aesthetic qualities of the site.
- Increasing on-site infiltration and water quality. Maintain the primary functions of detention ponds and stream drainages to attenuate flows and improve water quality while creating and improving wildlife habitat.
- Increase pervious surface area and surface conveyance.
- Decrease flow concentration.
- Take advantage of natural processes through bio-filtration and bio-retention.
- Manage vegetation to insure proper drainage functions are maintained while allowing habitat values to be expressed to the extent possible.



2. HABITAT VALUE AND PLANT CONSERVATION

Create and protect habitat for a diverse array of plants and animals; birds, mammals, insects, amphibians, and wetland plants.

- Increase plant species diversity including the number and variety of butterfly host plant grasses, flowering plants, and shrubs as well as the number of nectar plants and shelter plants.
- Increase the number and variety of native shrubs and trees that provide valuable cover, berries, insects, nest sites and other resources for migratory, nesting, and wintering birds.
- Increase the number and variety of wetland species that provide optimal conditions for amphibian and reptile breeding to occur.

3. AESTHETIC APPEAL

Create a beautiful landscape that people will enjoy and appreciate without sacrificing function and value for wildlife and plant habitat.

- Increase the amount of shade and resting areas along trails and open spaces while providing habitat for wildlife and viewing opportunities for visitors.
- Use plant species that maintain their beauty in a variety of seasons, such as a species with colorful

DESIGN CONCEPTS

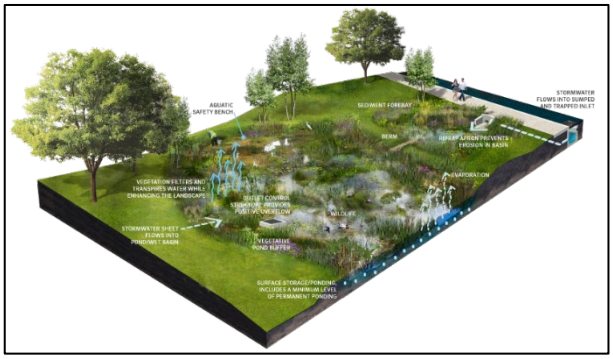
GENERAL CONSIDERATIONS

A significant portion of a developed site often must be used for drainage conveyance and site detention. In planning the site, designers should consider how the storm drainage facilities can contribute to the overall character of the project. Developers and designers should consider:

- How will the stormwater facilities be designed to achieve the goals of this document and the needs of the project?
- How will the stormwater facilities be designed as an amenity rather than a necessary nuisance for this project?

DESIGN POSSIBILITIES

Different development types will have differing needs that can be enhanced by thoughtful design of stormwater systems that can serve **multiple functions**. Some concepts to consider for detention areas based on development types include:



Extended wet detention pond with extensive landscaping

- ***Residential Development*** – neighborhood greenbelts, multi-purpose recreational fields*, pedestrian trails, entry features, water features, wildlife habitat, wetland/riparian amenities, community gardens*, orchards, natural playgrounds, off-leash dog play areas*.
- ***Business / Retail Development*** – Water features, entry features, loop trails, picnic shelters*, visual buffer to screen service areas from public spaces, bioswale/ landscape islands, etc.
- ***Industrial Development*** – Visual buffer to screen service and loading areas, trail connections, recreation areas, etc.

* Structures should be designed for flooding conditions.

PLANNING/SITE CONTEXT

Obtain and understand information about **site conditions** and **site context** before designing the detention facilities, including:

- Adjacent and regional drainage, recreational, and open space patterns
- Site constraints
- On-site topography and drainage conditions
- Soil conditions
- Unique natural features, amenities or views
- Aesthetic expectations

Vegetated filter strip in a residential setting

Consider how the design of drainage facilities and detention areas can contribute to the overall plan and adjacent developments. **Collaborate** with adjacent property developers to formulate a more effective neighborhood or regional storm drainage plan. Look for opportunities to integrate storm drainage conveyance and water quality systems into the planned development. Using bioswales, linear conveyance with check dams, and inverted landscape islands throughout the project will increase **distributed infiltration** and can result in reduced land dedication requirements for larger detention ponds.

LANDFORM AND SLOPES

Detention ponds engineered solely to meet the minimum holding capacity of the required storm flows generally result in ponds with uniform side slopes with little natural character, or with vertical side walls that may create unsafe conditions. Design pond slopes in a way that they may also contribute to other goals.

If a detention pond is designed to also serve as a neighborhood recreation or athletic field, use **gentle side slopes** to allow for easy access to the play fields. Steeper side slopes can be designed with **terraced flat areas** to serve as spectator seating. Other greenbelt amenities such as picnic areas and pedestrian trails can be developed adjacent to these spaces to create a neighborhood park amenity that also serves as stormwater detention. While gentler slopes for detention may require more land for the pond, by combining the required pond area with required community uses, less land may be used for these open areas overall.

