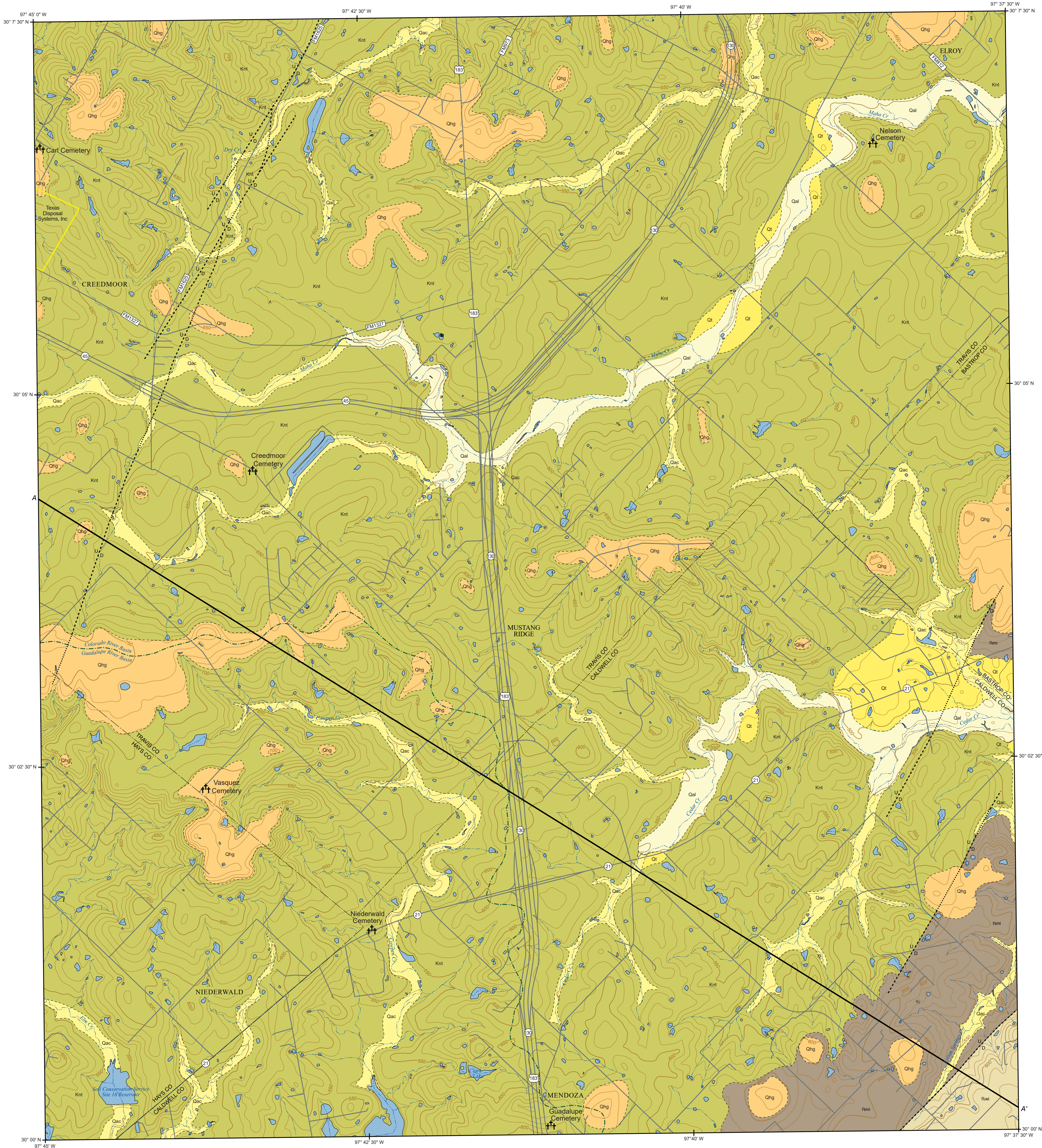
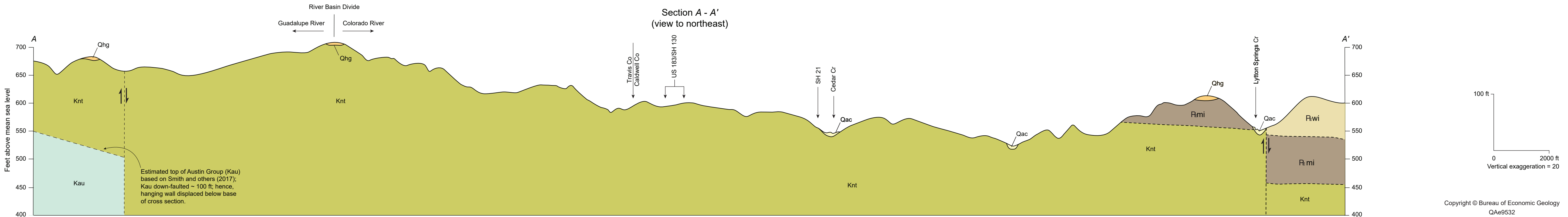


