

ARTICLE 19: STORMWATER

19.01: STORMWATER MANAGEMENT REQUIREMENTS

- A. Purpose and Intent. It is the purpose and intent of this article to protect, maintain, and enhance the water quality and public health, safety, and general welfare of the citizens of Knox County by establishing minimum requirements and procedures to control the adverse effects of increased post-development stormwater runoff, nonpoint source pollution, and illicit discharges associated with new development and redevelopment. The objectives of this article are:
1. To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges from any user.
 2. To prohibit illicit connections and discharges to the MS4.
 3. To establish legal authority to carry out all inspection, surveillance, monitoring, and enforcement procedures necessary to ensure compliance with this article.
 4. To control the rate of flow of stormwater runoff caused by site development to predevelopment rates, minimize impacts to downstream infrastructure, and to minimize pollutant runoff for the development during construction and after construction completion.
 5. To preserve and protect the county's unique karst geology, including its sinkholes and underground drainage systems, from the adverse impacts of development.
 6. To promote the use of Low Impact Development (LID) and green infrastructure practices that infiltrate, evapotranspire, or harvest and use stormwater on-site.
- B. Applicability. This article shall be applicable to all of the following, unless expressly exempted under subsection C:
1. Site developments with impervious area equal to or greater than 20,000 square feet
 2. Redevelopment resulting in 20,000 square feet additional impervious since 2008.
 3. Substantial redevelopment that creates special pollutant abatement requirements
 4. Site developments with less than 20,000 square feet of impervious surface area that require special pollutant abatement permit.
 5. The creation or addition of 20,000 square feet or greater of impervious surface area.
 6. Any land disturbance of 1 acre or greater.
 7. Any new development or redevelopment, regardless of size, located in a water quality buffer, floodplain, or sinkhole protection area.
 8. Any other land-disturbing activity that, based on a site-specific review by the Director of Engineering and Public Works or designee, is deemed to have a high risk of water quality degradation, illicit discharge, or downstream flooding or erosion.
- C. Exemptions.
1. The following are exempt from the provisions of this article, unless such activity is determined by the Director of Engineering and Public Works or designee to be a source of significant pollution, flooding, or erosion:
 - a. Routine property maintenance, such as home gardening, landscaping, and repairs, provided such activity does not alter the existing topography or drainage patterns.
 - b. Individual single-unit or duplex residential lots that are not part of a larger common plan of development, provided they do not drain to a sinkhole.

- c. Individual utility service connections, unless such activity is carried out in conjunction with the clearing, grading, excavating, transporting, or filling of a lot or lots for which a land disturbance permit would otherwise be required by the regulation;
 - d. Installation, maintenance or repair of individual septic tank lines or drainage fields, unless such activity is carried out in conjunction with the clearing, grading, excavating, transporting, or filling of a lot or lots for which a land disturbance permit would otherwise be required by the regulation;
 - e. Installation of posts or poles;
 - f. Bona fide agricultural activity, including farming, horticulture, and silviculture, provided such activity is consistent with a soil conservation plan approved by the Natural Resources Conservation Service (NRCS). This exemption does not apply to the construction of agricultural buildings or structures that require a building permit.
 - g. Emergency work to protect life or property from imminent danger. A stormwater plan shall be submitted retroactively within 30 days of the commencement of work.
 - 2. Responsibilities of exempt developments. The exemptions listed in subsection (1) shall not be construed as releasing the owner or operator of these developments from onsite drainage improvements that may be required in accordance with building and construction codes, nor from compliance with sections 26-176, 26-177 and 26-312—26-316, nor from providing adequate erosion prevention and sediment control measures to protect adjoining property owners and the public right-of-way.
- D. Stormwater Management Plan requirements.
- 1. General requirements.
 - a. The owner or operator of land development activities not exempted under section 26-171 must submit a Stormwater Management Plan as part of any application for a land disturbance permit or building permit.
 - b. No building permit shall be issued until the required Stormwater Management Plan is approved by the Department of Engineering and Public Works.
 - c. The Stormwater Management Plan shall include the specific required elements that are listed and/or described in the County Stormwater Management Manual, as amended. Additional information shall be provided as necessary to allow an adequate review of the site conditions.
 - d. Stormwater Management Plans, including Stormwater Pollution Prevention Plans (SWPPP) shall be prepared and stamped by an engineer, landscape architect, or architect competent in civil and site design and licensed to practice in the state with the following conditions:
 - i. Portions of the Stormwater Management Plan, including portions of the Stormwater Pollution Prevention Plan (SWPPP), that require hydraulic or hydrology calculations and design shall be prepared and stamped by a professional engineer competent in civil and site design and licensed to practice in the state.
 - ii. The SWPPP shall be prepared and stamped in accordance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities.
 - iii. All roads and joint permanent easements that are required to be designed and built to public road standards shall be prepared and stamped by a professional engineer competent in civil and site design and licensed to practice in the state.