General access is a primary **safety consideration**. Ramped access and gentle side slopes allow people and animals to evacuate the basin in the event of high water. Gentle side slopes also make pond maintenance and mowing easier, which should result in a more aesthetically pleasing and better maintained pond.

Access for maintenance equipment and personnel is necessary for proper care and management of stormwater facilities. Design slopes to provide appropriate access for wheeled service vehicles, utility vehicles, lawn mowers and/or brush hogs. Consider that trash and debris must be regularly removed by maintenance personnel. Periodic cleanup operations may also require the use of heavy equipment. If walls are used, they shall be limited to the minimum required height and length needed. Ideally no more than 50% of a basin perimeter should be bound by walls. All walls shall be built of suitable materials matching adjacent architecture or designed into the landscape scheme with natural stone or integral color concrete with form liner (see technical design standards for more information).

Dry detention pond with planted bottom

TECHNICAL DESIGN STANDARDS

Stormwater Management Ponds

Detention ponds designed to be naturalized open space should include **varied side slopes and an undulating bottom.** Varied slope conditions will promote opportunities for plant diversity and wildlife habitat by creating subtle changes in elevation above the average water level. Combine these techniques to create a wide array of diverse soil conditions and exposures for plants and animals to inhabit and "naturalize". Specific design criteria for Stormwater Ponds are listed in Article 4 of *Volume 2 of the Georgia Stormwater Management Manual*. However, to implement the practices discussed in this guidance document, the following criteria are being modified to match the standards in this document.

Design detention ponds with positive slopes (2% minimum) near the outlet to avoid standing water and limit mosquito habitat. Manicured turf areas that require regular mowing should also be sloped to drain appropriately. However, flatter areas are encouraged to increase infiltration, but must be landscaped appropriately with wetland plants, flowering plants and shrubs that do not require regular mowing and will tolerate wet and dry conditions. See **Table 1** for specific criteria for detention pond side slopes.

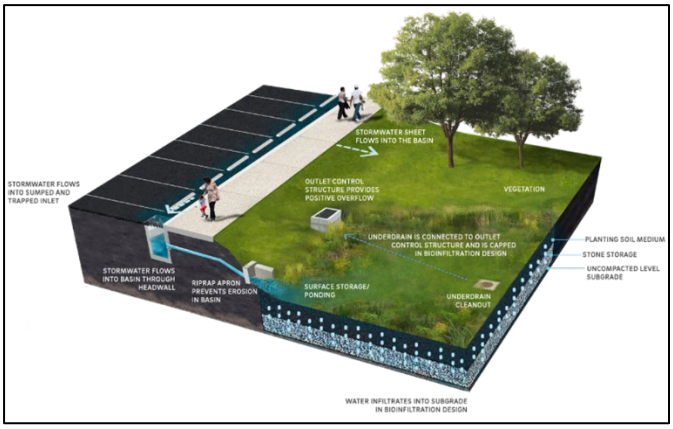
TABLE 1 STORMWATER MANAGEMENT POND SLOPES/WALLS

Zoning District	Zoning District Defined	Stormwater Management Pond Side Slopes
R-44	Single Family Rural Residential District	4:1 or flatter
RS-22	Single Family Suburban Residential	4:1 or flatter
CSO	Open Space Subdivision Overlay	4:1 or flatter
RM-4	Multifamily Residential Apartments	4:1 or flatter
RM-6	Multifamily Medium Density Apartments	4:1 or flatter
MHP	Manufactured Home Park	4:1 or flatter
PUV	Planned Urban Village	4:1 or flatter
O&I	Office/Institutional District	See Note 1
CH	Commercial Highway	See Note 1
CN	Commercial Neighborhoods	See Note 1
LI	Light Industrial	4:1 or flatter
HI	Heavy Industrial	4:1 or flatter
CBD	Commercial Central Business District	See Note 1
Note 1	Side slopes of 3:1 or underground detention facilities are permitted for office and commercial tracts under 1 acre in size; underground detention and GI/LID practices are encouraged to reduce the need for a pond when possible.	

Bioretention, Bioswales and Infiltration Practices

These practices are very useful for small sites (under 5 acres) and may provide all the stormwater management treatment needed. The benefit to these practices is that they can be designed to be aesthetically pleasing and wrapped around a building site to be less visually obtrusive. These practices are also beneficial to pretreating stormwater to reduce sediment load before entering a pond or other control for larger areas.

Bioretention areas are shallow stormwater basins or landscaped area that utilizes engineered soil or native, well drained soils and vegetation to capture and treat runoff. Bioswales also meet the criteria for Green Infrastructure/Low Impact Development and may be counted in the City's GI/LID program for MS4 reporting.

