

City of Columbia Stormwater Management Water Quality Stream Buffer Requirements

The City of Columbia Stormwater Management Division currently follows traditional standards set forth by the State and Federal NPDES Sediment and Erosion Control guidelines with the exception of that listed below and the City of Columbia Manual for Low Impact Stormwater Management. Please visit the SCDHEC website for more information on acceptable design aids and criteria for maximum Stormwater quantity and quality management.

Water quality buffers are required along all jurisdictional waters, and non-jurisdictional wetlands as identified by the US Army Corps of Engineers.

A water quality buffer is an area of original or re-established vegetation that borders streams, rivers, ponds, lakes, wetlands and seeps. Buffers are most effective when stormwater runoff is flowing into and through the buffer zone as shallow sheet flow, rather than concentrated flow such as channels, gullies, or wet weather conveyances. Therefore, it is critical that design of all development include management practices, to the maximum extent practical, that will result in stormwater runoff flowing into the buffer zone as shallow sheet flow.

Water quality buffers provide numerous environmental protection and resource management benefits including:

- ✓ Restoring and maintaining the chemical, physical, and biological integrity of the water resources
- ✓ Removing the pollutants delivered in urban Stormwater
- ✓ Reducing erosion and controlling sedimentation
- ✓ Stabilizing stream banks
- ✓ Providing infiltration of Stormwater runoff
- ✓ Maintaining base flow of streams
- ✓ Contributing the organic matter that is a source of food and energy for the aquatic ecosystem
- ✓ Providing tree canopy to shade streams and promote desirable aquatic organisms
- ✓ Providing riparian wildlife habitat
- ✓ Furnishing scenic value and recreational opportunity

Applications

1. This shall apply to all proposed development except for that development which meets exemptions in Section 21-40(b) of the City's Storm Water Quality and Quantity Control Ordinance.
2. Except as provided in Section 21-40(b) of the City's Storm Water Quality and Quantity Control Ordinance, this shall apply to all parcels of land, structures and activities which are causing or contributing to:
 1. Pollution, including non-point pollution, of the waters within the City limits,
 2. Erosion or sedimentation of stream channels, and
 3. Degradation of aquatic or riparian habitat

Exemptions

1. Any existing structure or structures under construction located within the buffer area provided the land owner can document existence or approval prior to ordinance implementation.
2. The addition or expansion to an existing structure provided it does not result in an increase in the total impervious area within the buffer area.
3. Activities associated with emergency operations, such as hazardous materials removal, flood or fire control, evacuations and storm damage clean up.
4. Single family parcels that are less than one acre and not part of a larger common plan for development or sale.

Buffers

Buffers shall be considered a "no disturb zone" along waters and wetlands identified by the USACE. Vegetation cannot be disturbed, removed or replanted unless a buffer restoration plans has been approved by the Storm Water Division

The buffer shall be at least fifty (50) feet from the boundaries of all features identified in this manual.

In areas where a floodway profile has been computed (AE Zone) as part of an approved flood study, the buffer area should be the maximum width listed above or the width of

the floodway, whichever is greater. If the width of the floodway is less than 50 feet from top of the bank, the distance to bring the buffer to at least 50 feet shall be added. In areas where a floodway study has not been computed (A Zones), the developer shall perform a flood study, determine the floodway and follow the buffer requirements outlined above. As an alternative to preparing the flood study, the buffer limits shall extend to the delineated flood plain limits.

Buffers widths may be reduced to twenty five (25) feet provided:

1. All stormwater runoff is captured and routed to a water quality control, and
2. There is no untreated sheet flow discharging into the buffer, and
3. This is implemented on small lot sizes with restricted area (1/4 acres or less).

Buffer Planting/Replanting

Buffer replanting plans must be submitted to the City for review. The following items must be included in the proposed plan:

1. Appropriate plant species and density,
2. Specific location and total square feet for each buffer zone;
3. Quantity, size, type of existing trees and ground cover;
4. Quantity, size, type and location of proposed vegetation for buffer restoration;
5. Long term maintenance and management plans,
6. Protection plans, and
7. Contingency plans to address vegetation die off.

Restored buffers must include planting new trees to a density of 12 healthy trees per 1000 square feet and these trees must have a minimum caliper of 1 ½ inches measured 6 inches above the rootball. Equivalent combinations of permanent trees, shrubs and ground covers, native and non-native, may be substituted. Invasive species shall be avoided. Shrubs shall be a minimum of 2' tall or 3 gallon size when planted. Temporary mulch and seeding may be used prior to final plantings.

In addition, the plan must provide for the continued protection of this buffer through conservation easement or other acceptable means.

