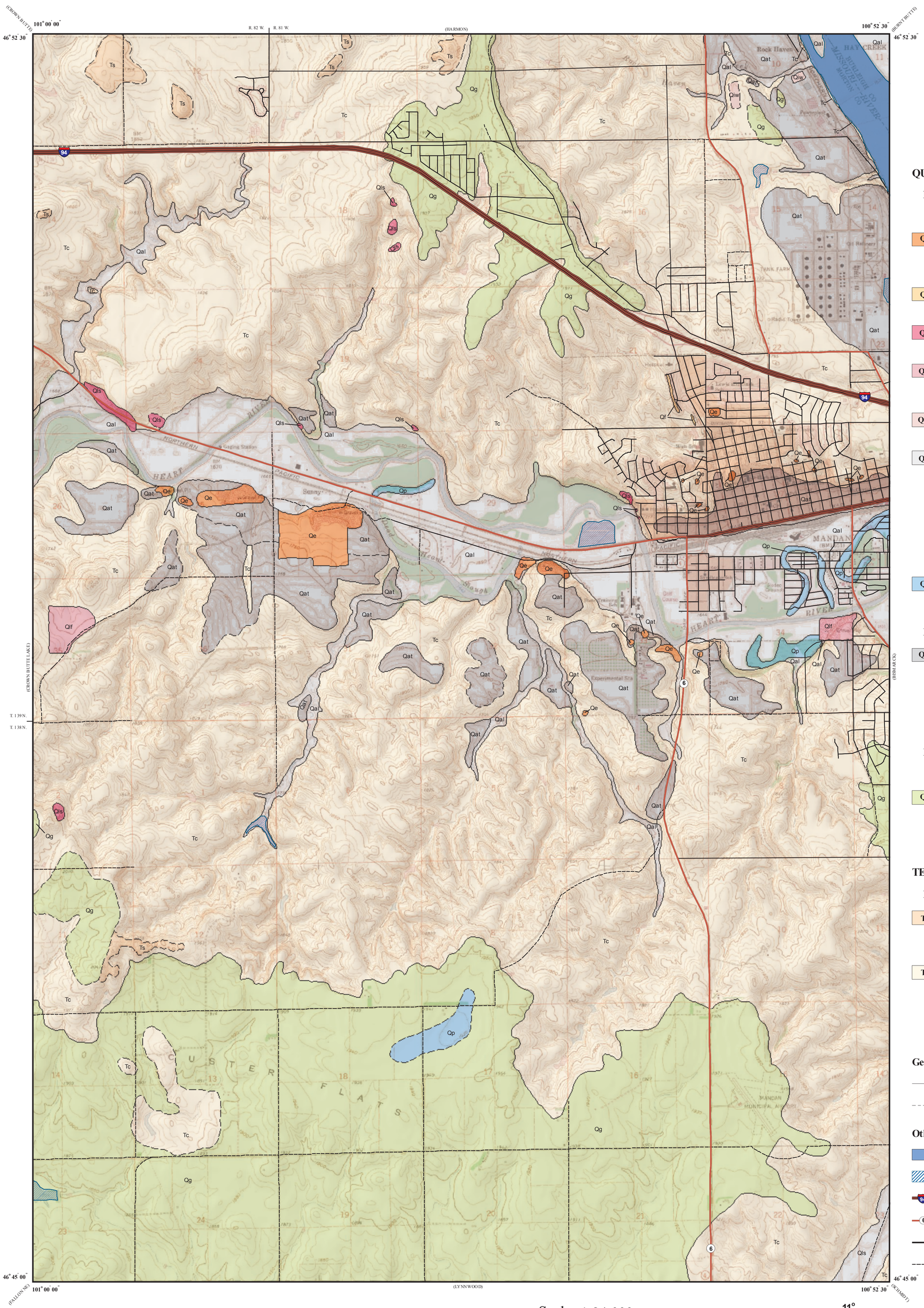
24K: Mndn - sg

North Dakota Geological Survey
John P. Bluemle, State Geologist

Surface Geology
Mandan Quadrangle, North Dakota



Edward C. Murphy

1999

UNIT DESCRIPTIONS

QUATERNARY SYSTEM

RECENT

OAHE FORMATION

Qe **Excavations**

Excavations, typically small (less than a few acre), many of which are visible on 1938 aerial photograhs, into mudstone or sandstone of the Cannonball Formation.

Qf **Construction Fill**

Fill material mapped off of 1960 circa aerial photographs.

Qls **Landslide Deposits**

Sedimentary rock disturbed (out of place) due to slope failure.

Qlf **Garbage Dump**

Municipal waste that was routinely burned after it had been dumped in a hole or onto a pile.

Qiw **Industrial Dump**

Area underlain by buried or mounded industrial waste (flyash).

Qal **Alluvium**

Sand, silt, clay, and occasionally gravel deposited under fluvial conditions (by a river or creek). Organic content is variable but often contain paleosols (ancient soil horizons). Bedding typically ranges from small scale cross-bedding to planar to obscurely bedded. These deposits, which range from a few feet up to 70 feet in thickness, are found within the flood plain of the Heart and Missouri rivers and associated tributaries and drainages. These areas routinely flooded prior to the advent of protective dikes and the Lake Tschida and Garrison dams. In the Heart River floodplain, it is underlain by 50-60 feet of Qat deposits.

Qp **Pond Sediment**

Ponded sediments, typically organic rich silts and clays, occasionally laminated.

HOLOCENE/PLEISTOCENE

Qat **Alluvial Terrace Deposits**

Silt, sand, and occasionally thin beds of gravel up to 80 feet thick deposited in two or three Heart River terraces and one terrace of the Missouri River. Typically consists of 20 feet of basal gravel overlain and sometimes obscured by alternating layers of windblown deposits of fine to coarse grained, crossbedded sand and silt. Primarily deposited during the Pleistocene. Ranges in elevation between 1650 and 1750 feet.

PLEISTOCENE

COLEHARBOR GROUP

Qg **Glacial Till**

Consisting primarily of till, a poorly sorted mixture of clay, silt, sand, pebbles, and cobbles transported and deposited primarily as a subglacial deposit. Occasionally will contain lenses of sand and gravel. Typically highly fractured, weathered, and less than 20 feet thick in the area.

TERTIARY SYSTEM

PALEOCENE

Ts **SLOPE FORMATION**

Consists of approximately 100 feet of alternating yellowish brown to grayish brown colored beds of sandstone, siltstone, mudstone, claystone, and lignite.

Tc **CANNONBALL FORMATION**

Consists of 300 feet of gray to black interbedded to shaly mudstone and fine grained, well sorted sandstone. The sandstone is typically poorly cemented but does contain several thin (less than 3 feet thick) well-cemented, lenticular lenses.

Geologic Symbols

Known contact between two geologic units

Approximate contact between two geologic units

Other Features

Water

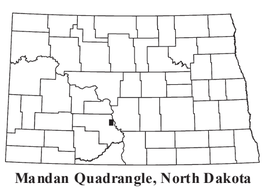
Water - Intermittent

Interstate Highway

State Highway

Paved Road

Unpaved Road

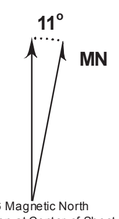


Scale 1:24,000

0 0.5 1

Miles

Lambert Conformal Conic Projection
1927 North American Datum
Standard Parallels 46° 45' 00" and 46° 52' 30"



1976 Magnetic North
Declination at Center of Sheet

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

Cartographic Compilation: Elroy L. Kadmas