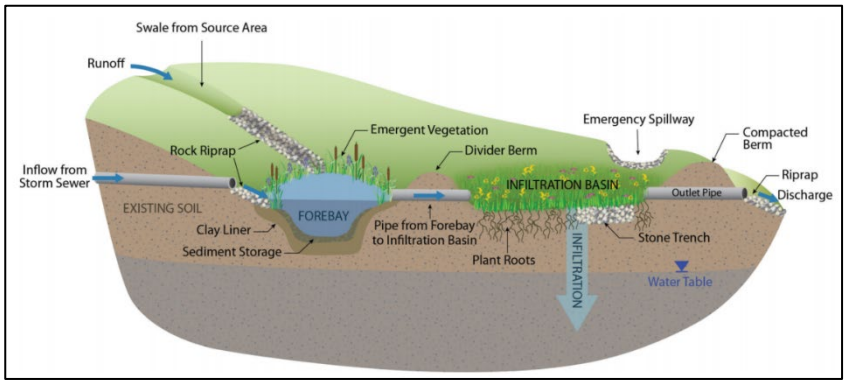


1. The maximum contributing drainage area is 5 acres for a bioretention area
2. The treatment area consists of ponding area, organic/mulch layer, plating media and vegetation.
3. Pretreatment is required to prevent clogging of underdrains or native soil
4. A landscaping plan will be required for the bioretention areas prepared in accordance with these regulations and using Georgia native plans whenever possible.
5. Ponding depth should be a maximum depth of 12 inches, with a preferable depth of 9 inches.
6. Landscaping in the area may also be counted towards tree protection requirements and/or landscaping requirements.

Bioswales are vegetated open channels that are explicitly designed and constructed to capture and treat runoff within dry or wet cells formed by check dames of other means. Adaptable to many linear situations, and often a small BMP used to treat runoff close to the source. Bioswales may also be used in conjunction with other stormwater controls to pretreat runoff.

1. Longitudinal slopes must be less than 4%
2. Bottom width of 2 to 8 feet
3. Side slopes 3:1 or flatter; 4:1 recommended
4. Convey the 25-year storm event with a minimum of 6 inches of freeboard.
5. A landscaping plan will be required for the bioretention areas prepared in accordance with these regulations and using Georgia native plans whenever possible.
6. Landscaping in the area may also be counted towards tree protection requirements and/or landscaping requirements.

Infiltration Practices, which may also be classified as a runoff reducing low impact development practices, are shallow excavations, typically filled with stone or an engineered soil mix, that are designed to intercept and temporarily store post-construction stormwater runoff until it infiltrates into the underlying and surrounding soils. If properly designed, they can provide significant reductions in post-construction stormwater runoff rates, volumes and pollutant loads. Infiltration practices also meet the criteria for Green Infrastructure/Low Impact Development and may be counted in the City's GI/LID program for MS4 reporting. Infiltration basins are good for sites with porous soils and can be integrated into landscaping plans. General guidelines for infiltration practices are:



1. Pretreatment should be provided upstream of all infiltration practices
2. Infiltration practices should be designed to completely drain within 72 hours of the end of a rainfall event
3. Underlying native soils should have an infiltration rate of 0.5 in/hr or more
4. The distance from the bottom of an infiltration practice to the top of the water table should be 2 feet or more
5. Facilities include an excavated trench (2-10 foot depth) filled with stone media (1.5-2.5 inch diameter), as well as pea gravel and sand filter layers
6. A pretreatment device is recommended upstream from the practice
7. Observation wells are used to monitor percolation and performance of the practice
8. Infiltration practices must not be placed under pavement or concrete

Specific design criteria for these practices are listed in Article 4 of *Volume 2 of the Georgia Stormwater Management Manual*. **Table 3** lists the zoning districts in the City of Loganville and the applicability of these practices for stormwater management and retrofitting (i.e., when the stormwater management system of an older development must be improved to meet the City's stormwater treatment guidelines.)

TABLE 3 BIOSWALES/BIORETENTION/INFILTRATION

Zoning District	Zoning District Defined	Primary Stormwater Treatment	Retrofitting
R-44	Single Family Rural Residential District	NO	Encouraged
RS-22	Single Family Suburban Residential	NO	Encouraged
CSO	Open Space Subdivision Overlay	NO	Encouraged
RM-4	Multifamily Residential Apartments	Encouraged on sites under 5 acres	Encouraged
RM-6	Multifamily Medium Density Apartments	Encouraged on sites under 5 acres	Encouraged
MHP	Manufactured Home Park	Encouraged on sites under 5 acres	Encouraged

PUV	Planned Urban Village	See Note 1	See Note 1
O&I	Office/Institutional District	Encouraged on sites under 5 acres	Encouraged
CH	Commercial Highway	Encouraged on sites under 5 acres	Encouraged
CN	Commercial Neighborhoods	Encouraged on sites under 5 acres	Encouraged
LI	Light Industrial	Encouraged on sites under 5 acres	Encouraged
HI	Heavy Industrial	Runoff may need to be treated to remove some pollutants before using one of these treatments	Runoff may need to be treated to remove some pollutants before using one of these treatments
CBD	Commercial Central Business District	Encouraged to be used with underground detention	Encouraged
Note 1	Planned Urban Village stormwater designs are integrated into the Detailed Master Plan; Open space and amenities shown on the Detailed Master Plan should provide many opportunities for bioswales, bioretention and infiltration		

