PRELIMINARY SURFICIAL GEOLOGY OF THE SEDGWICK COUNTY PORTIONS OF THE MOUNT HOPE AND PATTERSON QUADRANGLES, KANSAS

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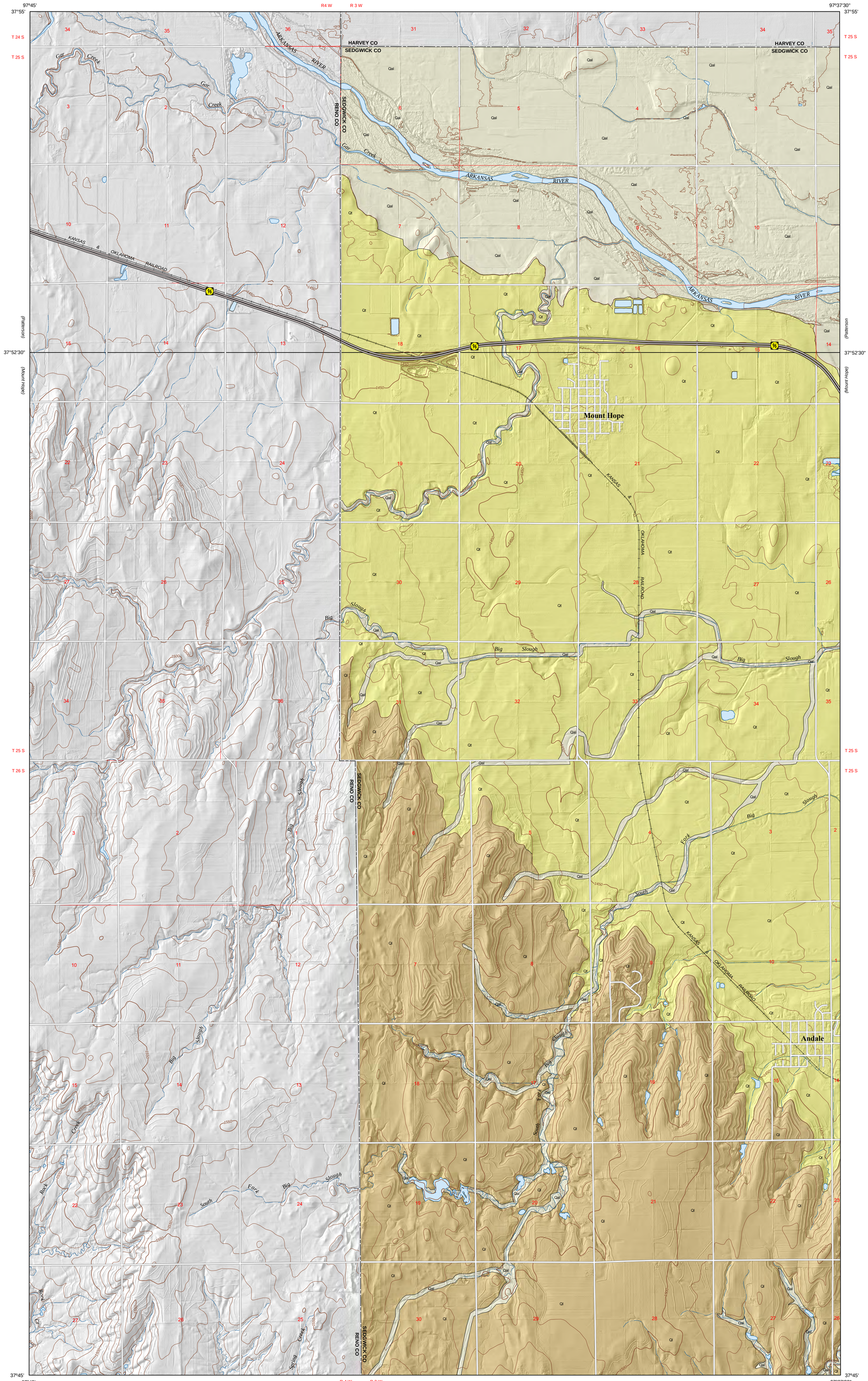

KANSAS GEOLOGICAL SURVEY
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GEOLOGIC UNITS

CENOZOIC

Quaternary System
Pleistocene–Holocene

Alluvium — Alluvium in Sedgwick County is fine to coarse sand and fine to coarse arkosic gravel containing minor amounts of silt and clay that grades upward into clayey silt. Alluvium from the Arkansas River is composed of unconsolidated gravel, sand, and silt and has an estimated thickness of 75 feet (Williams and Lohman, 1949). Pleistocene-age alluvium is present to a depth of nearly 50 feet and Pleistocene to possibly Pliocene to a depth of more than 180 feet (Lane and Miller, 1965). Alluvium of Quaternary age lines the floodplain of the Little Arkansas River with limited extension up smaller creeks. In certain areas, alluvium may form low terraces of 10–20 feet above the floodplain (Aber, 1991). Alluvium found in smaller creeks is composed of finer sediments and is variable in lithology (Moore, Jewett, and O'Connor, 1951). Its source is the shales and carbonates in the Permian Wellington Formation and Pleistocene loess.

Loess — Wind-blown loess deposits in Sedgwick County are tan to pink-tan calcareous silt with zones of caliche and fine sand (Bevans, 1989). The loess ranges from Pleistocene to Holocene in age. Loess covers many of the upland surfaces in Sedgwick County (Welch and Hale, 1987) and rests unconformably on the Permian Wellington Formation and stratigraphically below thick (>5ft) soils.