A recommended list of trees, shrubs, perennials and grasses for use in buffer restorations is provided below:

SOUTHERN NATIVES FOR SC MIDLANDS

<i>Botanical Name</i>	<i>Common Name</i>
<u>SC NATIVE TREES</u>	
<i>Acer barbatum</i>	southern sugar maple
<i>Acer leucoderm</i>	chalk maple
<i>Acer rubrum</i>	red maple
<i>Aesculus pavia</i>	scarlet buckeye
<i>Alnus serrulata</i>	common alder
<i>Amelanchier canadensis</i>	serviceberry
<i>Aralia spinosa</i>	devil's walkingstick
<i>Asimina parviflora</i>	dwarf pawpaw
<i>Betula nigra</i>	river birch
<i>Carpinus caroliniana</i>	American hornbeam
<i>Carya glabra</i>	pignut hickory
<i>Carya ovata</i>	shagbark hickory
<i>Carya tomentosa</i>	mockernut hickory
<i>Cercis canadensis</i>	eastern redbud
<i>Chionanthus virginicus</i>	fringetree
<i>Cornus florida</i>	flowering dogwood
<i>Craetaegus marshallii</i>	parsley hawthorn
<i>Diospyros virginiana</i>	common persimmon
<i>Fagus grandifolia</i>	American beech
<i>Fraxinus americana</i>	white ash
<i>Gordonia lisianthus</i>	gordonia
<i>Halesia diptera</i>	two-winged silverbell
<i>Hamamelis virginiana</i>	witchhazel
<i>Ilex decidua</i>	possumhaw
<i>Ilex opaca</i>	American holly
<i>Ilex vomitoria</i>	yaupon holly
<i>Juglans nigra</i>	black walnut
<i>Juniperus virginiana</i>	eastern redcedar
<i>Liquidambar styraciflua</i>	sweetgum
<i>Liriodendron tulipifera</i>	tulip poplar
<i>Magnolia grandiflora</i>	southern magnolia
<i>Magnolia virginiana</i>	sweetbay
<i>Morus rubra</i>	red mulberry
<i>Myrica cerifera</i>	wax myrtle
<i>Nyssa aquatica</i>	water tupelo
<i>Nyssa biflora</i>	swamp tupelo

<i>Nyssa ogeche</i>	ogeeche lime
<i>Nyssa sylvatica</i>	black tupelo
<i>Ostrya virginiana</i>	hophornbeam
<i>Oxydendron arboreum</i>	sourwood
<i>Persea borbonia</i>	redbay
<i>Pinus echinata</i>	shortleaf pine
<i>Pinus ellioti</i>	slash pine
<i>Pinus glabra</i>	spruce pine
<i>Pinus palustris</i>	longleaf pine
<i>Pinus serotina</i>	pond pine
<i>Pinus taeda</i>	loblolly pine
<i>Pinus virginiana</i>	virginia pine
<i>Platanus occidentalis</i>	American sycamore
<i>Quercus alba</i>	white oak
<i>Quercus coccinea</i>	scarlet oak
<i>Quercus falcata</i>	southern red oak
<i>Quercus laevis</i>	turkey oak
<i>Quercus laurifolia</i>	laurel oak
<i>Quercus lyrata</i>	overcup oak
<i>Quercus marilandica</i>	black jack oak
<i>Quercus michauxii</i>	swamp chestnut oak
<i>Quercus nigra</i>	water oak
<i>Quercus nuttallii</i>	Nuttall oak
<i>Quercus phellos</i>	willow oak
<i>Quercus prinus</i>	chestnut oak
<i>Quercus rubra</i>	northern red oak
<i>Quercus shumardii</i>	shumard red oak
<i>Quercus stellata</i>	post oak
<i>Quercus velutina</i>	black oak
<i>Quercus virginiana</i>	live oak
<i>Robinia pseudoacacia</i>	black locust
<i>Sabal palmetto</i>	cabbage palmetto
<i>Salix nigra</i>	black willow
<i>Sassafras albidum</i>	sassafras
<i>Symplocos tinctoria</i>	sweetleaf
<i>Taxodium distichum</i>	baldcypress
<i>Tilia americana</i>	American linden
<i>Vaccinium arboreum</i>	sparkleberry
<i>Viburnum prunifolium</i>	blackhaw
<i>Viburnum rufidulum</i>	rusty blackhaw