PLANTING AND MAINTENANCE

PLANTING DESIGN

There is no universal approach to landscape design for stormwater management areas. Planting design must respond to site- specific stormwater functions, soil types and hydrology, slopes, solar aspect, availability and type of irrigation, habitat creation, planned uses and planned maintenance. A Landscape Architect, arborist or design professional can assist with a comprehensive plan for the landscape design for your project's open space and detention areas. The following guidelines outline important criteria for the development of landscape plans for these areas.

Before finalizing planting plans and seed mixes, obtain **horticultural testing** of the on-site soils where planting will occur. Often planting plans must be completed before construction activities take place, so final soil conditions for areas to be planted are not available at the time of design. If mass grading is planned to occur after the planting plans are complete, require the contractor to incorporate 6" of topsoil from on-site or imported source into final grading operations, and indicate that the final seed mixes will be modified after final grading is complete and subsequent horticultural tests are evaluated.

NOTE – When developing a planting plan for a stormwater management pond or practice, be sure to check the Loganville Tree Protection Ordinance to see if the trees to be used in the pond/practice landscaping may be used to satisfy the tree protection/replacement requirements.

Use native and adapted plants. Proper landscape design with native plants based on a site's unique conditions can:

- Reduce or eliminate need for supplemental irrigation
- Reduce fertilizer and chemical pest control needs
- Enhance wildlife habitat
- Reduce maintenance needs

Rough-leaf dogwood

PLANT SPECIES SELECTION

Delineate **planting zones** with similar characteristics and proposed function. Characteristics should include slope, aspect, soil type, and moisture levels. Functions may include wildlife habitat, recreational use, or visual amenity or visual screening. **Table 4** lists native Georgia plants appropriate for planting in and around stormwater management ponds.

Plants should be screened for invasiveness by using checking with the Georgia Department of Natural Resources: https://georgiawildlife.com/invasive-species; and by using the Nature Conservancy's Nature Serve Explorer website: http://www.natureserve.org/explorer/servlet/NatureServe?init=Species

TABLE 4: RECOMMENDED PLANT LIST

TREES AND SHRUBS

(From Appendix D, Section 5, Georgia Stormwater Management Manual)

Georgia Native Plant List

TREES

Scientific Name	Common Name	Habit			H ZONE*	Hardiness
Acer negundo	Boxelder	Tree	Deciduous	Native	3,4,5	USDA Zone 2-10
Acer rubrum	Red Maple	Tree	Deciduous	Native	3,4,5	USDA Zone 3-9
Asimina triloba	Common Pawpaw	Tree	Deciduous	Native	3,4,5	USDA Zone 5-9
Betula nigra	River Birch	Tree	Deciduous	Native	2,3,4,5	USDA Zone 4-9
C Carya aquatica	Water Hickory	Tree	Deciduous	Native	3,4	USDA Zone 4-8
Carpinus caroliniana	American Hornbeam	Tree	Deciduous	Native	4,5	USDA Zone 3-9
Carya cordiformus	Bitternut Hickory	Tree	Deciduous	Native	3,4,5	USDA Zone 4-9
Carya illinoensis	Pecan	Tree	Deciduous	Native	3,4,5	USDA Zone 5b-9a
Carya laciniosa	Shellbark Hickory	Tree	Deciduous	Native	2,3,4,5	USDA Zone 5-8
Celtis laevigata	Sugarberry	Tree	Deciduous	Native	3,4,5	USDA Zone 6-9
Chemaecyparis thyoides	Atlantic White Cedar	Tree	Evergreen	Native	2,3,4,5	USDA Zone 4-8
Cornus drummondii	Rough-Leaf Dogwood	Tree	Deciduous	Native	3,4,5	USDA Zone 5-8
Crataegus spp.	Hawthornes	Tree	Deciduous	Native	4,5	USDA Zone 5-8
Diospyros virginiana	Common Persimmon	Tree	Deciduous	Native	4,5	USDA Zone 4-9
Fraxinus caroliniana	Carolina Ash	Tree	Deciduous	Native	3,4,5	USDA Zone 4-8
Fraxinus pennsylvanica	Green Ash	Tree	Deciduous	Native	3,4,5	USDA Zone 3-9a
Fraxinus profonda	Pumpkin Ash	Tree	Deciduous	Native	3,4,5	USDA Zone 5-9
Gordonia laisianthus	Loblolly Bay	Tree	Evergreen	Native	3,4	USDA Zone 6-9
Juniperus silicicola	Southern Red Cedar	Tree	Evergreen	Native	3,4,5	USDA Zone 8a-10b
Juniperus virginiana	Eastern Red Cedar	Tree	Evergreen	Native	3,4,5	USDA Zone 2-9
Liquidamber styraciflua	Sweetgum	Tree	Deciduous	Native	3,4,5	USDA Zone 5b-10a
Liriodendron tulipifera	Yellow Poplar	Tree	Deciduous	Native	3,4,5	USDA Zone 4-9
Magnolia virginiana	Sweetbay	Tree	Semi-Evergreen	Native	3,4,5	USDA Zone 5-10
Morus rubra	Red Mulberry	Tree	Deciduous	Native	4,5	USDA Zone 4-8
Myrica cerifera	Southern Bayberry	Tree	Evergreen	Native	3,4,5	USDA Zone 7-10
Nyssa aquatica	Water Tupelo	Tree	Deciduous	Native	3,4,5	USDA Zone 6-9
Nyssa ogeche	Ogeechee Tupelo	Tree	Deciduous	Native	3,4,5	USDA Zone 7a-9b
Nyssa sylvatica	Black Gum/ Swamp Tupelo	Tree	Deciduous	Native	3,4,5	USDA Zone 4b-9
Pinus elliottii	Slash Pine	Tree	Evergreen	Native	4,5	USDA Zone 7-11
Pinus glabra	Spruce Pine	Tree	Evergreen	Native	4,5	USDA Zone 8,9
Pinus serotina	Pond Pine	Tree	Evergreen	Native	4,5	USDA Zone 7-9
Pinus taeda	Loblolly Pine	Tree	Evergreen	Native	5	USDA Zone 6b-9
Platanus occidentalis	American Sycamore	Tree	Deciduous	Native	3,4,5	USDA Zone 4-9

