SECTION 231

SRA

SINKHOLE RETENTION AREA
(As amended by Ordinance No. O12-11-20)

SECTION 231.1 GENERAL DESCRIPTION

The SRA District is intended to regulate the use of lands considered vital to the natural drainage system of the city. The regulations set forth in this section shall apply to those areas of Cookeville designated as sinkhole retention areas as shown on the City of Cookeville Zoning Map and similar areas discovered during land development and/or construction.

The SRA District is an overlay district and may be located within the limits of any other zoning district. This district will not change the original zoning of the affected properties, but rather will add restrictions and limitations designed to promote public health, safety and the general welfare. Specifically, the prevention of sinkholes and natural drainage ways malfunction will help mitigate potential health and safety hazards, property loss and/or damage, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief and impairment of the tax base.

SECTION 231.2 STATUTORY AUTHORIZATION

The Legislature of the State of Tennessee has in Sections 13-7-201 through 13-7-210 of the Tennessee Code Annotated delegated the responsibility to local governmental units to adopt regulations designed to promote the health, safety and general welfare of its citizenry.

SECTION 231.3 FINDINGS OF FACT

231.3A Karst topography is common in much of Putnam County where soluble limestone forms the landscape. Sinkholes, collapsed sinks, springs, sinking creeks and caves characterize this type of topography. All of these are numerous in and around the City of Cookeville.

231.3B The geological features of karst terrain play an important role in storm water management, groundwater quality and flooding for a significant portion of the Cookeville area.

231.3C Sinkhole flooding within the Cookeville area is caused by large depressions in the ground, having little or no outlets, which simply store rainwater

231.3D The protection and maintenance of the numerous sinkholes and associated karst terrain features in the area is essential for drainage, water quality and a reduction of flooding.

231.3E Specific requirements for land disturbing activities and construction in and around sinkhole areas are necessary to reduce the potential for significant property damage and/or personal injury resulting from sinkhole flooding and collapse.

231.3F Available land for development in the City of Cookeville without significant natural constraints is limited and therefore, more pressure for development in environmentally sensitive areas such as sinkholes will continue to occur.

SECTION 231.4 STATEMENT OF PURPOSE

The intent of this section is to regulate karst sinkhole terrain development in order to protect the public health, safety and welfare by guiding the development and use of environmentally constrained lands in a manner that promotes safe and appropriate development and construction, storm water management, ground water quality and reduction of flooding.

SECTION 231.5 STATEMENT OF OBJECTIVES

231.5A Maintain property values and avoid property damage and/or safety concerns due to development in sinkhole areas.

231.5B Incorporate geotechnical practices to promote the stability and environmental quality of sinkhole areas.

231.5C Encourage the protection and retention of natural topographic drainage features including sinkhole areas.

231.5D Protect ground water by minimizing pollution caused by development activity in sinkhole areas.

231.5E Protect downstream areas from flooding caused by development activity in sinkhole areas.

231.5F Promote building stability by limiting the location of structures in sinkhole areas by incorporating geotechnical techniques into development and construction activities.

SECTION 231.6 DEFINITIONS

Unless specifically defined below, words or phrases used in this Section shall be interpreted as to give them the meaning they have in common usage and to give this Section its most reasonable application given its stated purpose and objectives.

CAVE ENTRANCE DRIP LINE. The beginning of a cave defined as a line on the ground at a cave entrance formed by drips from the rock above at the outermost point of the entrance's overhang.

CLOSED DEPRESSION. A karst geologic feature with variable size and amplitude which displays a distinct bowl-shaped depression in the land surface with internal drainage. Naturally occurring closed surface depressions found within karst landscapes are called sinkholes.

EPHEMERAL LAKE. A body of standing water occurring in a sinkhole of a karst region that is usually visible after sufficient precipitation has occurred. They may form from slow permeability of soils, rises in the water table or the development of a natural liner of slow permeable clays or soils.

GROUND WATER. The supply of freshwater under the ground surface in an aquifer or geologic formation that forms the natural reservoir for springs and wells.

GROUND WATER DRAINAGE BASIN. An area of the landscape that drains through the subsurface to a spring or other component of a karst drainage system such as a cave stream. This term is analogous to "catchment" for surface drainage systems, in which case it denotes an area of the landscape that drains to a river confluence or other point in a surface drainage system. In contrast to surface catchments, karst groundwater drainage basins generally cannot be determined by topographic maps, and thus must be delineated by other methods such as dye tracing.

KARST. A terrain, generally underlain by limestone or dolomite, in which the topography is chiefly formed by the dissolving of rock and which may be characterized by sinkholes, sinking streams, subterranean drainage, and caves.

KARST GEOLOGIC FEATURES. Geologic features that develop on karst terrain. Examples of karst geologic features are sinkholes, caves, sinking streams, and karst springs.