- e. The Stormwater Management Plan shall be subject to any additional requirements set forth in the minimum UDO regulations.
 - f. When existing or documented flooding problems are present, the Director of Engineering and Public Works or designee has authority to condition the approval of a grading or building permit upon the compliance with additional requirements, including but not limited to detention, conveyance facilities, or other stormwater management solutions required to reduce the adverse impact of the proposed development on other properties or on the subject development.
2. Conformity to plans.
- a. The approved Stormwater Management Plan, upon which subsequent permits may be issued by the county, shall be adhered to during grading and construction activities.
 - b. The approved SWPPP shall be adhered to by all operators associated with the construction project, or portions thereof, during grading and construction activities.
 - c. Under no circumstance is an owner or operator for a construction project, or portions thereof, allowed to deviate from the project's approved Stormwater Management Plan or SWPPP without prior approval of a plan amendment by the Director of Engineering and Public Works or designee.
 - d. The Director of Engineering and Public Works or designee shall require that an approved Stormwater Management Plan be amended if it is determined that the approved plan is inadequate.
3. Additional requirements for land disturbance permits.
- a. The owner or operator of land development activities not exempted by section 26-171 must obtain a land disturbance permit prior to commencing land disturbing activities.
 - b. Land disturbing activities performed in accordance with the approved plan shall commence within one year from the issue date of the land disturbance permit, or the land disturbance permit will become null and void and the plan must be resubmitted for approval.
 - c. The land disturbance permit application shall contain a SWPPP, which shall be prepared in accordance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities. The SWPPP can be included with the overall Stormwater Management Plan or can be a stand-alone plan.
 - d. Where there are multiple owners or operators associated with the same construction project that is subject to the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities, all owners or operators shall secure coverage under the State of Tennessee permit. It is the responsibility of the land disturbance permittee(s) to ensure all owners or operators obtain coverage under the State of Tennessee permit and to provide proof of coverage upon the Director of Engineering and Public Works request.
 - e. The Director of Engineering and Public Works or designee may request additional information as deemed necessary to protect streams and adjacent properties from erosion and off-site sedimentation.
4. Pre-construction meeting.
- a. Attendance at a pre-construction meeting with the Department of Engineering and Public Works prior to issuance of a land disturbance permit is required for owners and operators of developments or redevelopments that are priority construction activities, as defined in this article.

- b. Owners and operators of land development activities not listed in subsection 26-172(d)(1) may be required to attend a pre-construction meeting when coordination with adjacent construction activities is needed or when conditions indicate a higher than normal risk for pollutant discharges.
- E. Building permit requirements for small lots.
 - 1. Applicability. Developments that are exempt from the requirements for a Stormwater Management Plan under Sec. 26-171(e) must submit a small lot erosion prevention and sediment control plan prior to obtaining a building permit.
 - 2. General Requirements.
 - a. The small lot erosion prevention and sediment control plans shall be prepared in accordance with the requirements stated in the County Stormwater Management Manual, as amended.
 - b. The Director of Engineering and Public Works or designee has the discretion to require a full Stormwater Management Plan for small lots as set forth in this division as they deem necessary to protect adjacent or downstream properties, the public stormwater drainage system, and streams.
 - c. All areas of construction, including, but not limited to, areas of bare soil, vehicle wash pads, construction materials and waste storage areas, and concrete truck washout areas, shall be managed to prevent soil erosion and the discharge of sediment and other construction related wastes from the lot.
 - 3. Performance bonds shall be required as described in Article 21.
- F. Stormwater system criteria.
 - 1. General Requirements.
 - a. The provisions set forth in this section are not applicable to developments that have an approved stormwater plan prior to the date of adoption of this article.
 - b. Where such criteria exist, all stormwater facilities and systems, including those designed and constructed for stormwater quality treatment, and/or channel protection, and/or overbank flood protection, and/or extreme flood protection, shall be designed and constructed in accordance with the criteria, standards, and specifications presented in this article and in the County Stormwater Management Manual, as amended.
 - c. The portions of the new development or redevelopment on which stormwater management facilities and systems are or will be located shall be shown on the plat or site plan and recorded with the deed as permanent drainage or water quality easements.
 - d. Stormwater control measures shall not be designed for, or installed within, public rights-of way or on public property without the prior request or approval of the director or designee.
 - g. Stormwater management and treatment facilities and access to said facilities shall be located in common areas when in a residential development.
 - h. Steep slope and retaining wall construction shall be located in common areas when in a residential development.

- e. Banks of all streams, channels, ditches and other earthen stormwater conveyances shall be left in a stabilized condition upon completion of the project. No actively eroding, bare or unstable vertical banks shall remain. Placement of riprap and other hard armor as the sole bank protection method on blue line streams is only allowed when vegetative bank stabilization alternatives are not technologically feasible.
 - f. The Director of Engineering and Public Works or designee has the authority to require additional stormwater system standards for developments where:
 - i. They have determined, through stormwater master plans, engineering studies, history of existing or documented flooding or erosion problems, or engineering judgment, that additional restrictions are needed to limit adverse impacts of the proposed development;
 - ii. There is potential for discharges that may jeopardize the continued existence of listed or proposed threatened or endangered species or their critical habitat, as defined under the federal Endangered Species Act or other applicable state law or rule.
 - g. All hydrologic and hydraulic computations utilized in the design of stormwater treatment and control facilities must be performed by a professional engineer registered in the State of Tennessee.
 - h. The Director of Engineering and Public Works or designee may require that the applicant provide an engineering study to support any design that is not consistent with the standards and criteria presented in this article and in the County Stormwater Management Manual, as amended.
 - i. The Director of Engineering and Public Works or designee may waive or modify any of the stormwater system criteria provided in this section if adequate stormwater quality treatment, and/or channel protection, and/or overbank flood protection, and/or extreme flood protection is suitably provided by a downstream or shared off-site stormwater facility, or if engineering studies determine that installing the required stormwater management facilities would not be in the best interest of the County or would cause greater adverse impacts than not providing it.
2. Stormwater quality treatment.
- a. Stormwater quality treatment may be waived for developments not exempted by Sec. 26-171(e) that will add less than 20,000 square feet of new impervious surfaces unless required by a SPAP or FEMA
 - b. Treatment of WQV shall adhere to section 4.2.5.2 of the MS4 permit and all applicable County stormwater manuals.
 - c. Stormwater runoff from the development or redevelopment site must be treated prior to discharge from the development or redevelopment site in accordance with the stormwater treatment standards, criteria, and design specifications for stormwater control measures provided in the County Stormwater Management Manual, as amended.
 - d. Stormwater control measures that are not included in the County Stormwater Management Manual, as amended, may be approved for the treatment of stormwater quality on a case-by-case basis provided the following conditions are met:

