

Knox County, Tennessee
SWQMP Program Implementation 2009

Post Construction Site Runoff Control

GOALS and OBJECTIVES of KNOX COUNTY'S POST CONSTRUCTION STIE RUNOFF CONTROL PROGRAM:

REQUIREMENTS:

As a NPDES Phase II MS4 community, Knox County has specific permit requirements relating to post construction site runoff control for stormwater management in new development and redevelopment. Knox County must:

- Develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Your program must ensure that controls are in place that would prevent or minimize water quality impacts.
 - ✓ Knox County has dedicated infrastructure inspectors that ensure the proper installation of all structural stormwater BMPs during the development of a site. The inspectors make sure that all BMPs are installed according to the Knox County approved design plan. Knox County plans reviewers review all plans to make sure that proposed BMPs will not interfere with water quality standards set by the State.
- Develop and implement strategies which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for your community
 - ✓ Knox County has implemented a stormwater ordinance that favors Low Impact Development techniques that are designed to improve water quality. The ordinance also established buffers for water bodies.
- Ensure adequate long-term operation and maintenance of BMPs.
 - ✓ Knox County will perform inspections and respond to complaints.
- Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law
 - ✓ Knox County has created regulations for this requirement in sections 9 and 10 of the stormwater ordinance. Excerpts are below:

9.3 After Construction

Once the site has been stabilized and construction has ceased, routine inspections for the stormwater management facilities and best management practices are required, based on the guidance provided in the Operations and Maintenance Plan and “Covenants for Permanent Maintenance of Stormwater Facilities and Best Management Practices” for the property, as set forth in section 10 of this ordinance. Routine inspections are the responsibility of the property owner, or the owner(s) of the stormwater management facility(s) and best management practice(s).

SECTION 10. MAINTENANCE REQUIREMENTS

10.1 General

- (a) The Director may order corrective actions to erosion prevention and sediment control measures, stormwater management facilities, and/or the stormwater system as are necessary to properly maintain the stormwater systems within Knox County for the purposes of flood prevention, channel protection, water quality treatment and/or public safety. If the property owner(s) fails to perform corrective actions ordered by the Director, the Director shall have the authority to order corrective action, to be performed by the County or others. In such cases where a performance bond exists, the County shall utilize the bond to perform the corrective actions. In such cases where a performance bond does not exist, the property owner shall reimburse Knox County for double its direct and related expenses. If the property owner fails to reimburse Knox County, Knox County is authorized to file a lien for
- (b) This ordinance does not authorize access to private property by the property owner or site operator. Arrangements concerning removal of sediment on adjoining property must be settled by the owner or operator with the adjoining landowner.

10.3 After Construction

- (a) The owner(s) of stormwater management facilities and/or best management practices shall at all times properly operate and maintain all facilities and systems of stormwater treatment and control (and related appurtenances), and all best management practices in such a manner as to maintain the full function of the facilities or best management practices which are installed or used by the property owner(s) to achieve compliance with this ordinance. Maintenance of privately-owned stormwater management facilities shall be performed at the sole cost and expense of the owner(s) of such facilities.
- (b) Prior to release of the performance bond, the property owner shall provide Knox County with an accurate As-Built Certification, a final Operations and Maintenance Plan, which shall include an executed legal document entitled “Covenants for Permanent Maintenance of Stormwater Facilities and Best Management Practices”. The property owner shall record the Operations and Maintenance Plan in the Office of the Knox County Register of Deeds. The location of the stormwater facility(s) and best management practices, the recorded location of the Covenants document, and inspection and maintenance guidance that outlines the property owner’s responsibility shall be shown on a plat that is also recorded in the Office of the Knox County Register of Deeds.

- (c) Developments and redevelopments that have received approval of a stormwater management plan after the effective date of this ordinance shall maintain stormwater management facilities and best management practices in accordance with the maintenance guidance provided in the Operations and Maintenance Plan and the Covenants for Permanent Maintenance of Stormwater Facilities and Best Management Practices.
- (d) The Operations and Maintenance Plan shall specify the minimum inspection and maintenance requirements to be performed at necessary intervals by the property owner(s). The Operations and Maintenance Plan shall be prepared in accordance with the requirements stated in the Knox County Stormwater Management Manual, as amended.
- (e) In order to provide access to stormwater and/or water quality facilities by personnel, vehicles and equipment, the property owner(s) shall provide an unobstructed, traversable twelve (12) foot wide access within a minimum twenty (20) foot wide easement from a public street, driveway, or Joint Permanent Easement in strict accord with the stormwater management plan and any conditions required by the Director.
- (f) The Covenants for Permanent Maintenance of Stormwater Facilities and Best Management Practices shall grant Knox County permission to enter the property to inspect any stormwater facility or best management practices for proper functioning, maintenance and protection from disturbances (if applicable).
- (g) The removal of sediment and/or other debris from stormwater management facilities and best management practices shall be performed in accordance with all Knox County, state, and federal laws. Requirements for sediment removal and disposal are presented in the Knox County Stormwater Management Manual, as amended. The Director may stipulate additional requirements if deemed necessary for public safety.