Terraces — Terraces consist of unconsolidated sediments in the Arkansas River floodplain (Lane and Miller, 1965). Terraces are predominately gravel, sand, clay, and silt varying in thickness and occasionally contain clay and silt lenses (Bayne and O'Connor, 1968). Terraces were subdivided by Bayne (1962) as representing deposition in the Illinoisan Stage and the Wisconsinan Stage. The older Illinoisan Stage terrace deposits are primarily silt and sandy silt (Bayne and O'Connor, 1968). Sand and gravel beds are also known to locally contain clay and silt lenses (Bayne and O'Connor, 1968). Loess-derived silts, largely yellowish to reddish-brown in color, are found in the upper portion of these terrace deposits. These loess-derived deposits are approximately 40 feet thick in Sedgwick County (Lane and Miller, 1965). Later rejuvenation of the Arkansas River during the Wisconsinan Stage caused the river's incision into earlier terrace deposits. This process deposited arkosic sand and gravel and subsequently silt and clay deposits (Bayne, 1962). In south-central Kansas, this unit is derived from Paleozoic and Mesozoic deposits and can reach 55 feet in thickness (Bayne, 1962).

CITED REFERENCES

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EXPLANATION

Boundaries and Locations
- Township/range line
- Section line

Transportation
- State highway
- Local road
- Railroad

Hydrology and Topography
- Perennial stream
- Intermittent stream
- Water body
- Water body (manmade shoreline)
- Elevation contour (50-foot interval)
- Elevation contour (10-foot interval)
- Depression contour (50-foot interval)
- Depression contour (10-foot interval)

Geologic Unit Boundaries
- Observed contact

SEDGWICK COUNTY QUADRANGLES

1	Patterson	15	Wichita East
2	Bentley	16	Andover
3	Sedgwick	17	Cheney SE
4	Sedgwick NE	18	Lake Afton
5	Whitewater	19	Clearwater
6	Mount Hope	20	Bayneville
7	Colwich	21	Derby
8	Maize	22	Rose Hill
9	Valley Center	23	Norwich
10	Greenwich	24	Conway Springs
11	Cheney	25	Millerton
12	Garden Plain	26	Zyba
13	Goddard	27	Belle Plaine
14	Wichita West	28	Mulvane

Elevation contours are presented for general reference. Used in the U.S. Geological Survey's current US Topo 1:24,000 0-scale topographic map series, they were generated from hydrographically improved 1/3 arc-second National Elevation Dataset (NED) data and smoothed during processing for use at 1:24,000 scale. In some places, the contours may be more generalized than the base data used for compilation of geologic outcrop patterns. Outcrop patterns on the map will typically reflect topographic variation more accurately than the associated contour lines. Repeated fluctuation of an outcrop line across a contour line should be interpreted as an indication that the mapped rock unit is maintaining a relatively constant elevation along a generalized contour.

USGS National Elevation Dataset 1/3-arc-second 15 x 15 minute hillshade grids and 1-meter 2009 U.S. Department of Agriculture–Farm Services Agency (USDA–FSA) National Agriculture Imagery Program (NAIP) digital imagery were used as references in the digital mapping. USGS 7.5-minute 1:24,000-scale topographic maps, USDA–Natural Resources Conservation Service (NRCS) Web Soil Survey Geographic Database (SSURGO), and other geologic maps and bulletins were used to supplement the mapping. Roads and highways are shown on the base map as represented by data from the Kansas Department of Transportation (KDOT), U.S. Census Bureau, and other sources. U.S. Department of Agriculture–Farm Services Agency (USDA–FSA) National Agriculture Imagery Program (NAIP) imagery also was used to check road locations.

Shaded relief is based on 1-meter hydroflattened bare-earth DEMs from the City of Wichita-Sedgwick County LiDAR project. The original 1-meter DEM images, in ERDAS IMAGINE format, State Plane Kansas-South projection, North American Datum of 1983 (NAD 83), were resampled to 3-meter resolution, mosaicked into a single output DEM, which was reprojected to Universal Transverse Mercator (UTM) Zone 14. The output DEM was then converted to a hillshade, a multidirectional shaded-relief image using angles of illumination from 0°, 225°, 270°, and 315° azimuths, each 45° above the horizon, with a 4x vertical exaggeration.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program, award number G16AC00195 (FY2016).

This map was produced using the ArcGIS system developed by Esri (Environmental Systems Research Institute, Inc.).

This map is a preliminary product and has had less scientific and cartographic review than the Kansas Geological Survey's M-series geologic maps. KGS does not guarantee this map to be free from errors or inaccuracies and disclaims any responsibility or liability for interpretations made from the map or decisions based thereon.

SUGGESTED REFERENCE TO THE MAP

Parcell, W. C., Dinkel, G. L., Post, S. D., and Dunham, J. W., 2017, Preliminary surficial geology of the Sedgwick County portions of the Mount Hope and Patterson quadrangles, Kansas: Kansas Geological Survey, Open-File Report 2017-26, scale 1:24,000, unpublished.

SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2
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MILES
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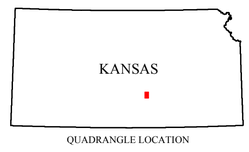
FEET

UNIVERSAL TRANSVERSE MERCATOR PROJECTION, ZONE 14
NORTH AMERICAN DATUM OF 1983

APPROXIMATE MEAN
DECLINATION, 2017



QUADRANGLE LOCATION