- i. The stormwater control measure, as applied to the site, meets the stormwater treatment standard published in the County Stormwater Management Manual, as amended. The director may require the applicant proposing the stormwater control measure to provide an engineering study to support this requirement.
 - e. Additional watershed or site-specific stormwater quality treatment requirements may be established by the director to satisfy local or state NPDES, TMDL or other regulatory water quality requirements.
2. Downstream channel protection.
- a. Downstream channel protection may be waived for developments not exempted by Sec. 26-171(e) that will add less than 20,000 square feet of new impervious surfaces.
 - b. The channel protection volume (the runoff volume from 75% of the 1-yr storm event) shall be captured and discharged over no less than a 24-hour period.
 - c. Downstream channel protection can be provided by an alternative approach in lieu of controlling the channel protection volume subject to prior approval by the Director of Engineering and Public Works. Sufficient hydrologic and hydraulic analysis that shows that the alternative approach will offer adequate channel protection from erosion must be presented in the Stormwater Management Plan.
3. Overbank and extreme flood protection.
- a. Overbank and extreme flood protection may be waived for developments not exempted by Sec. 26-171(e) that will add less than 20,000 square feet of new impervious surfaces.
 - b. Overbank flood protection shall be provided such that the calculated peak discharge of stormwater runoff resulting from the 50% (2-year), 10% (10-year), and 4% (25-year) return frequency, 24-hour duration storm events shall be no greater after development or redevelopment of the site than that which would result from the 50% (2-year), 10% (10-year) and 4% (25-year) return frequency, 24-hour duration storms on the same site prior to development or redevelopment.
 - c. Extreme flood protection shall be provided such that the calculated peak discharge of stormwater runoff resulting from a 1% (100-year) frequency, 24-hour duration storm shall be no greater after development or redevelopment of the site than that which would result from a 1% (100-year) frequency, 24-hour duration storm on the same site prior to development or redevelopment.
 - d. A downstream hydrologic analysis shall be performed to determine if the proposed development or redevelopment causes an increase in peak discharge as compared to pre-development runoff rates for the same site or has the potential to cause downstream channel and streambank erosion. This analysis must be done for the 50% (2-year), 10% (10-year), and 4% (25-year) return frequency, 24-hour duration storm events, at the outfall(s) of the site, and at each downstream tributary junction and each public or major private downstream stormwater conveyance structure to the point(s) in the stormwater system where the area of the portion of the site draining into the system is less than or equal to ten percent of the total drainage area above that point.
 - e. If peak discharge increases are identified in the ten percent downstream analysis area, as defined in subsection (d)(3), downstream flood protection shall be provided such that calculated peak discharges for the 50% (2-year), 10% (10-year), and 4% (25-year) return frequency, 24-hour duration storm events after development or redevelopment are no greater after development or redevelopment of the site than that which would result from the same duration storms in the same downstream analysis area prior to

development or redevelopment. These criteria must be applied throughout the ten percent downstream analysis area.

- f. Downstream flood protection can be provided by downstream conveyance improvements and/or purchase of flow easements in lieu of peak discharge controls subject to prior approval by the director and satisfaction of the following requirements:
 - i. Sufficient hydrologic and hydraulic analysis must be presented that shows that the alternative approach will offer adequate protection from downstream flooding for all potentially affected downstream property owners.
 - ii. The applicant is responsible for submittal and approval of any necessary CLOMR prior to construction, and a LOMR upon completion of construction.
 - iii. The applicant is responsible for all state and federal permits that may be applicable to the site including TDEC, NPDES and ARAP permits, US Army Corps of Engineers section 404 permits, and TVA section 26A permits.
 - iv. Developments and redevelopments that do not cause an increase in peak discharges are not exempt from conformance with water quality treatment and downstream channel protection requirements stated in subsections (b) and (c), respectively.
- 4. Pipes, channels, and other stormwater components.
 - a. The design of the stormwater system, excluding stormwater facilities for water treatment, channel protection, and overbank, extreme and downstream flood protection shall be based on the 4% (25-year) frequency storm. This criterion shall be applied to both closed conduit and open channel components. Minor systems that discharge to sinkholes must be designed to safely carry the 1% (100-year) frequency storm event.
 - b. All drainage systems shall be designed to ensure that no habitable finished floor elevations are flooded for the 0.2% (500-year) frequency storm.
 - c. Pipe material specifications are as follows:
 - i. Reinforced concrete or dual wall high density polyethylene pipe is required for pass through drainage.
 - ii. Reinforced concrete pipe is required for locations within stormwater detention or retention ponds and their outlet structures.
 - iii. Reinforced concrete pipe is required for location in public rights of way for all streets classified as "minor collectors" and above. For other pipe installations within public rights of way (i.e., local, residential streets), reinforced concrete, dual wall high density polyethylene, or aluminized corrugated metal pipe may be used. Other metal pipe materials, including corrugated metal, are not permitted. At no less than 30 days after the time of installation, visual inspection and deflection testing will be performed on all pipes and certified in accordance with TDOT Standard Specifications for Road and Bridge Construction including Supplemental Specifications — Section 607.09 of the Standard Specifications for Road and Bridge Construction dated March 1, 2006, to ensure structural integrity. All pipes with deflections greater than five percent of the nominal pipe diameter, undue misalignment, or poor joint construction shall be replaced by the contractor at his expense.
 - iv. It shall be the responsibility of the property owner to provide all necessary design, date, and installation details for construction to ensure failure of cross

drains, pipes, culverts or drainage systems will not occur, and prevent flooding or potential property damage on adjacent properties or rights-of-ways.

- v. Final pipe design specification must be indicated in the Stormwater Management Plan and approved by the director.

