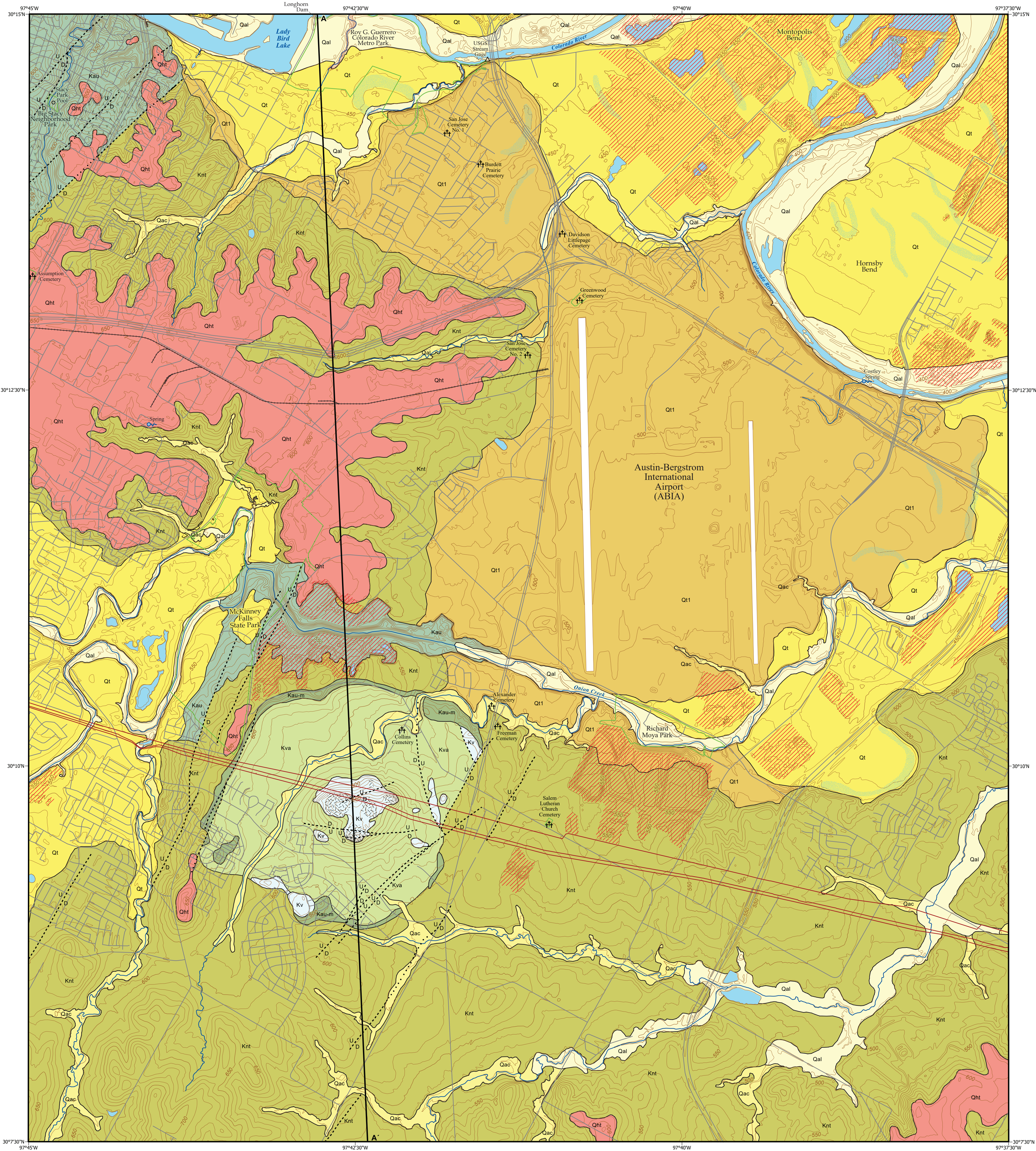




Explanation

Holocene

Qal—Quaternary alluvium: Channel, floodplain, and adjacent low terraces along Colorado River, Onion Creek, and the lower reaches of Dry Creek; unconsolidated sand, gravel, silt, and clay; dark brown clay-loam soil approximately 3 ft thick; maximum thickness of unit is as much as 30 ft along Hornsby Bend of the Colorado River.

Qac—Quaternary alluvium and colluvium: Stream channel and floodplain deposits along valley bottoms and adjacent slope-wash and colluvial deposits along valley sides; these processes are expressed as narrow, elongated headwaters with concave-upward cross sections. Materials consist of silt, clay, and some admixed gravel with local exposures along cut banks of streams; thicknesses estimated to range from 5 to 10 ft.

Qt1—Quaternary alluvial terrace: Sand, gravel, and clay, unconsolidated to weakly cemented by caliche; low-relief, gently sloping terrain adjacent to floodplain/channel; dark brown clay-loam soil 3-6 ft thick; total thickness of map unit ranges up to 60 ft; numerous paleo-channel deposits occur on the Hornsby Bend and Montopolis Bend; these floodplain scrolls/awales are seen as soil-filled features visible on air photos and lidar; locally the features have muted topographic expression with relief up to about 5 ft. Local alluvial terrace at a somewhat higher elevation is denoted at Qt1.