GEOLOGIC MAP OF THE CREEDMOOR QUADRANGLE, TEXAS

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GEOLOGIC UNITS

QUATERNARY

- Qal**—Quaternary alluvium: Channel, floodplain, and adjacent low terraces along upper reaches of Cedar Creek and Maha Creek; unconsolidated sand, gravel, silt, and clay; dark brown clay-loam soil approximately 3 ft thick; estimated total thickness of unit is 15 ft.
- 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.
- Qt**—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 from 10 to 25 ft.
- Qhg**—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) with thickest sections north of Cedar Creek along the boundary with the Lytton Springs quadrangle, and along the drainage divide separating the Colorado and Guadalupe watersheds near the border between the Creedmoor and Buda quadrangles. 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.

PALEOGENE

- P.wi**—Wilcox Group, undivided: Fault-bound occurrence in southeast corner of Creedmoor quadrangle, an area having limited access and no outcrops. On the basis of exposures on the Lytton Springs sheet, substrate is inferred to consist of siltstone, and sandstone, which is mostly friable. Total estimated thickness of unit on this map is approximately 70 ft. Terrain consists of a northwest-facing topographic ridge having relief of about 50 ft; silty- and sandy-clay soils are mostly 3 to 5 ft thick.
- P.mi**—Midway Group, undivided: Mudstone, mostly clayey but locally sandy, micaceous, and glauconitic, with lenses of ferruginous and calcareous concretions (Garner and Young, 1976). This material results in a continuation of the thick, clay-loam Blackland soils that form on the nearby Upper Cretaceous claystone units. The contact with the underlying Navarro Group represents the Cretaceous-Paleogene boundary (formerly known as the "K-T" boundary), which marks the instant of geologic time (66 Ma) when an asteroid or comet hit the Earth with catastrophic results: demise of non-avian dinosaurs and many other life forms. Despite the extraordinary geologic event that created the boundary between strata representing the end of the Mesozoic Era and the beginning of the Cenozoic, the contact is not well expressed in this area, and it is inferred on this map. Estimated thickness of this unit within the Creedmoor quadrangle is roughly 75 ft.

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. These comprise 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, with similar substrate materials extending into the overlying Midway Group. The 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, 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: Limestone, chalk, and marl—not exposed within map limits, but its inferred subsurface position is shown in the cross section, based on work by Smith and others (2017).

Map Symbols

- Geologic contact, dashed where approximate
- USGS topographic contour showing elevation (feet above MSL). Contour interval = 10 ft.
- Road
- Intermittent stream
- Watershed divide
- Water body (lake/pond)
- County boundary
- Cross section line
- Fault—showing sense of motion.
U = upthrown block; D = downthrown block.
Dashed where inferred; dotted where concealed.
- Sanitary landfill
- Cemetery

Acknowledgments

The mapping of this quadrangle entailed analyses of aerial photographs, review of existing mapping, and field work. The topographic base was created from digital files of the Texas Natural Resources Information System (TNRIS) for the U.S. Geological Survey, Creedmoor, Texas, 7.5-minute topographic quadrangle map. Digital files of roads, county boundaries, drainage, and lakeshores were also obtained from TNRIS. 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. Lidar coverage of the quadrangle (at 1m resolution) was obtained from the Strategic Mapping Program (StratMap), Central Texas Lidar of vintage 2017-01-01, downloaded on 2021-01-22.

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References

- Barnes, V. E., Project Director, 1974, Austin Sheet: The University of Texas at Austin, Bureau of Economic Geology Geologic Atlas of Texas Austin Sheet, text to accompany map—reprinted 1995, map scale = 1:250,000.
- Garner, L. E., and Young, K. P., 1976, Environmental geology of the Austin area: an aid to urban planning: The University of Texas at Austin, Bureau of Economic Geology, Report of Investigations No. 86, 39 p.
- Smith, B. A., Hunt, B. B., and Daring, B. K., 2017, Hydrogeology of the saline Edwards zone, southeast Travis County, Central Texas: Barton Springs Edwards Aquifer Conservation District, BSEACD Report of Investigations 2017-1015, 61 p.
- Young, Keith, 1977, Rocks of the Austin area, in Student Geology Society, The University of Texas (Austin), Guidebook to the geology of Travis County, p. 16-35.