G. Special pollution abatement permits.

1. A special pollution abatement permit shall be required for the following land uses, which are considered pollutant hotspots:
 - a. Vehicle, truck or equipment maintenance, fueling, washing or storage areas including but not limited to: Automotive dealerships, automotive repair shops, and car wash facilities;
 - b. Parking areas greater than 120,000 square feet;
 - c. Recycling and/or salvage yard facilities;
 - d. Restaurants, grocery stores, and other food service facilities;
 - e. Commercial facilities with outside animal housing areas including animal shelters, fish hatcheries, kennels, livestock stables, veterinary clinics, or zoos;
 - f. Other producers of pollutants identified by the Director of Engineering and Public Works by information provided to or collected by him/her or his/her representatives or reasonably deduced or estimated by him/her or his/her representatives from engineering or scientific study.
2. The Director of Engineering and Public Works or designee has the authority to require a special pollution abatement permit for land uses or activities that are not identified by this article as hotspot land uses but are deemed to have the potential to generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water.
3. Technical requirements for the permit shall be based on the provisions and guidelines set forth in the County Stormwater Management Manual, as amended.
4. Best management practices specified in the special pollution abatement permit must be appropriate for the pollutants targeted at the site and approved by the Director of Engineering and Public Works for use in the county, as set forth in subsections 26-175(b)(2) and (b)(3).
5. A special pollution abatement permit will be valid for a period of five years, at which point it must be renewed. At the time of renewal, any deficiency in the management method must be corrected.

- H. NPDES permits. Persons or entities who hold NPDES general, individual and/or multi-sector permits shall provide either a copy of such permit or the permit number assigned to them by the state department of environment and conservation to the Director of Engineering and Public Works or designee no later than 60 calendar days after issuance of the permit.

19.02: FLOODWAY PROTECTION

- A. Purpose and Intent. Development within floodways can raise flood levels, increasing the risk of flood damage to properties both upstream and downstream. This section establishes standards for the protection of floodways.
- B. Delineation of the Floodway. The floodway is delineated on the Flood Insurance Rate Maps (FIRMs) prepared by the Federal Emergency Management Agency (FEMA). Where a floodway has not been delineated by FEMA, the applicant shall be required to provide a hydrologic and hydraulic analysis to determine the floodway boundary.

- C. Prohibited Uses in the Floodway. Knox County has adopted a zero-rise standard for the floodway, meaning that no development shall be permitted that would raise the base flood elevation by any measurable amount. The following encroachments are prohibited within the delineated floodway unless it has been demonstrated through a hydrologic and hydraulic analysis, performed in accordance with standard engineering practice by a registered professional engineer, that the proposed encroachment would not result in any increase in flood levels during the occurrence of the base flood discharge:
1. Fill;
 2. New construction;
 3. Substantial improvements; or
 4. Other development including the expansion of existing structures.
- D. Permitted Uses in the Floodway. Uses that do not involve structures, fill, or obstruction of flood flows may be permitted in the floodway, including:
1. Agricultural uses, such as crop production, pasture, and orchards.
 2. Recreational uses, including parks, greenways, trails, and picnic areas.
 3. Conservation areas and open spaces.
 4. Temporary structures, such as portable picnic shelters, which can be readily removed in the event of a flood.
- E. Higher Standards Required.
1. All new buildings within the Special Flood Hazard Area (SFHA) must have their lowest floor elevated to one foot above the 0.2% annual chance flood elevation (the 500-year flood). Foundations of all structures shall be designed and constructed to withstand flood conditions at the site.
 2. All development within the SFHA must comply with all applicable provisions of this ordinance.
- F. TVA Flowage Easements. Where a property is subject to a Tennessee Valley Authority (TVA) flowage easement, no development shall be permitted within the easement area without prior written approval from TVA pursuant to Section 26a of the TVA Act. TVA flowage easements are considered a Primary Open Space Area for the purposes of Section 16.02 and shall be incorporated into the open space of any Conservation Subdivision.

19.03: WATER QUALITY BUFFERS

- A. General requirements for proposed developments.
1. Applicability and general requirement. Owners of proposed developments for which a Stormwater Management Plan is required. They shall establish water quality buffers as set forth herein on streams, rivers, naturally occurring wetlands, ponds and lakes that are located within the legal boundaries of said developments.
 2. Water quality buffers shall meet the minimum standards established in the County Stormwater Management Manual, as amended. Buffers that do not meet the minimum standards prior to the commencement of land disturbing activities shall be restored during said activities to achieve the standards. Vegetation restoration requirements are provided in the County Stormwater Management Manual. Restoration designs shall be shown on the Stormwater Management Plan.
 3. Buffers shall be protected from disturbance, soil erosion, and discharges of sediment and other construction related wastes during land disturbing and construction activities. All areas of the water quality buffer shall be left in a stabilized condition upon completion of land disturbing and construction activities. No actively eroding, bare or unstable areas shall remain.

4. Permanent markers, in the form of signage approved or provided by the director, may be required to identify the boundary of a water quality buffer. Such markers shall be installed prior to final plat approval.
 5. Water quality buffers shall be placed into a permanent easement that is recorded with the final plat or site plan. The easement shall be clearly identified and labeled as "Water Quality Buffer" on the final plat or site plan, and all land development, construction, and as-built plans. The final plat or site plan shall also include the note, "No introduction of impervious surfaces in the water quality buffer."
- B. General requirements for water quality buffers.
1. Applicability. This section applies to owners of water quality buffers after land development is complete.
 2. Water quality buffers shall be protected and maintained in keeping with the standards and requirements set forth in the stormwater management manual, as amended. Buffers that were platted prior to the date of adoption of this division may continue to be maintained in keeping with county requirements in place at the time of platting.
 3. Water quality buffers shall be protected from soil erosion and discharges or dumping of sediment or other pollutants into the buffer.
 4. Replacement of a buffer's permanent boundary markers may be required for markers that have been removed or destroyed.
 5. Prohibited uses. The following land uses and activities are prohibited in the water quality buffer:
 - a. The placement of impervious surfaces;
 - b. Concentrated animal lots, kennels, dog parks, and similar uses;
 - c. The use, cleaning, maintenance, storage, or parking of motorized vehicles or equipment;
 - d. Storage of liquid, solid, or gaseous materials of any kind;
 - e. Dumping, handling, or storage of any waste material, including landscaping debris;
 - f. Any other use to have potential to discharge pollutants into the water quality buffer.
 6. Permitted Uses. Permitted uses are limited to utility crossings, approved trails, and stormwater conveyances designed to be non-erosive.