Regular inspection and maintenance of storm water best management practices is important to ensure that the practices are functioning properly and to remove trash and organic debris

Knox County must develop and implement a set of requirements to establish, protect and maintain water quality buffers in areas of new development and redevelopment.

- ✓ Knox County has created regulations for water quality buffers. Below is an excerpt concerning water quality buffers from Knox County's stormwater management ordinance. The ordinance is available On-line at www.knoxcounty.org/stormwater

SECTION 6. WATER QUALITY BUFFERS

6.1 General Requirements

- (a) Water quality buffers shall be established, protected and maintained along all community waters, as set forth herein and in the Knox County Stormwater Management Manual, as amended, in all new developments and redevelopments requiring a stormwater management plan and/or recording of a plat.
- (b) Developments that have received approval of a stormwater management plan, or developments for which a stormwater management plan was not required prior to the effective date of this ordinance shall be exempted from the requirements of this section.
- (c) Water quality buffer areas shall be included in the Operations and Maintenance Plan for the development, and therefore shall be covered by Covenants for Permanent Maintenance of Stormwater Facilities and Best Management Practices. These documents shall be prepared in accordance with section 10 of this ordinance and the Knox County Stormwater Management Manual, as amended.
- (d) All areas of the water quality buffer, including streambanks, shall be left in a stabilized condition upon completion of construction activities. No actively eroding, bare or unstable areas shall remain, unless approved by the Director.
- (e) The Director may require permanent boundary markers, in the form of signage approved or provided by the Director. Such markers shall be installed prior to recording of the final plat, and the issuance of a Certificate of Occupancy. The Director has the authority to require replacement of permanent boundary markers that have been removed or destroyed.
- (f) Water quality buffers shall be placed into a permanent water quality easement that is recorded with the deed. For water quality buffer areas that are not publicly owned, the easement shall be held by one of the following non-governmental entities, provided that the entity meets the minimum criteria stated in the Knox County Stormwater Management Manual, as amended:
 - (1) A viable third party such as a land trust, land management company, or utility;
 - (2) A viable homeowners association.
- (g) If neither of the entities identified in section 6.1(f) are able to provide perpetual protection of the water quality buffer, then the property owner shall assume responsibility for maintenance and protection of the buffer area.

6.2 Protection During Construction

- (a) Unless otherwise provided herein, all water quality buffer areas shall remain protected from land disturbance, vegetation removal, construction of impervious surfaces, and discharges of sediment and other construction-related wastes during development activities.
- (b) Water quality buffers shall be clearly identified on all construction drawings, and marked with the statement "Water Quality Buffer. Do not disturb."
- (c) Water quality buffers cannot be encroached upon or disturbed during project construction, unless they are being established, restored, or enhanced in accordance with an approved Buffer Enhancement Plan.

6.3 Design Criteria

Water quality buffers shall be applied to community waters as stated in this section.

6.3.1 Streams

Water quality buffers shall be applied in the following manner to streams that are identified as community waters:

