



Memo

To: Mr. John Walczak, Director
Louisville Zoo

From: Mary Knopf, PE
Mark Schuhmann, PE
Wood Environment and Infrastructure Solutions, Inc.

Date: March 14, 2019

Re. Louisville Zoo- Mega Cavern Subsidence

The purpose of this memorandum is to provide a brief summary of our visual observations and recommendations made regarding the area of ground subsidence observed at the Louisville Zoo property. Wood geotechnical engineers performed numerous site visits between Wednesday, March 6th and Tuesday, March 12th to complete a visual assessment of the ground subsidence site and adjacent areas. These observations and comments refer to the area of subsidence which occurred on March 6th, 2019.

The area of ground subsidence is located in an undeveloped and unoccupied area of the Zoo along the southern property line, north of Taylor Avenue and the Louisville Mega Cavern. The subsidence area is bounded by a gravel maintenance roadway to the south, a second gravel maintenance roadway to the west, a chain-link fence and an asphalt roadway to the north, and a treed area to the east. The subsidence area site is partially covered in mature trees and vegetation. The area of ground subsidence is visually estimated to be 80 yards long (in the east-west direction), 50 yards wide (north-south direction) and 40 feet deep. The perimeter of the subsidence area is well defined and exposes varying thicknesses of limestone rock.

Wood was provided an escort in the Louisville Mega Cavern by a Professional Mining Engineer (Mr. David Newman, PhD, PE, PG with Appalachian Mining & Engineering, Inc.) who was retained by the Louisville Mega Cavern. We viewed the subsidence area as well as the portion of the Louisville Mega Cavern, which was accessible by foot and underlies the Louisville Zoo area. The subsidence area is well defined, and we did not observe areas of obvious concern outside of the boundary restricted area noted below. The cause of this subsidence is undetermined at this time. The area of the Louisville Zoo property where the subsidence is located is near the eastern boundary of the Louisville Mega Cavern. An adjacent area of the Louisville Mega Cavern between the subsidence area and Entrance 4 of the Louisville Mega Cavern was identified by the Mining Engineer as an area that will require remediation. We recommend the east-west running gravel maintenance road located south of the subsidence area and north of the Zoo property line, be closed until this area has been remediated and additional investigations completed to evaluate the eastern extent of the mine. It should be noted that the location of the area requiring remediation was noted below ground and the correlation to the above grade location will be provided by Louisville Mega Cavern.

We believe a physical barrier should be erected on the ground surface no less than 40 feet from the perimeter of the subsidence area on the west, north and east sides and extending to the Louisville Zoo's property line on the south side. The barrier should stay in place until a permanent solution has been determined and implemented.

This memorandum is for the exclusive use by the Louisville Zoo only. It may not be relied upon by any other parties. We trust the information contained in this memo meets your current needs. If you have any questions, please do not hesitate to contact us at (502) 267-0700.

11003 Bluegrass Parkway
Suite 690
Louisville, KY 40299
(502) 267-0700