19.04: STREAM BUFFERS

- A. Purpose and Intent. Streams and waterbodies are among the most important natural resources. They provide drinking water, support aquatic and terrestrial wildlife, provide recreational opportunities, and define the character of the county's valleys. Riparian vegetation plays a critical role in filtering pollutants from stormwater runoff, stabilizing stream banks, moderating stream temperatures, and providing habitat. This section establishes permanent stream buffers to protect these functions.
- B. Applicability. A permanent, vegetated stream buffer shall be established and maintained along all perennial and intermittent streams, rivers, ponds, lakes, and wetlands, as identified on the most recent USGS 7.5-minute topographic maps or as determined in the field by a qualified professional using TDEC-approved hydrologic determination methodology. This requirement applies to all new development, redevelopment, and subdivision of land.
- C. Buffer Measurement. The stream buffer shall be measured horizontally from the top of the bank on each side of the stream, or from the edge of the ordinary high-water mark for lakes and ponds. Where a stream is located within a floodplain, the buffer shall be measured from the top of the bank, not from the edge of the floodplain.

- D. Buffer Widths as determined by Knox County Stormwater Manuals.
 - 1. Buffer Averaging: The required buffer width may be averaged along the length of a parcel's stream frontage, provided that the minimum width of the buffer at any single point is no less than one-half of the required width. Buffer averaging must be applied independently to each side of the stream.
- E. Permitted Uses within a Stream Buffer. The following uses are permitted within a stream buffer, provided they are designed and constructed to minimize disturbance to existing vegetation and to the stream channel:
 - 1. Road and utility crossings, where necessary, designed to cross at an angle as close to perpendicular as possible to minimize disturbance.
 - 2. Public greenway trails, provided the trail surface is no wider than twelve feet and is constructed of pervious materials where feasible.
 - 3. Stream bank stabilization and habitat restoration projects approved by Knox County, TDEC, and/or the U.S. Army Corps of Engineers.
 - 4. Removal of individual dead, diseased, or hazardous trees.
 - 5. Removal of invasive species.
- F. Prohibited within a Stream Buffer. The following are prohibited within the required stream buffer:
 - 1. New principal or accessory structures.
 - 2. Impervious surfaces, except as permitted for trails and crossings.
 - 3. Septic systems, drain fields, and associated infrastructure.
 - 4. Storage of hazardous materials, chemicals, or waste.
 - 5. Livestock grazing or other intensive agricultural uses.
 - 6. Fencing, except for wildlife-friendly fencing that allows for the safe passage of wildlife.
- G. Buffer Management and Maintenance. The stream buffer shall be maintained as an area of undisturbed vegetation per County Stormwater Manuals.
- H. Nonconforming Situations. Where an existing structure, use, or impervious surface is located within the required stream buffer at the time of adoption of this chapter, it shall be considered a lawful nonconforming situation. Expansions of such structures or uses that further encroach into the stream buffer are prohibited.

19.05: SOIL EROSION AND SEDIMENTATION CONTROL

- A. Site Grading and Erosion and Sediment Control.
 - 1. Concept Plan Review. A site grading plan may be required during the Concept Plan review stage of the subdivision review process. Depending upon the degree of site alteration, the site grading plan may be required for both the street layout and potential building sites.
 - 2. Site Grading and Erosion and Sediment Control – Design Plan Review. The site grading and erosion and sediment control plan shall be provided by the developer in accordance with the design standards during the Design Plan review stage of the subdivision review process. The developer's engineer should contact the Department of Engineering and Public Works regarding the applicable design standards from the adopted ordinances and regulations.
- B. Off-site sedimentation prevention. In keeping with [this] section, adequate erosion prevention and sediment control measures shall be employed consistent with guidance materials referenced herein for all land disturbing activities, including those exempted in section 26-171 to minimize erosion and prevent off-site sedimentation. Land disturbing or construction activities that do not employ erosion

prevention and sediment controls and cause off-site sedimentation or sediment discharges to waters of the state or onto adjacent properties may be subject to enforcement.

C. General requirements.

1. Operators shall implement appropriate erosion prevention and sediment control best management practices.
2. The design, installation, maintenance and inspection of erosion prevention and sediment control design standards and best management practices shall be performed in accordance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities, the TDEC erosion and sediment control handbook, and the County Stormwater Management Manual, as amended. Where the provisions of this section, the County Stormwater Management Manual, as amended, or; another regulation conflict or overlap, that regulation which is more restrictive or imposes higher standards or requirements shall prevail.
3. Additional requirements for discharges into impaired or exceptional Tennessee waters that are defined in the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities shall be implemented for all priority construction activities located in the county, as defined by this article.
4. The Director of Engineering and Public Works may require more stringent standards or best management practices than those established by the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities for priority construction activities or where there is potential for discharges that may jeopardize the continued existence of listed or proposed threatened or endangered species or their critical habitat, as defined under the federal Endangered Species Act or other applicable state law or rule.
5. Discharges from sediment basins and traps must be through a pipe or a conveyance lined with rip-rap or other stabilized spillway so that the discharge does not cause erosion.
6. Sediment laden water to be pumped from excavation and work areas must be held in settling basins or filtered prior to its discharge into surface waters. Water must be discharged onto a stabilized outlet point so that the discharge does not cause erosion and sedimentation.
7. For installation of any waste disposal systems on site, or sanitary sewer or septic system, the plan shall provide for the necessary sediment controls. Owners or operators must also comply with applicable state and/or local waste disposal, sanitary sewer or septic system regulations for such systems, to the extent that these are located within the permitted area.
8. Construction site operators shall control other construction related wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality in conformance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities.
9. Construction materials generated and buried onsite shall meet the applicable standards of this UDO.
10. All discharges from a site shall leave the property at non-erosive velocities and volumes.
11. The portion of the performance bond pertaining to erosion prevention and sediment control shall be released only after final stabilization has been achieved in conformance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities.