SC NATIVE SHRUBS

<i>Agarista populifolia</i>	Florida leucothoe
<i>Ilex glabra</i>	inkberry
<i>Kalmia latifolia</i>	mountain laurel
<i>Aesculus parviflora</i>	bottlebrush buckeye
<i>Callicarpa americana</i>	American beautyberry
<i>Calycanthus floridus</i>	sweetshrub
<i>Clethra alnifolia</i>	clethra
<i>Euonymus americanus</i>	strawberrybush
<i>Fothergilla gardenii</i>	dwarf fothergilla
<i>Gaylussacia dumosa</i>	dwarf huckleberry
<i>Hydrangea quercifolia</i>	oakleaf hydrangea
<i>Lindera benzoin</i>	spicebush
<i>Rhododendron austrinum</i>	Florida azalea
<i>Rhododendron canescens</i>	piedmont azalea
<i>Rhododendron viscosum</i>	swamp azalea
<i>Rosa palustris</i>	swamp rose
<i>Rosa carolina</i>	Carolina rose
<i>Sabal minor</i>	dwarf palmetto
<i>Sterartia malachodendron</i>	Virginia stewartia
<i>Syrax americana</i>	storax
<i>Vaccinium myrsinites</i>	evergreen blueberry
<i>Viburnum dentatum</i>	arrowwood
<i>Viburnum nudum</i>	possumhaw viburnum
<i>Yucca flaccida</i>	beargrass

SC NATIVE PERENNIALS

<i>Amsonia ciliata</i>	Texas bluestar
<i>Amsonia ludoviciana</i>	sandhill bluestar
<i>Asclepias incarnata</i>	swamp milkweed
<i>Asclepias tuberosa</i>	butterflyweed
<i>Aster oblongifolius</i>	aromatic aster
<i>Baptisia alba</i>	white wild indigo
<i>Baptisia australis</i>	blue false indigo
<i>Boltonia asteroides</i>	boltonia
<i>Coreopsis auriculata</i>	eared coreopsis
<i>Coreopsis major</i>	major coreopsis
<i>Echinacea pallida</i>	pale coneflower
<i>Echinacea purpurea</i>	purple coneflower
<i>Eryngium yuccifolium</i>	eryngo
<i>Eupatorium coelestinum</i>	wild ageratum
<i>Eupatorium fistulosum</i>	Joepyeweed
<i>Hibiscus aculeatus</i>	pineland hisbiscus

<i>Hibiscus coccineus</i>	Texas star hibiscus
<i>Monarda fistulosa</i>	wild bergamot
<i>Oenothera tetragona</i>	sundrops
<i>Penstemon digitalis</i>	Mississippi penstemon
<i>Passiflora incarnata</i>	passionflower
<i>Phlox pilosa</i>	downy phlox
<i>Physotegia virginiana</i>	fall obedient plant
<i>Apityopsis graminifolia</i>	silkgrass
<i>Rudbeckia triloba</i>	brown-eyed Susan
<i>Solidago sp.</i>	goldenrod
<i>Stokesia laevis</i>	Stokes aster
<i>Thermopsis villosa</i>	Carolina bushpea

SC NATIVE GRASSES

<i>Andropogon ternarius</i>	splitbeard bluestem
<i>Andropogon virginicus</i>	broomsedge
<i>Aristida stricta</i>	wiregrass
<i>Muhlenbergia capillaris</i>	pink muhly
<i>Sorghastrum nutans</i>	Indiangrass

Buffer Management and Maintenance

The function of a buffer is to protect the physical and ecological integrity of the water, to reduce the flooding potential and to filter runoff from all development. The objective of a buffer is undisturbed native vegetation.

Management of buffer includes specific limitations on alteration of the natural conditions. The following practices and activities are restricted within the buffer:

1. Clearing or grubbing of existing vegetation,
2. Clear cutting of vegetation,
3. Soil disturbance by grading, stripping, or other practices,
4. Filling or dumping,
5. Use, storage, or application of pesticides, herbicides, and fertilizers,
6. Conversion of vegetation from native to exotic species, and
7. Motor vehicles are not permitted in stream buffers unless during the installation of certain utilities permitted in the buffer zone.

In order to maintain the functional value of a buffer, indigenous vegetation may be removed as follows:

1. Dead, diseased or dying trees that are in danger of falling and causing damage to dwellings or other structures may be removed with approval from the Storm Water Division,
2. Debris in the buffer area that is caused by storm damage, and
3. Invasive plant species may be removed and replaced by native species that are equally effective in retarding runoff, preventing erosion and filtering non-point source pollution from runoff.

