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The Relationship Between Geology and Landslide Hazards of Atchison, Kansas, and Vicinity

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ABSTRACT

Landslides along the Missouri and Kansas rivers will affect existing structures and potential development in the Kansas City metropolitan area. A pilot landslide-mapping project was conducted in the vicinity of Atchison, Kansas, to inventory existing landslides and determine the factors that caused them. Landslides are generally controlled by the slope morphology, geology, soils, and moisture conditions. For this study, landslides were divided into recent and older landslides (including earth slides and earth flows) and rock-fall hazards (including rock falls and rock topples). Recent landslides are associated with shale members of the Pennsylvanian Lawrence Formation, Oread Limestone, Kanwaka Shale, and Tecumseh Shale. Limestone layers that occur between these shale members were incorporated into recent and older landslides. Recent landslides occurred on slopes with an average angle of 22 degrees. Recent landslides were also observed in glacial drift, loess, and alluvium. Rock-fall hazards occurred in areas of nearly vertical slopes along streams, river bluffs, highways, and quarries, where limestone members of the Pennsylvanian Oread, Lecompton, and Deer Creek Limestones are exposed. Troublesome rock-fall hazards occurred where weak shale layers are eroding underneath resistant limestone layers.

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