12. The Director of Engineering and Public Works shall have the authority to impose more stringent criteria to achieve final stabilization than required by the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities for release of the erosion prevention and sediment control portion of the performance bond if site is a priority construction activity, has an elevated potential for erosion or off-site damages, or has caused past damages off-site due to sediment discharges.
13. Riparian buffer zones shall be preserved in conformance with the State of Tennessee NPDES General Permit for Discharges of Stormwater Associated with Construction Activities.

19.06: INSTALLATION AND MAINTENANCE

A. Stormwater Management.

1. Stormwater Management Plan. A Stormwater Management Plan shall be provided by the developer in accordance with the design and construction standards. The developer's engineer should contact the Department of Engineering and Public Works regarding the applicable design standards from the adopted ordinances and regulations.
2. Pre-design Meeting. The subdivision developer and/or project engineer is strongly encouraged to have a pre-design meeting with Department of Engineering and Public Works staff to identify stormwater issues related to development in the area and the use of Best Management Practices (BMPs) and alternative design strategies (i.e. Low Impact Design (LID), green infrastructure) to address such issues.
3. Concept Plan. A preliminary Stormwater Management Plan shall be included as a part of the proposed Concept Plan application. Any proposed alternative stormwater methodologies that would conflict with required street design standards should be identified at this stage of the subdivision process. The Planning Commission may approve a modification of the conflicting street standard through the Concept Plan approval process when the modification is recommended by the Department of Engineering and Public Works.
4. Final Plat. The Final Plat shall identify any stormwater buffers, easements, etc. required by the Stormwater Management Plan as approved through the Design Plan stage of the subdivision. Any required and recorded maintenance agreements shall also be identified on the Final Plat.
5. Identification of Sinkholes and Other Closed Contour Area. Any property that is being subdivided under the Subdivision Regulations that includes a sinkhole or other closed contour area as designated on the Knoxville, Knox County, Knoxville Utilities Board Geographic Information System (KGIS) database, through actual survey, or the Department of Engineering and Public Works staff, shall meet the following requirements:
6. The sinkhole/closed contour area shall be shown on the Concept Plan and Final Plat by identifying the uppermost contour and any descending contours within the feature. The plat shall also identify a 50 foot building setback from the uppermost closed contour of the feature. If it is determined by the Tennessee Department of Environment and Conservation (TDEC) that the feature is not a sinkhole, or the Department of Engineering and Public Works staff determines that the closed contour designation on KGIS is the result of a manmade feature such as a street and the closed contour area has a drainage outfall, the feature will not have to be designated on the plat.
7. In Knox County, a note will be required on the plat that all structures will have to be located outside of the 50 foot setback area unless a geotechnical study prepared by a registered engineer states that building within the 50' sinkhole/closed contour area setback is acceptable

and the study is approved by the Department of Engineering and Public Works. The geotechnical study must be reviewed and approved prior to approval of a plat for any proposed lots that do not have an adequate building area outside of the 50 foot setback area. Building construction is not permitted within the sinkhole/closed contour area or within any required drainage easement for the sinkhole/closed contour area.

8. Any proposed lot that includes all or part of a sinkhole/closed contour area and required setback shall include an adequate building area in compliance with this section.
9. Identification of Streams and Flood Zones. Any property that is being subdivided under the Minimum Subdivision Regulations that includes a stream or includes land within a Federal Emergency Management Agency (FEMA) flood zone or floodway, shall meet the following requirements:
10. Any subdivision that includes streams or similar water features that are regulated by Knox County shall identify the water feature and any required buffer areas on the Concept Plan and Final Plat.
11. Any subdivision that includes areas designated as floodway on the official zoning map shall identify the zoning boundary on the Concept Plan and Final Plat.
12. Any subdivision that includes flood zones that are designated on the FEMA Flood Insurance Rate Maps (FIRM) shall identify the floodway, 100 and 500 year flood plain areas, the no-fill zone, and any applicable minimum floor elevations (MFEs) for individual lots on the Concept Plan and Final Plat.

B. As-built certifications.

1. Prior to the certification of final plat, an as-built certification shall be provided to the Director of Engineering and Public Works or designee from a licensed engineer, showing that all drainage structures or facilities, facility volumes, size, slopes, locations, elevations, and hydraulic structures have been field verified, represent the as-built field conditions, and comply with the approved Stormwater Management Plan(s). Features such as roadway lines, grades, cross slopes, locations, contours, and elevations shall be provided to verify approved plans as required. Other contents of the as-built certification must be provided, in accordance with the policies stated in the County Stormwater Management Manual, as amended.
2. As-built certifications shall include sufficient design information to show that stormwater facilities will operate as designed. This shall include the existing (or before site development) peak flow discharges, the after-site development peak discharges, and/or volumes of stormwater runoff based on the proposed site development, as well as all necessary computations used to determine the reduced peak flow rates for the design storms.
3. The as-built certification must be stamped by the appropriate design professional required to stamp the original Stormwater Management Plan, as stated in section 26-171, and/or a registered land surveyor licensed to practice in the state.

C. Monitoring and inspections—Right-of-entry.

1. The Director of Engineering and Public Works or designee may enter upon any property which discharges or contributes, or is believed to discharge or contribute, to stormwater runoff or the stormwater system, stream(s), natural drainageway(s) or via any other private or public stormwater management system during all reasonable hours to monitor, remove foreign objects or blockages, and to inspect for compliance with the provisions of this article.
2. Failure of a property owner to allow such entry onto a property for the purposes set forth in subsection (a) shall be cause for the issuance of a stop work order, withholding of a certificate of

occupancy, and/or civil penalties and/or damage assessments in accordance with the enforcement provisions of Article 23 of this ordinance.