- (a) A water quality buffer having a minimum width of fifty (50) feet shall be provided along each side of a stream, as measured perpendicular from the top-of-bank of the active channel. For those streams that do not have a defined top-of-bank, the buffer shall be measured perpendicular from the centerline of the stream.
 - (1) The inner zone of the water quality buffer shall have a minimum width of 25-feet, measured perpendicular from the top-of-bank of the active channel and extending landward. For those streams that do not have a defined top-of-bank, the buffer shall be measured perpendicular from the centerline of the stream.
 - (2) The inner zone shall remain undisturbed in accordance with the policies set forth in the Knox County Stormwater Management Manual, as amended.
 - (3) The vegetative target for the inner zone is mature, moderately dense forest (i.e., trees) with woody shrubs and understory vegetation. Where forest vegetation has the potential to impact traffic safety or limit access, areas immediately surrounding approved stream crossings and utility access areas that are located in the inner zone may be vegetated with dense grasses.
 - (4) The outer zone of the water quality buffer shall be measured from the edge of the inner zone and shall extend the perpendicular distance required to obtain a total minimum buffer width of 50-feet, when combined with the width in the inner zone.
 - (5) The minimum vegetative target for the outer zone is mowed, dense grasses that cover the entire zone.
 - (6) The outer zone can be disturbed and graded, but must be revegetated in accordance with the policies set forth in the Knox County Stormwater Management Manual, as amended.
- (b) The width of water quality buffers located on streams may be modified by averaging as set forth herein, and in accordance with policies stated in the Knox County Stormwater Management Manual, as amended, provided that the following conditions are met:
 - (1) The average width of the averaged buffer within the boundaries of the property to be developed must be at least fifty (50) feet; and,
 - (2) The width of the buffer shall not be less than twenty-five (25) feet at any location, except where stream crossings have been approved by the Director.
 - (3) Those areas of the buffer having a minimum width of twenty-five (25) feet (or less at approved stream crossings) can comprise no more than fifty (50) percent of the buffer length.
- (c) Buffer averaging is required for water quality buffers that have stream crossings.
- (d) Buffer width averaging is prohibited for any portion of developments that have (or will have) the land uses listed below.
 - be buffered
 - (2) Developments or facilities that include on-site sewage disposal and treatment system drainfields (i.e., septic systems), raised septic systems, subsurface discharges from a wastewater treatment plant, or land application of biosolids or animal waste;
 - (3) Landfills (demolition landfills, permitted landfills, close-in-place landfills);
 - (4) Junkyards;

- (5) Commercial or industrial facilities that store and/or service motor vehicles;
- (6) Commercial greenhouses or landscape supply facilities;
- (7) Developments or facilities that have commercial or public pools;
- (8) Agricultural facilities, farms, feedlots, and confined animal feed operations; and,
- (9) Animal care facilities, kennels, and commercial/business developments or facilities that provide short-term or long-term care of animals;
- (10) Other land uses deemed by the Director to have the potential to generate higher than normal pollutant loadings.

6.3.2 Ponds and Lakes

- (a) Water quality buffers shall be applied in the following manner to ponds and lakes that are identified as community waters:
 - (1) For ponds and lakes that are directly connected to other community waters, a minimum buffer of 25-feet shall be provided around the perimeter of ponds and lakes. The buffer shall be measured perpendicular from the topographic contour that defines the normal pool elevation.
 - (2) The minimum vegetative target for the pond or lake buffer is mowed, dense grasses that cover the entire zone.
 - (3) The pond or lake buffer can be disturbed and graded but must be revegetated in accordance with the policies set forth in the Knox County Stormwater Management Manual, as amended.
- (b) Water quality buffers shall not be required around the perimeter of hydraulically disconnected ponds, or ponds that are newly designed and constructed for the purposes of stormwater quality treatment.

6.3.3 Wetlands

- (a) Water quality buffers shall be applied in the following manner to wetlands that are identified as community waters:
 - (1) A minimum buffer width of 25-feet shall be provided around the perimeter of a wetland, as measured from the outermost edge of the wetland as determined by USACE, NRCS, TDEC, or other qualified professional.
 - (2) The vegetative target for the wetland buffer is undisturbed, mature, moderately dense forest (i.e., trees) with woody shrubs and understory vegetation.
 - (3) The wetland buffer shall remain undisturbed in accordance with the policies set forth in the Knox County Stormwater Management Manual, as amended.
- (b) Water quality buffers are not required for wetlands designed and constructed for the purposes of stormwater quality treatment.

6.3.4 Steep Slopes

Where slopes greater than 15%, or where Slope Protection Areas as identified by the Metropolitan Planning Commission, are located within 50 feet of the community water, one of the two following conditions shall apply:

- (1) the buffer width in the steep slope areas shall be adjusted to include an additional twenty-five (25) feet, giving a total buffer width of seventy-five (75) feet; or,
- (2) the buffer in steep slope areas shall have a minimum width of fifty (50) feet and shall consist of one-zone, comprised of undisturbed, forested vegetation, as described in section 6.3.1(a)(3).