Qht—Quaternary high alluvial gravel: Admixed gravel, silt and clay; poorly sorted and loosely consolidated to weakly cemented by caliche; clasts consist of chert, vein quartz, and limestone pebbles and cobbles derived from uplands of the Hill Country, Edwards Plateau, Llano Uplift, and beyond; variable thickness (up to about 40 ft). Soil cover consists of stony clay, but slope wash of soil and poorly consolidated substrate obscures contacts. The gravel substrate may provide shallow (perched) groundwater resources as well as local aggregate for road metal.

Cretaceous

Knt—Taylor-Navarro Groups, undivided: The dominant constituent of this unit is claystone with variable calcareous content, as well as local thin siltstone partings. Within the Austin area, these combined units contain more than 900 ft of substrate beneath the Blackland Prairie terrain (Barnes, 1974; Young, 1977). Constituent formations and members cannot be discriminated, owing to poor exposures and overall similarities of substrate properties. This stratigraphic sequence represents open-marine environments that received long-term influx of volcanic ash. These ash deposits weathered to form montmorillonite, which is the main type of clay minerals common to this unit. These substrates and their weathered surface soils are notorious for engineering problems (low strength, high shrink-swell, low permeability, high erodibility, and high corrosion potential). Thick, dark-brown clay soils constitute prime agricultural land, typical of the Blackland Prairies of Central Texas.

Kau—Austin Group, undivided: This unit comprises parts of seven formations that consist mostly of earthy, compact limestone, local chalk intervals, and marly horizons. This undivided unit is mapped in the northwest corner of the Montopolis Quadrangle. There, bedrock is a chalky limestone that is fairly easily excavated, but is a stable foundation material. It is locally interbedded by weathered intervals of volcanic ash. This area of the map is cut by several faults of the Balcones system, so that an undisturbed section of bedrock is difficult to ascertain. Estimated thickness of the Austin plus the interbedded volcanic ash deposits is probably about 200 ft in this area.

Kau-m—McKown Formation of the Austin Group: In the vicinity of Pilot Knob volcano, the main exposures of the Austin Group consist of resistant limestone strata of the McKown Formation, a grainstone that represents beach rock and reef atoll that surround the lagoon and high-standing expression of the dense, durable marine volcanic rocks of the Pilot Knob complex. This limestone unit is up to 32 ft thick, and was quarried on the high-standing reef deposits, north of the igneous complex, and nearby areas along Onion Creek. This resistant bedrock unit forms the ledges that are interbedded with volcanic ash deposits, that are undercut by stream flow to form the lower and upper falls of Onion Creek in McKinney Falls State Park.

Pilot Knob Volcanic Complex: This complex includes the remnants of a marine volcano with hard alkaline rock surrounded by altered volcanic ash. The generalized extent of mainly high-standing volcanic rock is mapped as Kv, and the weathered ash strata are denoted as Kva. In addition, local areas contain hard volcanic deposits exhibiting abrupt changes in topographic relief, mapped as Kv-h. The altered deposits of volcanic ash (Kva), form low-lying landscapes that are readily sculpted by surface streams. The material is weak and exhibits moderate plasticity. Surficial soils are amenable to cultivation.

Map Symbols (lines, symbols, and patterns)

—	Contact (distinct)		Headwater erosion: modern erosion along Country Club Creek.
- - -	Contact (approximate)		High relief volcanics: Topographic highs of the Pilot Knob volcanic complex.
— U — D —	Fault—showing sense of motion. U = upthrown block; D = downthrown block. Dashed where inferred; dotted where concealed.		Interbedded/admixed with volcanic ash: Highly faulted area of the Austin Chalk, undivided, that is locally interbedded by volcanic ash of the Pilot Knob volcanic complex.
A — A'	Cross section line		Disturbed land: significant change to surface topography; includes grading, excavation and mining pits and tailing piles.
	Stream (active or intermittent), drainage ditch, canal, or tidal channel.		Meander scar
	Elevation (ft); contour interval 10 ft.		Water: river, ponds, water filled excavated pits.
	Roads		Parks: city, county, and state park boundaries of geologic interest.
	Railroad		ABIA airport runway
	Pipeline		
	Spring		
	Gage		
	Well		
	Cemetery		

Acknowledgments

The mapping of this quadrangle entailed analyses of aerial photographs, review of existing geologic mapping, and field work. The topographic base was created from GIS digital files of the Montopolis, Texas, 7.5-minute topographic quadrangle map, from the U.S. Geological Survey.

We obtained 0.6- and 1.0-m pixel, natural color, National Agriculture Imagery Program digital imagery from the U.S. National Resources Conservation Service (2022 vintage), and Texas Natural Resources Information System (TNRIS) (2020 vintage). Lidar coverage of the quadrangle (at 1 m resolution) was obtained from the Strategic Mapping Program (StratMap), Central Texas Lidar of 2018 vintage.

Data from water wells and petroleum-exploration wells available from online data bases of the Texas Water Development Board (TWDB) provided information on depth and thickness of various units. Digital GIS files of roads and railroads were obtained from the Texas Department of Transportation. Streams, river- and lake-shores were mapped from 2022 aerial imagery.

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