D. During grading or construction.

1. During grading or construction, site inspections shall be performed in accordance with following requirements:
 - a. The owner or operator shall at all times properly operate and maintain all erosion prevention and sediment control measures, stormwater management facilities, and related appurtenances which are installed or used by the property owner to achieve compliance with this article.
 - b. If sediment escapes the construction site, off-site accumulations of sediment that have not reached a stream must be removed at a frequency sufficient to minimize off-site impacts. Fugitive sediment that has escaped the construction site and has collected in a street must be removed so that it is not subsequently washed into storm sewers and streams by the next rain and/or so that it does not pose a safety hazard to users of public streets. Owners and operators shall not initiate remediation/restoration of a stream without consulting TDEC first, and such activities shall be performed in accordance with all county, state, and federal laws and regulations.
 - c. The owner or operator shall conduct site inspections in accordance with the requirements stated in the state general NPDES permit for discharges of stormwater associated with construction activities. The Director of Engineering and Public Works has the authority to impose more stringent inspection requirements as necessary for purposes of water quality protection and public safety.
 - d. Site inspection documentation shall be maintained on-site during normal working hours by the owner or operator or designee and shall be made available for review by the Director of Engineering and Public Works immediately upon request.
 - e. The following areas and items must be inspected as set forth in subsection XX:
 - i. All disturbed areas that are not stabilized;
 - ii. Any areas used for storage of materials that are exposed to precipitation;
 - iii. Borrow or waste areas associated with the construction activity;
 - iv. Temporary and permanent stormwater management facilities;
 - v. Locations where vehicles enter and exit the site;
 - vi. Stormwater outfall locations;
 - vii. Erosion prevention and sediment control measures; and
 - viii. Structural and non-structural stormwater management facilities and stormwater control measures.

E. After construction.

1. Once the site has been stabilized and construction has ceased, routine inspections for the stormwater management facilities and stormwater control measures are required, based on the guidance provided in the operations and maintenance plan and "covenants for permanent maintenance of stormwater facilities and stormwater control measures" for the property, as set forth in this Article. Routine inspections are the responsibility of the property owner, or the owner(s) of the stormwater management facility(s) and stormwater control measure(s).
2. The owner(s) of stormwater management facilities and/or stormwater control measures shall at all times properly operate and maintain all facilities and systems of stormwater treatment and control (and related appurtenances), and all stormwater control measures in such a manner as to maintain the full function of the facilities or stormwater control measures which are installed

or used by the property owner(s) to achieve compliance with this article. Maintenance of privately-owned stormwater management facilities shall be performed at the sole cost and expense of the owner(s) of such facilities.

3. Where a maintenance agreement applies to a stormwater management facility or stormwater control measure serving more than one lot or property, all property owners subject to the maintenance agreement shall be responsible for the inspection, maintenance, repair, and continued proper operation of the facility or control measure in accordance with the recorded maintenance agreement.
 4. Prior to release of the performance bond, the property owner shall provide the 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 Stormwater Control Measures." The property owner shall record the Operations and Maintenance Plan in the county Register of Deeds office. The location of the stormwater facility(s) and stormwater control measures, 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 final plat or site plan that is also recorded in the county Register of Deeds office.
 5. Developments and redevelopments that have received approval of a Stormwater Management Plan after the effective date of this article shall maintain stormwater management facilities and stormwater control measures in accordance with the maintenance guidance provided in the Operations and Maintenance Plan and the Covenants for Permanent Maintenance of Stormwater Facilities and Stormwater Control Measures.
 6. 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 County Stormwater Management Manual, as amended.
 7. 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 12-foot wide access within a minimum 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 of Engineering and Public Works.
 8. The covenants for permanent maintenance of stormwater facilities and stormwater control measures shall grant the county permission to enter the property to inspect any stormwater facility or stormwater control measures for proper functioning, maintenance and protection from disturbances (if applicable).
 9. The removal of sediment and/or other debris from stormwater management facilities and stormwater control measures shall be performed in accordance with all county, state, and federal laws. Requirements for sediment removal and disposal are presented in the County Stormwater Management Manual, as amended. The Director of Engineering and Public Works may stipulate additional requirements if deemed necessary for public safety.
- F. Maintenance and Repair. The Director of Engineering and Public Works or designee 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 the 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 of Engineering and Public Works or designee, the director or designee 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 action.

19.07: LOW IMPACT DEVELOPMENT INCENTIVES

- A. Purpose. To encourage the voluntary use of LID and Green Infrastructure practices that exceed the minimum requirements of this article, the County shall provide incentives in the form of development standard modifications or stormwater fee credits.
- B. Eligibility. An applicant may be eligible for one or more incentives if they voluntarily incorporate LID practices that go beyond the base requirements for managing the WQv, such as:
 - 1. Managing more than 100% of the WQv on-site through infiltration, evapotranspiration, or reuse.
 - 2. Reducing the site's overall impervious cover by at least 20% compared to a conventional site layout.
 - 3. Preserving more than 50% of the site in a natural, undisturbed condition.
- C. Available Incentives. Upon approval by the Director of Engineering and Public Works and the Planning Commission, an eligible applicant may be granted one or more of the following:
 - 1. Parking Reduction: A reduction of up to 20% in the minimum number of required parking spaces.
 - 2. Landscape Credit: Use of bioretention areas and vegetated swales to meet up to 50% of the site's landscaping and open space requirements.
 - 3. Setback Reduction: A reduction in minimum building setbacks to allow for the clustering of development and preservation of open space.
 - 4. Stormwater Fee Credit: A credit against future stormwater utility fees, proportional to the volume of runoff managed or impervious area reduced beyond the minimum requirements. The specific credit structure shall be established by the director.