**Hydrologic Zone for Stormwater Pond or Wetland*

Georgia Native Plant List (continued)

	Scientific Name	Common Name	Habit			H ZONE*	Hardiness
TREES	*Populus deltoides*	Eastern Cottonwood	Tree	Deciduous	Native	4,5	USDA Zone 3-9
	Populus heterophylla	Swamp Cottonwood	Tree	Deciduous	Native	3,4,5	USDA Zone 7-8
	Ptelea trifoliata	Wafer Ash	Tree	Deciduous	Native	5	USDA Zone 4-9
	Quercus bicolor	Swamp White Oak	Tree	Deciduous	Native	3,4,5	USDA Zone 3-8
	Quercus laurifolia	Laurel Oak	Tree	Deciduous	Native	4,5	USDA Zone 7-9
	Quercus lyrata	Overcup Oak	Tree	Deciduous	Native	3,4,5	USDA Zone 5-9
	Quercus michiauxii	Swamp Chestnut Oak	Tree	Deciduous	Native	4,5	USDA Zone 6-8
	Quercus nigra	Water Oak	Tree	Deciduous	Native	4,5	USDA Zone 5-9
	Quercus pagoda	Cherrybark Oak	Tree	Deciduous	Native	4,5	USDA Zone 4-8
	Quercus palustris	Pin Oak	Tree	Deciduous	Native	4,5	USDA Zone 4-8
	Quercus phellos	Willow Oak	Tree	Deciduous	Native	3,4,5	USDA Zone 5-9
	Quercus shumardii	Shumard Oak	Tree	Deciduous	Native	4,5	USDA Zone 5-9
	Salix caroliniana	Coastal Plain Willow	Tree	Deciduous	Native	3,4,5	USDA Zone 7-8
	Salix nigra	Black Willow	Tree	Deciduous	Native	3,4,5	USDA Zone 2-8
	Taxodium distichum var. distichum	Baldcypress	Tree	Deciduous	Native	2,3,4	USDA Zone 4-9
	Taxodium distichum var. nutans	Pondcypress	Tree	Deciduous	Native	2,3,4	USDA Zone 4-9
	Ulmus americana	American Elm	Tree	Deciduous	Native	3,4,5	USDA Zone 2-9
	Ulmus rubra	Slippery Elm	Tree	Deciduous	Native	3,4,5	USDA Zone 3-9
SHRUBS	*Aesculus pariviflora*	Bottlebrush Buckeye	Shrub	Deciduous	Native	3,4,5	USDA Zone 4-8
	Aesculus pavia	Red Buckeye	Shrub	Deciduous	Native	3,4,5	USDA Zone 4-8
	Alnus serrulata	Hazel Alder	Shrub	Deciduous	Native	3,4,5	USDA Zone 5-8
	Aronia arbutifolia	Red Chokeberry	Shrub	Deciduous	Native	3,4,5	USDA Zone 4-9
	Cephalanthus occidentalis	Common Buttonbush	Shrub	Deciduous	Native	2,3,4	USDA Zone 5-9
	Euonymus atropurpuresu	Eastern Burning Bush	Shrub	Deciduous	Native	4,5	USDA Zone 3-7
	Fothergilla gardenii	Fothergilla	Shrub	Deciduous	Native	4,5	USDA Zone 5-8
	Hamemelis virginiana	Witch Hazel	Shrub	Deciduous	Native	3,4,5	USDA Zone 3-8
	Hypericum densiflorum	Common St. Johns Wort	Shrub	Deciduous	Native	4,5	USDA Zone 5-9
	Ilex glabra	Inkberry	Shrub	Evergreen	Native	3,4,5	USDA Zone 4-9
	Ilex verticillata	Winterberry	Shrub	Deciduous	Native	2,3,4	USDA Zone 3-9
	Illex decidua	Decidious Holly	Shrub	Deciduous	Native	3,4,5	USDA Zone 5-9
	Juniperus horizontalis	Creeping Juniper	Shrub	Evergreen	Native	5	USDA Zone 3-9
	Lindera benzoin	Spicebush	Shrub	Deciduous	Native	3,4,5	USDA Zone 4-9