Design Requirements

The buffer plan must be submitted in conjunction with the sediment and erosion control plan, SWPPP document, and all applicable calculations for the land disturbance permit. The Storm Water Division requires that the following steps be taken during the site plan development and site construction process to protect water quality buffers during construction:

1. Water quality buffers must be clearly identified on all stormwater management plans and construction drawings and marked with the statement "Water Quality Buffer. Do Not Disturb",
2. Water quality buffers cannot be encroached upon or disturbed during project construction, unless they are being established, restored, or enhanced as approved,
3. Water quality buffers must be clearly marked with a warning barrier before the pre-construction conference. The marking shall be maintained until completion of construction activities. All contractors and others working on the construction site must be made aware of the existence of the buffer(s) and the restrictions on disturbing the buffer(s),
4. All areas of the water quality buffer, including stream banks, must be left in the existing condition upon completion of construction activities. Should construction activities associated with development cause degradation to stream banks all eroding, bare, or unstable stream banks shall be restored to existing conditions,
5. If any trees are to be removed, show the tree location and provide a note stating that the tree must be hand cleared,
6. The locations of all signage must be clearly shown on the plans,
7. A narrative stating the extent of the buffer areas, including any allowed disturbance in the buffer areas (this should be in the narrative as well as in the SWPPP document) must be included in the plans,
8. Additional sediment and erosion control mechanisms will be required when land disturbing activities occur within 25 feet on the upstream/upland side of a buffer, and
9. The stream buffer shall be shown and labeled on the engineering plans, preliminary, bonded and final plat, and

10. Trails and walking paths may be allowed within the buffer area provided the following criteria are met;
- (a) No motorized vehicles are allowed on the path,
 - (b) The clearing for the path is the minimal necessary for construction of the path,
 - (c) If the path is to be constructed of impervious materials, then the width of the path must be compensated through additional buffer width. If the path is constructed of pervious materials, then no additional buffer width is required,
 - (d) The nearest edge of the path should be as far from the stream bank as feasible and in no case should it be closer than 20 feet to the top of the stream bank,
 - (e) Trees and shrubs removed during construction should be replaced.

Water Quality Buffer Width Adjustments

If the land use or activity involves the storage of hazardous substances or petroleum facilities, the buffer area width must be adjusted to include an additional 20 feet.

If the land use or activity involves solid waste landfills or junkyards, the buffer area width must be adjusted to include an additional 50 feet.

The Storm Water Division has the ability to reduce or increase the buffer width adjustments on a case-by-case basis, as appropriate to address identified water quality issues. Those cases that generally require an increase in width would be classification as a 303(d)-listed water or areas with extreme slopes. In cases of buffer width reduction, additional stormwater treatment measures may be required.

Water Quality Buffer Averaging

Buffer averaging can be utilized to adjust the required buffer width, allowing some flexibility for site development. Using buffer averaging, the width of the buffer can be varied with the criteria stated below, as long as a minimum average width of fifty (50) feet from the jurisdictional line are maintained.

The following criteria must be met in order to utilize buffer averaging on a development site:

1. Buffer averaging is required for water quality buffers that have stream crossings,
2. An overall average buffer width of fifty (50) feet must be achieved within the boundaries of the property to be developed,

3. The average width must be calculated based upon the entire length of the feature that is being buffered,
4. Buffer averaging shall be applied to each side of the feature independently. If the property being developed includes both sides of the feature, buffer averaging can be applied to both sides, but must be applied to each independently, and
5. That portion of buffers in excess of one hundred (100) feet will not be credited toward the buffer averaging formula within the boundaries of the property to be developed. The total width of the buffer shall not be less than twenty-five (25) feet, or the width of the floodway at any location, except at approved crossings. Those areas of the buffer having a minimum width of twenty-five (25) feet (or less at approved crossings) can comprise no more than fifty percent (50%) of the buffer length.

Areas Where Water Quality Buffer Averaging is Prohibited

Buffer width averaging is prohibited in developments that have, or will have after development, the land uses listed below within 100' of a jurisdictional water or wetland:

1. Developments or facilities that include on-site sewage disposal and treatment systems, raised septic systems, subsurface discharges from a wastewater treatment plant, or land application of bio-solids or animal waste,
2. Landfills (demolition landfills, permitted landfills, closed-in-place landfills),
3. Junkyards,
4. Commercial or industrial facilities that store and/or service motor vehicles,
5. Commercial greenhouses or landscape supply facilities,
6. Commercial or public pools,
7. Animal care facilities, kennels and commercial/business developments or facilities that provide short-term or long-term care of animals, and
8. Other land uses deemed by the Storm Water Division to have potential to generate higher than normal pollutant loadings.

Variances

Variances and appeals may be granted under the provisions set forth in Section 21-60 of Article IV. Storm Water Quantity and Quality Control of the City's Code.