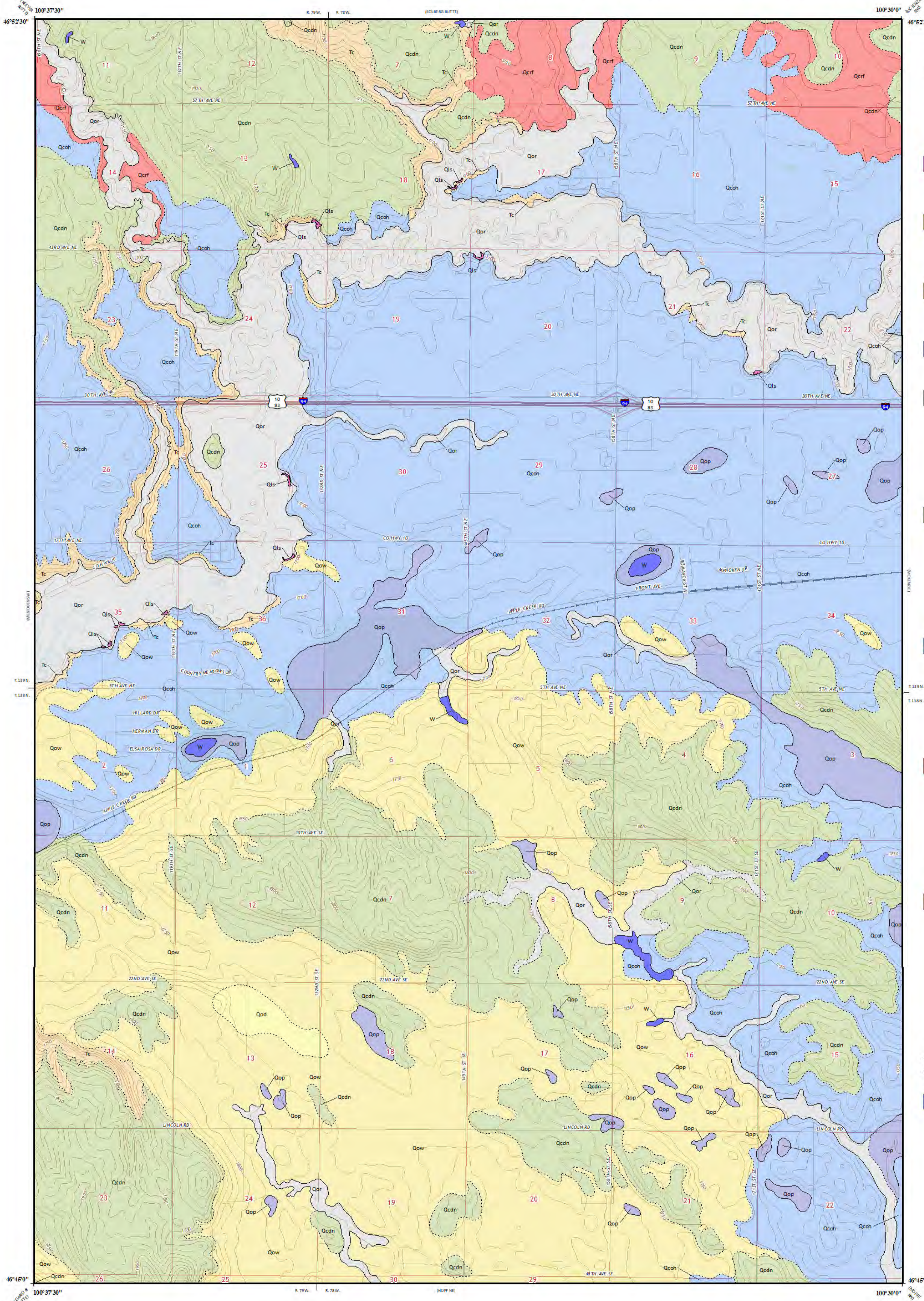


Surface Geology Menoken Quadrangle, North Dakota

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QUATERNARY SYSTEM

HOLOCENE

OAH FORMATION

Sand, silt, clay, gravel, and organic debris; all postglacial sediment deposited on the landscape; includes river sediment, windblown sediment, and lake sediment.

Qls Landslide deposits

Moderately to poorly sorted combination of soil, unconsolidated sediments, and sedimentary rocks that has slid down the local slope under its own weight. Most prevalent along valleys, ravines, and hillslopes.

Qqd Windblown sand

Well-sorted, fine to medium sand; obscurely bedded; poorly developed paleosols common; subdued topography, consisting of vague knobs and elongated ridges with long axes aligned parallel to prevailing northwesterly winds; blowouts common; windblown lake and fluvial sand reworked into dunes; currently inactive.

Qow Windblown silt and sand

Moderately to well sorted grayish brown to tan, silt and sand; deposited as a thin mantle draped over, and only slightly modifying, the pre-existing glacial and non-glacial topography; generally less than 10 feet (3 meters) thick.

Qop Pond and slough sediment

Organic debris, clay, and silt; obscurely bedded; dark colored; generally more than 3 feet (1 meter) thick; deposited in poorly drained depressions in the landscape.

Qor Alluvium and overbank sediment

Sand, silt, clay, and disseminated organic debris; obscurely bedded, dark colored; locally abundant gastropod and pelecypod shells including *Valvata tricarinata*, *Sphaerium* sp., and *Psidium* sp.; commonly more than 3 feet (1 meter) thick.