19.08: PERMIT CONTROLS AND STORMWATER SYSTEM INTEGRITY; NON-STORMWATER DISCHARGES

- A. Permit controls and stormwater system integrity.
 - 1. Any alteration, improvement, or disturbance to existing drainage channels, pipes, or other stormwater systems owned or operated by Knox County shall be prohibited without authorization from the Director of Engineering and Public Works. This does not include alterations that must be made in order to maintain the intended performance of the drainage system.
 - 2. Other state and/or federal permits that may be necessary for construction in and around streams and/or wetlands shall be approved through the appropriate lead regulatory agency prior to submittal of a Stormwater Management Plan.
 - 3. Any non-permitted drainage system, construction or fill located within a floodplain shall, upon written notice from the director, be removed at the property owner's expense.
- B. Non-stormwater discharges—Illicit discharges. Except as hereinafter provided, all non-stormwater discharges into the municipal separate storm sewer system of the county are prohibited and are declared to be unlawful.
- C. Prohibitions. No person shall:
 - 1. Connect, or allow to be connected, any sanitary sewer to the stormwater system.
 - 2. Cause or allow an illicit discharge to the municipal separate storm sewer system, or any component thereof, or onto driveways, sidewalks, parking lots, sinkholes, county property, or

other areas draining to the municipal separate storm sewer system. Illicit discharges include, but are not limited to:

- a. Sewage discharges or overflows, including sanitary sewer overflows (SSOs);
- b. Discharges of wash water resulting from the hosing or cleaning of gas stations, auto repair garages, or other types of automotive services facilities;
- c. Discharges resulting from the cleaning, repair, or maintenance of any type of equipment, machinery, or facility including motor vehicles, cement-related equipment, and port-a-potty servicing, etc.;
- d. Discharges of wash water from mobile operations such as mobile automobile washing, steam cleaning, power washing, and carpet cleaning, etc.;
- e. Discharges of wash water from the cleaning or hosing of impervious surfaces in industrial and commercial areas including parking lots, streets, sidewalks, driveways, patios, plazas, work yards, and outdoor eating or drinking areas, etc.;
- f. Discharges of runoff from material storage areas containing chemicals, fuels, grease, oil, or other hazardous materials;
- g. Discharges of pool or fountain water containing chlorine, biocides, or other chemicals; discharges of pool or fountain filter backwash water;
- h. Discharges of sediment, or construction-related wastes, etc.;
- i. Discharges of food-related wastes (e.g., grease, fish processing, and restaurant kitchen mat and trash;
- j. Disposal of materials such as litter, trash, debris, and yard waste.

D. Allowable discharges.

1. The following discharges shall not be in violation of this article:

- a. Water line flushing;
- b. Landscape irrigation;
- c. Diverted stream flows or rising groundwater;
- d. Infiltration of uncontaminated groundwater [as defined at 40 CFR 35.2005(20)] to separate storm drains;
- e. Pumping of uncontaminated groundwater;
- f. Discharges from potable water sources, foundation drains, uncontaminated air conditioning condensation, irrigation waters, springs, water from crawl space pumps, or footing drains;
- g. Lawn watering;
- h. Individual non-commercial car washing on residential properties; or car washing of less than two consecutive days in duration for a charity, non-profit fund raising, or similar non-commercial purpose;
- i. Flows from riparian habitats and wetlands;
- j. Dechlorinated swimming pool discharges;
- k. Incidental street wash water from street cleaning equipment designed for cleaning paved surfaces and limiting waste discharges;
- l. Street deicing for public safety;
- m. Any activity authorized by a valid NPDES permit;
- n. Any flows resulting from firefighting; and
- o. Waste temporarily staged for scheduled collection.

2. Discharge due to water line flushing through a direct connection to the waters of the state is prohibited. Persons responsible for water line flushing activities are required to de-chlorinate discharges before such discharges come in contact with waters of the state.
 3. If the Director of Engineering and Public Works or designee finds that any activity, including but not limited to any of the activities listed in this section, are found to cause or may cause sewage, industrial wastes, other wastes, or other non-stormwater discharges to be discharged into the stormwater system, the director or designee shall so notify the person performing such activities, and shall order that such activities be stopped or conducted in such a manner as to avoid the discharge of sewage, industrial wastes or other wastes into the stormwater system. The Director of Engineering and Public Works or designee may require submittal of a stormwater pollution prevention plan if the activity, or actions taken to cease the activity, have the potential to cause further releases of pollution or non-stormwater discharges to the stormwater system.
- E. Notification and monitoring requirements.
1. As soon as any person has knowledge of any illicit spills or discharges to the stormwater system in violation of this article, such person shall immediately notify the Department of Engineering and Public Works of this discharge. If such person is directly or indirectly responsible for such discharge or responsible for the operation of the system or business, then such person shall also take immediate action to ensure the containment and cleanup of such discharge and shall confirm such notification with a written report to the Director of Engineering and Public Works or the designee within three calendar days. At a minimum, the written report for any illicit discharge shall include:
 - a. Date and time of the discharge;
 - b. Location of the discharge;
 - c. Material or substance discharged;
 - d. Duration and rate of flow;
 - e. Total volume discharged;
 - f. Total volume recovered;
 - g. Cause or reason for the discharge;
 - h. Remediation and containment action taken;
 - i. Material Safety Data Sheets (MSDS) for the discharged material;
 - j. Action taken to prevent further discharges;
 - k. Description of any environmental impact.
 2. The Director of Engineering and Public Works may require any person engaging in any activity or owning any property, building or facility (including but not limited to a site of industrial activity) to undertake such reasonable monitoring of any discharge(s) to the stormwater system operated by the county and to furnish periodic detailed reports of such discharges.
- F. Illegal dumping. It shall be illegal for any person to intentionally dump liquids or solids that are considered priority pollutants by the U.S. Environmental Protection Agency (EPA) on the ground where there is potential exposure to rain or stormwater and potential for the pollutant to reach the municipal separate storm sewer system of the county.
- G. Enforcement. Enforcement of this section shall be subject to the provisions contained in Article 23 of this ordinance.