KARST SPRING. The discharge points for underground streams.

SINKHOLE. Any closed depression in soil or bedrock formed by the erosion and transport of earth material from below the land surface, which is circumscribed by a closed topographic contour and drains to the sub-surface. The sinkhole boundary is described as an area bounded by a projected line demarcating a change in slope from toward the center of the sinkhole to away from the sinkhole which represents a local drainage divide. Precipitation falling on the surface sloping toward the sinkhole is likely to run into the sinkhole throat, or infiltrate the soil and move through subsoil conduits to the throat. This includes areas which contribute surface water to a sinkhole via streams.

SINKHOLE COLLAPSE FEATURE. Sometimes called "cover collapse sinkhole", a relatively steep-side, "throat-like" sinkhole typically within a larger sinkhole and typically with rock or soil walls, formed by the erosion and transport of earth materials into the subsurface in a manner such that the expression of this transport has propagated to the surface.

SINKHOLE RETENTION AREA BUFFER. A non-buildable perimeter edge area around a sinkhole collapse feature, the extent of which is established in the field by a licensed geotechnical engineer. The purpose of the buffer is to minimize the exposure of impervious surfaces such as structures to sinkhole subsidence.

SINKHOLE TERRAIN SURVEY. A survey of property containing sinkhole areas as depicted on the City of Cookeville Zoning Map. This survey depicting site specific karst geologic features is required for submission prior to development review.

SINKHOLE WATERSHED. An area bounded by a projected line demarcating a change in slope from toward the center of the sinkhole to away from the sinkhole which represents a local drainage divide. Precipitation falling on the surface sloping toward the sinkhole is likely to run into the sinkhole throat, or infiltrate the soil and move through subsoil conduits to the throat. This includes areas which contribute surface water to a sinkhole via streams.

SINKING STREAM SINKPOINT. The location where a surface stream disappears into the subsurface karst aquifer, either at a discrete point such as a cave entrance, or gradually along the reach of a stream channel.

SURFACE WATER BODY. Any lake, stream, sinkhole or other water area, whether natural or man-made, but not including any jurisdictional wetland.

SECTION 231.7 APPLICABILITY

This section shall apply to all land disturbing activity, including new development and subdivision, proposed in sinkhole retention areas as shown on the City of Cookeville Zoning Map , except as exempted under Section 231.8.

SECTION 231.8 EXEMPTIONS

This section shall not apply to the following development/construction activities:

231.8A Addition of accessory structures or alteration of the ground surface (cutting, filling, grading, etc.) associated with landscaping, installation of walks or driveways, or similar activities on sites developed with a principal structure built prior to the effective date of these regulations

231.8B Clearing and other activities required for surveying and preliminary site investigation, conducted with a "Grading or Clearing Permit" issued by the Public Works Department in accordance with the Erosion and Sediment Control Ordinance (Title 14, Chapter 5 of the Municipal Code)

231.8C Maintenance of roads and utility lines

231.8D Expansion of an existing residential structure by less than 50% or of a non-residential structure by less than 10%

231.8E Construction on existing lots shown on plats or plans approved prior to the effective date these regulations

SECTION 231.9 SINKHOLE TERRAIN SURVEY

Proposed development activity on land indicated as a sinkhole retention area on the City of Cookeville Zoning Map will require that the applicant conduct and submit a sinkhole terrain survey of the property which shall identify site specific karst geologic features. This survey shall be conducted and certified by a geologist or geotechnical engineer licensed in the State of Tennessee with the qualifications to review and analyze karst geological features. This shall include at least one field site inspection. The date of the site survey and the person conducting the survey shall be noted on the submitted survey.

231.9A The following is a list of karst geologic features to be identified as part of the sinkhole terrain survey and identified on all submitted subsequent development plats or site plans. An asterisk (*) indicates those features requiring a sinkhole feature buffer as required in Section 231.10:

1. Sinkhole*
2. Sinkhole Collapse Feature*
3. Cave Entrance Drip Line*
4. Sinking Stream Sink Point*
5. Springs
6. Ephemeral lakes after rainfall
7. Subsurface cave passages as determined by preexisting cave maps
8 Surface drainage flow into the ground

231.9B The following is a list of requirements specific to certain karst geologic features that shall be indicated on all required plans when any of the features listed in 231.9A have been identified:

1. Location and limits of the area of the sinkhole depression, including the topographic boundary of the entire closed depression at two (2) foot contour intervals
2. Sinkhole low point location and elevation
3. Calculation of pre-development and post-development surface drainage volumes directed toward the low point of the sinkhole

SECTION 231.10 SINKHOLE RETENTION AREA BUFFER

Proposed development sites that depict sinkholes or sinkhole collapse features on the Sinkhole Terrain Survey shall require that the applicant's geotechnical engineer licensed in the State of Tennessee determine and certify the appropriate sinkhole retention area buffer based on their analysis of the particular collapse feature.