**Hydrologic Zone for Stormwater Pond or Wetland*

GRASSES

(From Appendix D, Section 5, Georgia Stormwater Management Manual)

Georgia Native Plant List (continued)

GRASSES/HERBACEOUS

Scientific Name	Common Name	Habit			H ZONE*	Hardiness
Andropogon glomeratus	Bushy Broom Grass	Grass	Perennial	Native	3	USDA Zone 5-9
Andropogon virginicus	Broom Grass	Grass	Perennial	Native	4	USDA Zone 5-8
Chasmanthium latifolium	Upland Sea-Oats	Grass	Perennial	Native	3	USDA Zone 3-8
Leersia oryzoides	Rice Cut Grass	Grass	Perennial	Native	2	USDA Zone 3a-9b
Panicum virgatum	Switchgrass	Grass	Perennial	Native	2	USDA Zone 5-9
Sorghastrum nutans	Yellow Indian Grass	Grass	Perennial	Native	4	USDA Zone 5-9
Osmunda cinnamomea	Cinnamon Fern	Fern	Perennial	Native	3	USDA Zone 2-10
Osmunda regalis	Royal Fern	Fern	Perennial	Native	3	USDA Zone 3-9
Woodwardia virginica	Virginia Chain Fern	Fern	Perennial	Native	2	USDA Zone 3-10
Carex spp.	Carex Sedges	Sedge		Use only Native	2	Varies
Cyperus odoratus	Flat Sedge	Sedge		Native	2	USDA Zone 7-11
Juncus effusus	Soft Rush	Sedge		Native	2	USDA Zone 4-9
Scirpus californicus	Giant Bulrush	Sedge		Native	2	USDA Zone 6-9
Scirpus cyperinus	Woolgrass	Sedge		Native		USDA Zone 4-8
Scirpus validus	Softstem Bulrush	Sedge		Native	2	USDA Zone 3-9
Canna flaccida	Golden Canna	Perennial	Perennial	Native	2	USDA Zone 8-11
Coreopsis leavenworthii	Tickseed	Perennial	Perennial	Native	2	USDA Zone 8-11
Coreopsis tinctoria	Dwarf Tickseed	Perennial	Perennial	Native	3	USDA Zone 3-11
Crinum americanum	Swamp Lily	Perennial	Perennial	Native	2	USDA Zone 7-11
Eleocharis cellulosa	Coastal Spikerush	Perennial	Perennial	Native	2	USDA Zone 8-11
Eleocharis interstincta	Jonited Spikerush	Perennial	Perennial	Native	2	USDA Zone 8-10
Eupatorium fistolosum	Joe Pye Weed	Perennial	Perennial	Native	4	USDA Zone 4-8
Eupatorium perpurea	Joe Pye Weed	Perennial	Perennial	Native		USDA Zone 4-9
Helianthus angustifolius	Swamp Sunflower	Perennial	Perennial	Native	2	USDA Zone 6-9
Hibiscus coccinieus	Swamp Hibiscus	Perennial	Perennial	Native	2	USDA Zone 6-9
Iris louisiana	Louisiana Iris	Perennial	Perennial	Native	2	USDA Zone 5-9
Iris virginica	Southern Blue-Flag	Perennial	Perennial	Native	2	USDA Zone 5-9
Liatris spicata	Spiked Gayfeather	Perennial	Perennial	Native	3	USDA Zone 3-8
Lobelia cardinalis	Cardinal Flower	Perennial	Perennial	Native	3	USDA Zone 3-9
Peltandra virginica	Green Arum	Perennial	Perennial	Native	2	USDA Zone 5-9
Polygonum hydropiperoides	Smartweed	Perennial	Perennial	Native	2	USDA Zone 3-10
Pontederia cordata	Pickerelweed	Perennial	Perennial	Native	2	USDA Zone 3-10