PLEISTOCENE

COLEHARBOR GROUP

The Coleharbor Group includes all sediments in North Dakota associated with deposition by Pleistocene glaciers.

Qcdn Draped glacial sediment

Light olive-brown to olive-brown; unsorted; unbedded; calcareous; shaly; lignite fragments common; contains abundant cobbles and surface boulders of mostly crystalline lithologies, with minor amounts of limestone, dolostone, and, more rarely, local bedrock types; undulating to hilly surface; discontinuous; thin; lacks hummocky topography owing to postglacial erosion; deposited on a non-glacial surface as a thin mantle draped over, and only slightly modifying, the pre-existing topography by a pre-Late Wisconsinan glacier (Napoleon Advance). May be covered by a patchy, thin (< 5 feet [1.5 meters]) veneer of windblown sediment.

Qcoh Collapsed lake sediment

Flat-bedded to gently folded, light olive-brown to olive-brown laminated clay, clayey silt, silty clay, silt and sand; non to moderately calcareous; iron-stained in places; small (generally less than pebble-sized) carbonate nodules and masses of gypsum, and sand-sized organic fragments common; subtle, flat to gently undulating hummocky surface, pitted by steep-sided, bowl-shaped depressions (kettle holes) formed by the melting of detached blocks of buried ice; offshore sediment deposited in a proglacial, ice-dammed lake. May be covered by a patchy, thin veneer of windblown sediment.

Qcrf Collapsed outwash

Moderately well-sorted, light to dark olive brown, low-angle flat-bedded to high-angle cross-bedded silt, sand, and gravel; calcareous; shaly; bouldery in places; gently undulating to rolling surface, pitted by steep-sided, bowl-shaped depressions (kettle holes) formed by the melting of detached blocks of buried ice; deposited as outwash by meltwater flowing through the Apple Creek and Random Creek meltwater channels. May be covered by a patchy, thin veneer of windblown sediment.

TERTIARY SYSTEM

PALEOCENE

Tc CANNONBALL FORMATION

Marine sandstone and mudstone. Grayish green to yellowish brown, medium to fine grained, generally poorly cemented sandstone; contains scattered ironstone concretions and dark mineral grains that impart a "salt and pepper" appearance; commonly capped by a two- to three-foot-thick, well-cemented, lenticular sandstone. Light to dark gray to black mudstone; fissile; commonly banded with lenses of white to yellowish brown silt and very fine sand; forms smooth, rounded slopes. Marine fossils, ophiomorpha, and petrified wood fragments common locally. The maximum thickness of the Cannonball Formation is about 150 feet (46 meters) in this map area. May be covered by a thin (< 5 feet [1.5 meters]) veneer of windblown or glacial sediment.

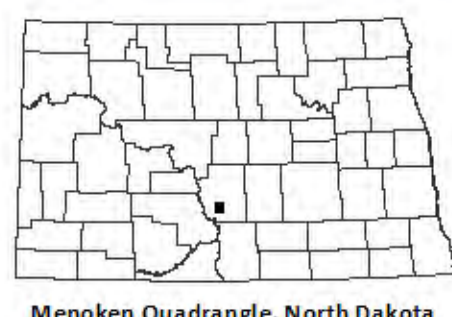
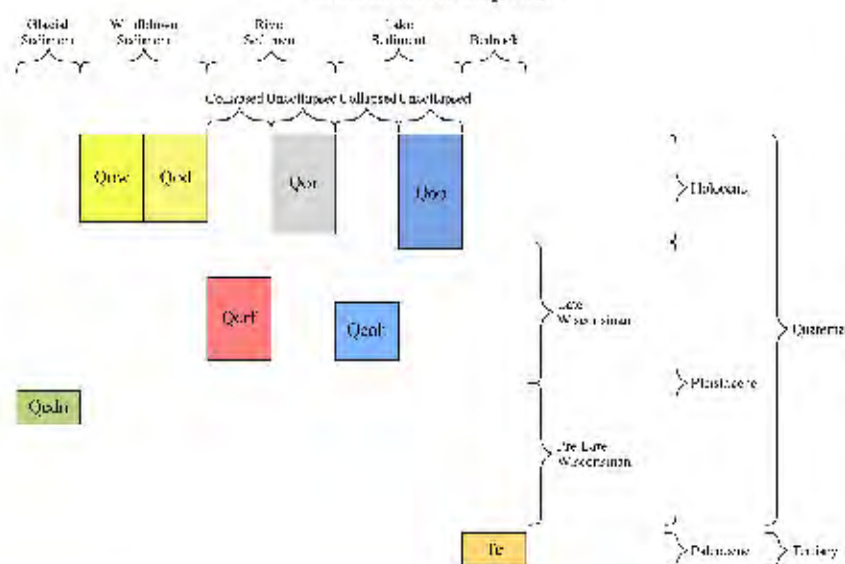
Geologic Symbols

- Geologic contact
- - - Geologic contact (inferred)
- W Water

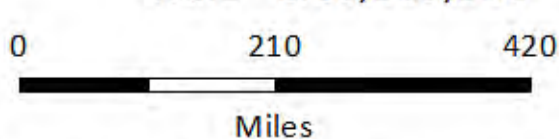
ROAD CLASSIFICATION

- Expressway
- Secondary Hwy
- Ramp
- Local Connector
- Local Road
- 4WD
- Interstate Route
- US Route
- State Route

Correlation of Map Units



Scale 1:10,000,000



Lambert Conformal Conic Projection
North American 1983 Datum
USGS 7.5 Minute Topo Map

