Sinkholes and Remediation

So, you think you have a sinkhole on your property. Now what?

The first thing is to understand what kind of sinkhole you have. Sinkholes can be divided into three types based on the source of the sinkhole – geologic, solid waste, and excavation. Each is created in a different way and handled in a different way. A field investigation may be required to identify the cause of a sinkhole. This investigation may include evaluation of the site geology, history of land use and development, and understanding of local underground infrastructure.

Usually, sinkholes develop gradually by a slow sagging of soil downwards into a cavity. However, sometimes they appear suddenly when a soil bridge collapses into a buried void. These suddenly appearing sinkholes are the most dangerous as they may give no indication of instability until too late.

Types of Sinkholes

1) Geologic sinkholes
   Geologic sinkholes form in and over soluble geologic materials. In New Jersey these are carbonate rocks (limestone, dolomite, marble, and lime sand). Over time, usually hundreds of thousands of years, water dissolves the carbonate material leaving a void space behind. A sinkhole forms when overlying material collapses into the void. These sinkholes occur primarily, but not exclusively, in northwestern New Jersey. These sinkholes are karst features and, to a geologist, these are the only true sinkholes. The New Jersey Geological and Water Survey has an information circular describing Karst Features in New Jersey. This is available at: https://njgeology.org/enviroed/infocirc/karst.pdf

   Geologic sinkholes may be shallow or deep. In northern New Jersey they may connect to a network of voids large enough to be a cave. There has been some success in filling these sinkholes but this requires an understanding of their extent. And it may take a significant volume of cement or other fill material. Any remediation should be done with the assistance of a professional engineer working with a geologist and a licensed contractor.

2) Solid waste sinkholes
   A solid waste sinkhole forms when degradable material (generally wood) is buried and then decays, leaving a void. The overlying material may sink down into the void resulting in a surface depression. The size of the surface depression depends on the amount of decayed material. If a parcel of land is developed by first cutting down and burying trees or woody construction debris, then at some point in the future this wood could decay, resulting in surface depressions. Another example is after a tree falls or is cut down. Small, linear depressions may develop over the path of the root structure, with a larger depression at the site of the former tree trunk. The Department of Environmental Protection's Bureau of Solid Waste Compliance and Enforcement has a

guideline for handling solidwaste sinkholes caused by the improper disposal of solid waste. That guideline is available at: https://njgeology.org/enviroed/freedwn/BSWCEsinkholeguidance.pdf.

3) Excavation sinkholes
Humans excavate for various reasons. This may include mining or installation of pipes and drains. There have been cases in New Jersey where the shafts to an underground mine and old open cuts were not properly sealed when the mines were abandoned in the 1700's, 1800's or early 1900's and later development occurred over the abandoned mines. Over time the fill material in the mine shafts or open cuts may be eroded away leaving a home owner with a sinkhole. In other cases, a water or sewer pipe may break with rushing water eroding away soil, causing a void. The pipe break may not be noticed until overlying material collapses into the void. In addition, some sinkholes have been caused by the collapse of long-abandoned septic tanks, cesspools, drywells, and petroleum tanks. Remediation of a previously excavated cavity will require filling that cavity. If the cavity was caused by water erosion, the source of the water should first be eliminated. If the cause is related to an abandoned mine the Department of Labor and Workforce Development, Public Safety and Occupational Safety and Health should be contacted. Any remediation work should be done with the assistance of a professional engineer and a licensed contractor.

Remediation of Sinkholes

There are currently no state or federal funds available for the remediation of sinkholes in New Jersey. Generally, the responsibility for a geologic sinkhole lies with the landowner. In the case of a solid waste sinkhole responsibility may lie with the party who deposited the solid waste if this was done in violation of appropriate laws and regulation. The local municipality's planning office or engineer's office may be able to help with information. In the case of an excavation sinkhole caused by a leaking pipe, the pipe owner may be responsible for remediation. The local municipality's engineer's office may be of assistance with information on pipe location and ownership.

If you wish for the New Jersey Geological and Water Survey to confirm the type of bedrock underlying your property, please contact the Survey at njgsweb@dep.nj.gov and provide your street address, municipality, and county. The Survey's web site (njgeology.org) provides geologic data and maps. Another option is using NJ-GeoWeb. This is an on-line graphical tool which displays spatial data. Bedrock geology is one data set available, along with many others. This tool is available at nj.gov/dep/gis/geowebsplash.htm.

Please note that the New Jersey Geological and Water Survey cannot recommend professional engineers, geologists, or licensed contractors who may be needed to develop and implement a remediation plan.