**Hydrologic Zone for Stormwater Pond or Wetland*

Georgia Native Plant List (continued)

GRASSES/HERBACEOUS

Scientific Name	Common Name	Habit			H ZONE*	Hardiness
Pontederia lanceolata	Pickerelweed	Perennial	Perennial	Native	2	USDA Zone 3-10
Rudbeckia hirta	Black-eyed Susan	Perennial	Perennial	Native	4	USDA Zone 3-9
Rudbeckia laciniata	Greenhead Coneflower	Perennial	Perennial	Native	4	USDA Zone 3-9
Sagittaria lancifolia	Lance-leaf Arrowhead	Perennial	Perennial	Native	2	USDA Zone 5-10
Sagittaria latifolia	Duck Potato	Perennial	Perennial	Native	2	USDA Zone 5-10
Saururus cernuus	Lizard's Tail	Perennial	Perennial	Native	2	USDA Zone 3-9
Scirpus americanus	Three-square	Perennial	Perennial	Native	2	USDA Zone 3-9
Thalia geniculata	Alligator Flag	Perennial	Perennial	Native	2	USDA Zone 7-9
Typha latifolia	Broadleaf Cattail	Perennial	Perennial	Native	2	USDA Zone 3-10
Vernonia gigantea	Ironweed	Perennial	Perennial	Native	4	USDA Zone 5-8
Nuphar luteum	Water Lily	Water Lily	Perennial	Native	1	USDA Zone 4-10
Nymphaea mexicana	Yellow Water Lily	Water Lily	Perennial	Native	1	USDA Zone 3-11
Nymphaea odorata	Fragrant Water Lily	Water Lily	Perennial	Native	1	USDA Zone 3-11

**Hydrologic Zone for Stormwater Pond or Wetland*

PLANTING TECHNIQUES

(adapted from Appendix D, Section 7 of the Georgia Stormwater Management Manual)

Establishment

Slope stabilization methods (such as planted erosion control mats or fiber rolls) should be utilized for slopes susceptible to washout. Erosion control mats and fabrics should also be utilized to protect channels that are susceptible to washing out. Flows should be diverted temporarily from seeded areas until they are stabilized. Aquatic and safety benches should be stabilized with emergent wet- land plants and wet seed mixes

Irrigation

Planting design should minimize the need for a permanent irrigation system, however, irrigation is an important aspect of any landscape establishment. New plantings need two to three years of irrigation to become established but this varies by location and seasonal conditions. Temporary irrigation systems, hand watering or alternative methods of irrigation for landscape establishment should be specified. After that period, native plants will need little to no supplemental irrigation. Where permanent irrigation systems are utilized, they should include a weather-based controller to avoid watering during wet weather. Because bio-retention soils are formulated to infiltrate, irrigation application rates must be properly designed to avoid overwatering and prevent potential discharges via underdrains.

Wet pond in a commercial development acting as a first point of treatment. Note the inclusion of several species of trees and shrubs.

Staking

Provide extra support to trees, especially in high wind areas. They should be securely staked during establishment and inspected once or twice a year and following storm events. Stakes should be removed as soon as they are no longer needed to stabilize the tree (between one and two years).

Weeding

Weeds compete with plants for nutrients, water and sunlight. They should be regularly removed, with their roots, by hand pulling or with manual pincer-type weeding tools. Care should be given to avoid unnecessary compaction of soils while weeding. **Regular mowing** helps prevent weed seeds from being produced. Careful spot spraying is also acceptable, but many herbicides affect seedling grasses and non-target plants. Always read and follow label directions. After the initial establishment period, if chemical weed controls are needed in the pond bottoms of wet detention areas, herbicides should be selected that have an aquatic label. Even herbicides approved for aquatic use should only be used during periods of dry weather and dryer conditions to reduce the amount of herbicide that gets into the water itself. Side slopes generally above the high water line can be sprayed with non-aquatic but non-persistent herbicides as per the manufacturer's recommendations.

Leaf litter and trimmings present during maintenance should be removed from BMP rather than left to decompose because nitrogen levels can be affected and can change the function of the BMP.

Mulching

Compost Mulch (1" - 2") should be applied to specified areas to retain moisture, prevent erosion and suppress weed growth. Reapply annually as the mulch breaks down. Use a compost mulch and avoid bark mulches that can float during storm events.

Fertilization

The design for plantings shall minimize the need for herbicides, fertilizers, pesticides, or soil amendments at any time before, during, and after construction and on a long-term basis. Instead, a compost top dressing or application of compost tea can be used to introduce nutrients and beneficial microorganisms to the soil. Apply compost mulch once per year in spring or fall or spray apply compost tea once per year between March and June.

Plant Replacement

At the end of the first year and again at the end of the two-year warranty period, all plants that do not survive must be replaced to avoid spreading disease, establishment of weeds in bare areas and reduced LID function. Before replacing with the same species, determine if another species may be better suited to the conditions.

