



**MONTGOMERY COUNTY GOVERNMENT
BUILDING AND CODES DEPARTMENT**

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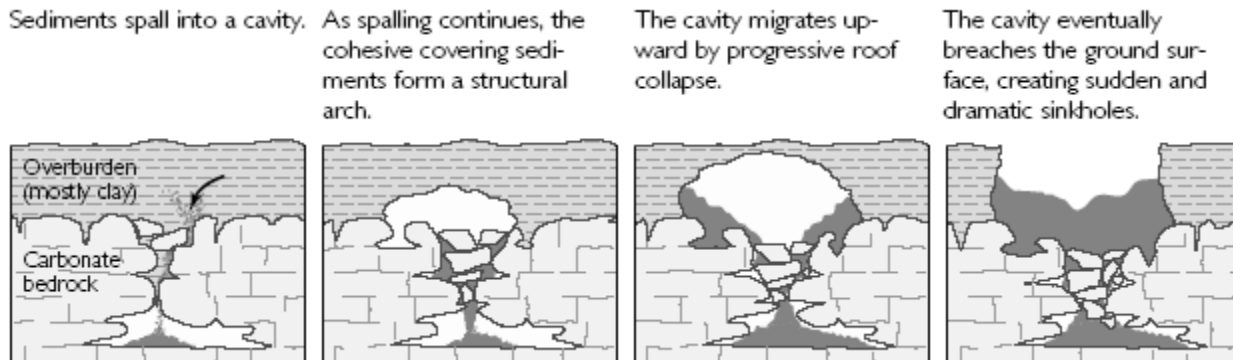
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Sinkholes

Sinkholes are the result of water movement through limestone rock formations. As water moves through the natural cracks in these formations, the limestone is slowly dissolved leaving open spaces in the rock structure. When enough limestone has dissolved to weaken the rock, the surface soil collapses into a cone shaped depression commonly called a sinkhole. The size of the sinkhole is dependent on several factors including groundwater level, surface water infiltration rate, overburden depth, and water chemistry. Once formed, a sinkhole can grow in size unpredictably, based on conditions specific to that area.

Sinkholes are a common feature of Montgomery County and the surrounding areas. The following diagram illustrates the most common sinkhole formation mechanism for this area.



Sinkholes are difficult to stabilize permanently because they are chronic features that may grow or reform after filling. The process of filling sinkholes may also cause changes in the existing patterns of surface runoff and ground water flow that should be avoided. It is important that a civil engineer or geotechnical professional be consulted before making any attempt to alter or “fix” a sinkhole.

Montgomery County Storm Water Regulations require a 60 foot undisturbed buffer zone around any throats, cave entrances or Class V Injection Well structures to help protect ground water quality. The buffer provides significant reduction of total suspended solids, nutrients, and other pollutants that would otherwise be transported into the sinkhole by storm water flows.

During periods of construction, a marked buffer area acts to limit activities that may increase a sinkhole’s instability. This is necessary because the limestone underlying a sinkhole may be unstable, and vibration from construction and heavy equipment can result in increased personal and property danger.

Because sinkholes represent a direct path for pollution to enter area water resources, it is illegal to put any substance on the ground that can be washed into any sinkhole, or to dispose of trash, dirt, yard waste, garbage, building materials, animal wastes or chemicals by dumping them in or around a sinkhole. Landowners, farmers, businesses and industries are legally liable for accidental leaks that may result in contamination entering a sinkhole.

Care must be taken to prevent pollution from entering sinkholes. By taking a few basic precautions around sinkholes, you can help prevent water pollution. These precautions include:

- Establish a buffer zone of undisturbed, deep rooted, native vegetation around the sinkhole, which will act as a pollution filter. While the EPA recommends a 100 foot buffer, studies have shown that even 30 feet of vegetated buffer will significantly reduce the pollution that can be carried into a sinkhole by storm water runoff.
- Use fencing to keep livestock from the immediate vicinity of the sinkhole. This will limit the deposition of animal wastes near the sinkhole, which could be carried into the sinkhole and on to our streams by storm water runoff.
- Do not use fertilizers, pesticides or herbicides in or around sinkholes.

Class 5 Injection Wells are sinkholes that have been modified to dispose of surface runoff. Any modification to a sinkhole or change to the area around a sinkhole that results in an increase in the amount of runoff being directed into the sinkhole must be permitted by the Tennessee Department of Environment and Conservation Underground Injection Control section.

For more information, please go to:

EPA's Office of Ground Water and Drinking Water Web Site:

<http://www.epa.gov/safewater>

Tennessee Department of Environment and Conservation, Office of Water Pollution Control:

<http://tennessee.gov/environment/wpc/>

Montgomery County Storm Water Management and Control Regulation Program Website:

<http://www.mcgtm.org/stormwater/forms>

Sinkhole Formation Diagrams borrowed from: Waltham, T., Bell, F.G., Culshaw, M.G. (2005). Sinkholes and Subsidence Karst and Cavernous Rocks in Engineering and Construction. Springer Berlin Heidelberg, Denver, CO.