Background

- Landslides are a well-documented geologic hazard in the Appalachian Plateau region of western Pennsylvania.
- During construction of I-79 in the 1960s, highway slope excavation reactivated a pre-existing rockslide in Allegheny County, PA (Fig. 1).
- Geology in the region consists of generally flat-lying to gently folded alternating layers of weak and resistant sedimentary rock. Steep slopes have been carved by fluvial erosion and covered with colluvial soil.
- Lithologies in the study area are part of the Conemaugh Group of Pennsylvanian strata.
- Rockslide features include:
  - Vertical exposure of Morgantown Sandstone at head scarp.
  - Detachment and downslope movement of Morgantown Sandstone has created a deep graben-like feature below the head scarp (Fig. 7 and Line 4).
  - Near-vertical stress-relief jointing creating open fractures on the surface that can reach depths of over 100 ft.
  - Large secondary scarp approximately 270 ft downslope from head scarp.
  - Slide dimensions are approximately 1,100 ft wide by 650 ft long down axis.

Methods

- Electrical resistivity data were collected July 11-12, 2016.
- 1150 feet of ER survey profiles.
- Survey profiles included two longitudinal lines (1 and 4) and two transverse lines (2 and 3) collected across the accessible parts of the slide footprint and where the potential to image rockslide features was maximized.
- Experimented using dipole-dipole, Wenner, and Schlumberger electrode configurations for all profiles, and used different electrode spacing.
- Used Advanced Geosciences, Inc. SuperSting 8-channel resistivity meter.
- Inversions were made using Advanced Geosciences, Inc. AGI EarthImager 2D ver. 2.3.0.

| Table 1. Electrical Resistivity Lines, Distance, and Electrode Spacing |
|---------------------------|----------------|--|----------------|
| Line | Distance (ft) | Electrode spacing (ft) |
| 1   | 365           | 5               |
| 2   | 330           | 10              |
| 3   | 290           | 5               |
| 4   | 164           | 3               |

Objectives

- Integrate electrical resistivity (ER) data, a priori knowledge of slope movement and stratigraphy, and observable surficial features to characterize subsurface.
- Compare multiple electrode configurations and spacing to determine effectiveness of each.