MODIFICATION/APPEAL PROCEDURES

These standards and guidelines illustrate and regulate the implementation of the concepts and objectives of the overall goal of improved aesthetics of the City. Their purpose is to convey these fundamental concepts, but also to foster design innovation and collaboration between city staff, developers, and design professionals. Proposed designs that illustrate the spirit and accomplish the goals, but do not conform to these standards must be submitted to the Planning and Development Department on the applicable forms.

NOTE – An Appeal of these Standards may be required in the treatment method is not approved in a zoning district based on these Standards (i.e., site conditions make designing 4:1 side slopes for a proposed pond in a qualifying residential zoning district infeasible.)

*NOTE - A Modification of these Standards may be requested when the*re *is a technical issue to meeting these Standards (i.e., soil types, pretreatment requirements or other engineering criteria may make the standard difficult to achieve on a particular site.)*

Requests to modify or appeal requirements of these standards will be processed in the same manner as modifications or appeals to other City development criteria, found in *Article 13* of the *Development Regulations*.

The request (s) shall include:

- **Identifying Issue**: Identification of the standard to be waived or varied and why the standard is infeasible.
- **Alternate Design**: Identification of the proposed alternative design or construction criteria.
- **Comparison to Standards**: A thorough description of the variance request and how the new design compares to the standard.
- **Justification**: Indication of how the proposed plan (as varied) advances the purpose of the standard sought to be varied equally well or better than would compliance with such standard.
- **Review Fee**: The owner will be required to pay a Modification Fee to cover administrative costs and engineering review of the request. The fee shall be established by City Council and may be amended from time to time.

Based upon review of the plans and additional information submitted, the City may approve or deny the appeal or modification request. If the City approves the modification/appeal request, the plans will continue to be reviewed and approved within the typical review process. If the City denies the request, the applicant shall subsequently submit revised plans in compliance with these Standards. The City shall provide a written response outlining the basis for all approvals or denials of requests.

NOTE – Any modification requests to steepen side slopes to 2H:1V or for vertical walls, if approved, will include a requirement for additional landscaping and plantings to screen the stormwater management facility from public view above and beyond what is required in these guidelines or in the Loganville Zoning Ordinance and/or Development Regulations.

APPENDICES

GLOSSARY OF TERMS & CONCEPTS

Base Flow – The portion of stream flow that is not runoff and results from seepage of water from the ground into a channel over time. The primary source of running water in a stream during dry weather.

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

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

Bio-filtration – The use of vegetation such as grasses and wetland plants to filter and treat stormwater runoff as it is conveyed through an open channel or swale, or collects in an infiltration basin (see Bio-retention).

Biological Diversity – The concept of multiple species or organisms living together in balance with their environment and each other.

Bio-retention – The use of vegetation in retention areas designed to allow infiltration of runoff into the ground. The plants provide additional pollutant removal and filtering functions.

Detention - The storage and slow release of stormwater following a precipitation event by means of an excavated pond, enclosed depression, or tank. Detention is used for both pollutant removal, stormwater storage, and peak flow reduction. Both wet and dry detention methods can be applied.

Evapotranspiration - The loss of water to the atmosphere through the combined processes of evaporation and transpiration, the process by which plants release water they have absorbed into the atmosphere.

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

Floodplain - Can be either a natural feature or statistically derived area adjacent to a stream or river where water from the stream or river overflows its banks at some frequency during extreme storm events.

Green Roof - A contained space over a building that is covered,
partially or entirely, with living plants.

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

Hydrologic Soil Groups - Soil groups based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

- *Group A*. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- *Group B*. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately

deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

- *Group C*. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- *Group D*. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.
- If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

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

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

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

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

Metered Detention and Discharge - A system where stormwater is collected in a cistern pond and then slowly released into the landscape beds or the storm drain in the following hours at
the rate that allows for better filtration and is less taxing to the overall community storm drain.

National Pollutant Discharge Elimination System (NPDES) - A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a special permit is issued by the EPA, a state, or (where delegated) a tribal government or and Indian reservation.

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

Peak discharge - The greatest volume of stream flow occurring during a storm event.

Pervious - Admitting of passage or entrance. Material that permits elements such as water and oxygen to enter and or pass through.

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

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

Retrofit - The creation or modification of a stormwater management practice, usually in a developed area, that improves or combines treatment with existing stormwater infrastructure.

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

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

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

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

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

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

Surface water - Water that flows across the land surface, in channels, or is contained in depressions on the land surface (e.g. Runoff, Ponds, Lakes, Rivers, and Streams).

Swale - A natural or human-made open depression or wide, shallow ditch that intermittently contains or conveys runoff. Swales can be equipped with an underdrain or other man-made drainage device and can be used as a BMP to detain and filter runoff.

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

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

Water table – The level underground below which the ground is wholly saturated with water.

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