6.4 Use of Buffer Areas

- (a) The following uses are permitted in the inner zone of stream buffers and the wetland buffer:
 - (1) Conservation uses, wildlife sanctuaries, nature preserves, forest preserves, fishing areas, and passive areas of parklands, provided that no impervious surfaces are created;
 - (2) Recreational trails and greenways that are either unpaved or paved with pervious materials;

- (3) Education/scientific research that does not require any of the prohibited activities identified in section 6.4(d);
- (4) Stream restoration projects, facilities and activities, with prior approval of the Director;
- (5) Infrastructure features such as roads, bridges, storm drainage, stormwater management facilities that are appropriate for use in a riparian zone (i.e., wetlands, buffers), and utilities, provided that they adhere to the following standards:
 - i. The width of the disturbance for the feature is the minimum required to allow for maintenance and access;
 - ii. The angle of the buffer crossing shall be perpendicular (with up to 15% deviation off perpendicular) to the stream in order to minimize clearing requirements; and,
 - iii. The number of buffer crossings is minimized, with no more than one crossing every one-thousand (1,000) linear feet. The Director has the authority to approve additional crossings if justified by traffic, safety, or access issues.
 - iv. Multiple driveway or private roadway crossings of a stream or a wetland within one development shall be prohibited, unless approved by the Director after the property owner has demonstrated that the development has been planned in such a manner that driveway and private roadway crossings have been minimized to the maximum extent possible.
- (b) Access areas for utilities (e.g., manholes) that are located in the buffer area are allowed in buffer areas. Access areas must be minimized to the maximum extent possible, and shall be located no less than every 300 feet unless warranted by valid safety, access or service issues.
- (c) The following uses are permitted in the outer zone of stream buffers and in buffers surrounding lakes and ponds:
 - (1) All activities that are allowable in the inner zone of stream buffers.
 - (2) Yards, trails, greenways, picnic areas, and passive recreation areas as long as they do not have impervious surfaces. Passive recreation areas are defined as recreational activities that do not require hardened, impervious surfaces to be constructed, such as soccer fields without parking and other facilities, walking trails that are either unpaved or paved with permeable materials; bird watching; or hiking. Passive recreation areas do not include golf courses, ball fields that require the construction of impervious surfaces or the maintenance of open soil areas (such as baseball infields), picnic shelters or parking.
- (d) The following activities are prohibited within water quality buffers without prior approval of such activities by the Director:
 - (1) Spraying, filling, dumping, and animal grazing;
 - (2) Use, storage, or application of pesticides, herbicides, fertilizers, or household or commercially-generated wastes;
 - (3) Concentrated animal lots or kennels;
 - (4) Use or storage of motorized vehicles, except for maintenance approved by the Director, or emergency use;
 - (5) Creation of impervious surfaces, except for those impervious surfaces that are included in approved stream crossings;
 - (6) Other uses as deemed by the Director to have the potential to generate higher than normal pollutant loadings.

6.5 Allowable Disturbances

- (a) The following disturbances are permitted in the inner zone of stream buffers and the wetland buffer:
 - (1) Limited disturbances to remove and/or plant trees or vegetation, as required to maintain the overall health of vegetation in the buffer area, performed in accordance with the requirements stated in the Knox County Stormwater Management Manual, as amended.
 - (2) Removal of individual trees that are in danger of falling, causing damage to dwellings or other structures, are dead or diseased, or have been heavily damaged by storms. The root wad or stump should be left in place, where feasible, to maintain soil stability.
 - (3) Disturbances necessary for the construction of utility access areas and approved stream crossings.
 - (4) Disturbances as required to establish and/or restore buffer areas in accordance with an approved Buffer Enhancement Plan.
- (b) The following disturbances are allowed in the outer zone of stream buffers and in buffers surrounding lakes and ponds:
 - (1) Clearing, grubbing, grading, and revegetation, performed in accordance with an approved stormwater management plan.
 - (2) Disturbances necessary for the construction of utility access areas and approved stream crossings.
 - (3) Ongoing vegetation maintenance activities such as mowing, bush-hogging, and weed-eating. No chemical applications are allowed in the outer zone.

6.6 Water Quality Buffer Enhancement

- (a) The property owner may restore or enhance vegetation within a water quality buffer with prior approval of a Buffer Enhancement Plan by the Director.
- (b) The Director shall have the authority to require a property owner to restore or enhance water quality buffers that have been disturbed or do not meet, or have the potential to meet through natural vegetative succession, the vegetative targets for buffer areas that are defined herein, and/or in the Knox County Stormwater Management Manual, as amended.
- (c) The required elements of a Buffer Enhancement Plan shall be provided in the Knox County Stormwater Management Manual, as amended.
- (d) One (1) year after completion of the restoration or enhancement activity, the portion of the drainage bond related to the buffer enhancement area can be released provided that the enhancement area has been restored or enhanced as required, that soils within the buffer area are stable and not eroding, and that buffer vegetation is healthy and growing as expected.



http://na.fs.fed.us/ra/stratplan/stratplan04_08/