231.10A At a minimum this analysis shall take into account surrounding evidence of instability such as surrounding soil subsidence.

231.10B The sinkhole retention area buffer shall be measured starting from the last closed contour line of the sinkhole as determined by the applicants geotechnical engineer.

231.10C No activities are permitted within the sinkhole retention area buffer except for regular maintenance and landscaping.

231.10D Sinkhole retention area buffers located down slope of development activities shall be physically screened with soil erosion and sediment controls approved by the Public Works Department.

231.10E Sinkhole retention area buffers shall include ground cover and tree plantings as approved by the Public Works Department.

231.10F Flow of surface water into a sinkhole low point shall not be increased from pre-development conditions as calculated within the geologic assessment report.

SECTION 231.11 DISCOVERY OF SINKHOLE FEATURE DURING DEVELOPMENT

The discovery of previously unknown karst geologic features during development activity shall require that:

231.11A All work other than erosion and sediment control installation within the area shall be immediately discontinued

231.11B Developer shall report the discovery of such features to the Planning Department and Public Works Department

231.11C Developer's geotechnical engineer licensed in the State of Tennessee shall report and consult on the matter with the Planning Department and Public Works Department

231.11D Continuation of site disturbance and construction cannot proceed without express authorization from the Planning Director and Public Works Director

231.11E The Planning Director and/or the Public Works Director may require revisions to all related plats and other plans based on the location and scope of the newly discovered sinkhole feature. Revisions shall comply with Section 231.10.

SECTION 231.12 PERMITTED PRINCIPAL USES AND STRUCTURES

231.12A Within residential districts uses such as lawns, gardens, parking areas, and open space or landscaped areas.

231.12B Within commercial and industrial districts uses such as loading areas, parking areas, and open space or landscaped areas.

231.12C Private and public recreation uses such as golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, boat launching ramps, swimming areas, parks, wildlife and nature preserves, target ranges, trap and skeet ranges, hunting and fishing areas, hiking and horseback riding trails.

231.12D Agricultural uses such as general farming, pasture, grazing, outdoor plant nurseries, horticulture, viticulture, truck farming, forestry, sod farming and wild crop harvesting.

231.12E Any use which the Building Official determines to be compatible with the intent of this district.

SECTION 231.13 PROHIBITED USES AND STRUCTURES

Any use or structure not specifically permitted or permitted on appeal.

SECTION 231.14 USES PERMITTED BY SPECIAL REVIEW

Uses and structures permitted in the underlying zone may be permitted in a sinkhole retention area as shown on the City of Cookeville Zoning Map only upon application to the Planning Commission and subject to the following conditions:

231.14A The applicant shall submit to the Department of Public Works and the Planning Commission evidence that the proposed use can be protected from inundation by retaining wall, levee, or other means without undue interference either with the flow of any water course or with any necessary retention basin.

231.14B The Public Works Department shall review the evidence submitted by the applicant and make a written evaluation and recommendation of same to the Planning Commission.

231.14C Upon consideration of said evidence by the Planning Commission, the applicant may be granted a permit with protective measures stipulated as being conditional to approval of the permit.

231.14D No building permit and no use and occupancy permits shall be issued until and unless the above conditions have been met to the satisfaction of the Building Official.

231.14E All subdivision proposals and other new development plans are required to record the boundaries of the sinkhole retention area buffer. This boundary may differ from the established sinkhole retention area buffer only on approval of the Department of Public Works which shall be noted on said plat or plans.

SECTION 231.15 STANDARDS FOR REVIEW

In all areas designated as a sinkhole retention area where a use is proposed that is not specifically permitted, review by the Planning Commission will include a site plan showing all of the following items:

231.15A Scale not less than 1 inch = 100 feet

231.15B Two (2) foot contour intervals

231.15C Location and lowest elevation of sinkholes

231.15D Location of natural and man-made drainage ways

231.15E Zoning of adjacent properties

231.15F Any other features deemed appropriate by the Building Official in conjunction with the Public Works Director

SECTION 231.16 CONFLICT WITH OTHER PROVISIONS

231.16A The requirements of the SRA District are additional to those contained in the basic underlying zoning districts.

231.16B Where any conflicts exist between the provisions of this section and any other provisions of this ordinance, code, law, rule, regulation or policy of the City of Cookeville, these provisions shall not be construed as permitting any land use which is prohibited or permitted only as a special exception within the basic zoning district.

SECTION 231.17 INTERPRETATION OF DISTRICT BOUNDARIES

Where interpretation is needed as to the exact location of any boundaries relating to the SRA District, the Building Official, in conjunction with the Public Works Director, shall make the necessary interpretation.