

# Surface Geology

## Valley City West Quadrangle, North Dakota

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2008

### EXPLANATION

**Qb** Borrow Area (abandoned and/or reclaimed)  
Includes gravel pits

**Qba** Borrow Area (active)  
Includes gravel pits and landfill

### QUATERNARY SYSTEM

#### HOLOCENE

**Qls** Landslide  
A mass of glacial and/or preglacial material that has slumped downslope. Includes earthflows and areas of soil creep.

#### HOLOCENE/PLEISTOCENE

##### OAHE FORMATION

**Qop** Pond and Slough Sediment

Clay, silt, and organic debris; obscurely bedded; dark colored; deposited in modern ponds and sloughs. All maps areas not coded are (Qop) pond and slough sediment.

**Qor** River Sediment

Dark, occasionally cross-bedded overbank sediment deposited on the floodplains of modern streams. Contains some sand and gravel (channel sediment).

#### COLEHARBOR GROUP

##### Ice-Contact Deposits

**Qecs** Till

Poorly sorted, unbedded mixture of rock, cobbles, pebbles, gravel, sand, silt, and clay deposited by active and stagnating ice. Matrix is olive-brown silty to clayey sand; calcareous; rock fragments mainly shale with minor crystalline and limestone pebbles, cobbles, and boulders that become more dominant as size increases. Hilly, steeply sloping, bouldery surface found mainly along the slopes of the Sheyenne River valley and its tributaries. Local relief up to 200 feet.

**Qecu** Till

Poorly sorted, unbedded mixture of rock, cobbles, pebbles, gravel, sand, silt, and clay deposited by active and stagnating ice. Matrix is olive-brown silty to clayey sand; calcareous; rock fragments mainly shale with minor crystalline and limestone pebbles, cobbles, and boulders that become more dominant as size increases. Includes isolated masses of a dark yellowish-brown silty, highly calcareous till, and small areas of stratified sand and gravel. Undulating to rolling surface, bouldery in places. Local relief 20 to 100 feet.

**Qecg** Till

Poorly sorted, unbedded mixture of rock, cobbles, pebbles, gravel, sand, silt, and clay deposited by active and stagnating ice. Matrix is olive-brown silty to clayey sand; calcareous; rock fragments mainly shale with minor crystalline and limestone pebbles and cobbles. Includes small, isolated areas of stratified sand and gravel. Overlain in places by a thin (~2 to 4 feet) layer of grayish-brown silty clay. Trace longitudinal ridges (flutes) visible on air photos. Local relief 0 to 20 feet.

##### Glaciofluvial Sediment

**Qcre** Ice-Contact Fluvial Deposits

Poorly to well-sorted grayish-brown and very dark gray silt, sand and gravel intermixed with pebbles, cobbles, boulders and till. Cross-bedding, laminae, faults, and soft-sediment deformation structures common. Includes eskers, kames, and crevasse fill.

**Qcrf** Ice-Contact Fluvial Deposits

Moderately well sorted, cross-bedded and plane-bedded grayish-brown and very dark gray sand and gravel deposited as point bars and outwash.

**Qcl** Glaciolacustrine Sediment

Flat-bedded, thinly laminated, very dark gray sticky silt and clay overlying glacial sediment.

#### CRETACEOUS SYSTEM

**Kp** PIERRE FORMATION

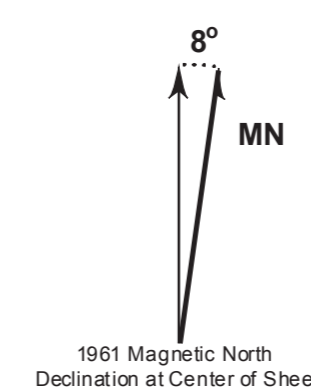
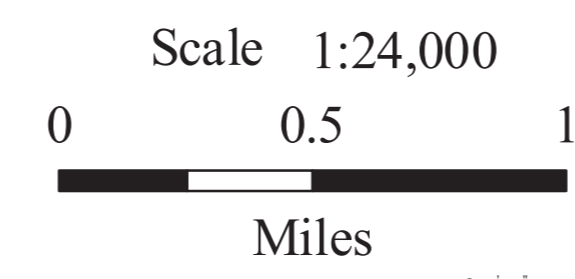
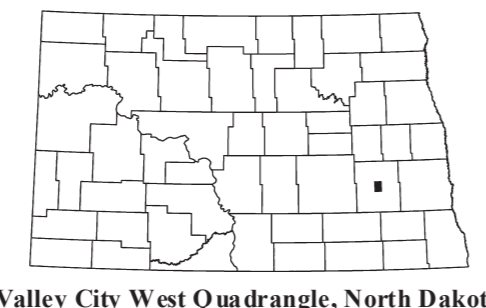
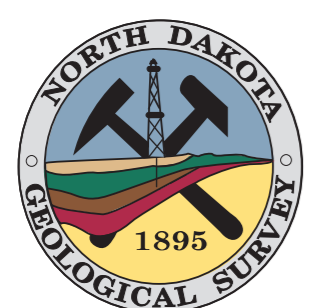
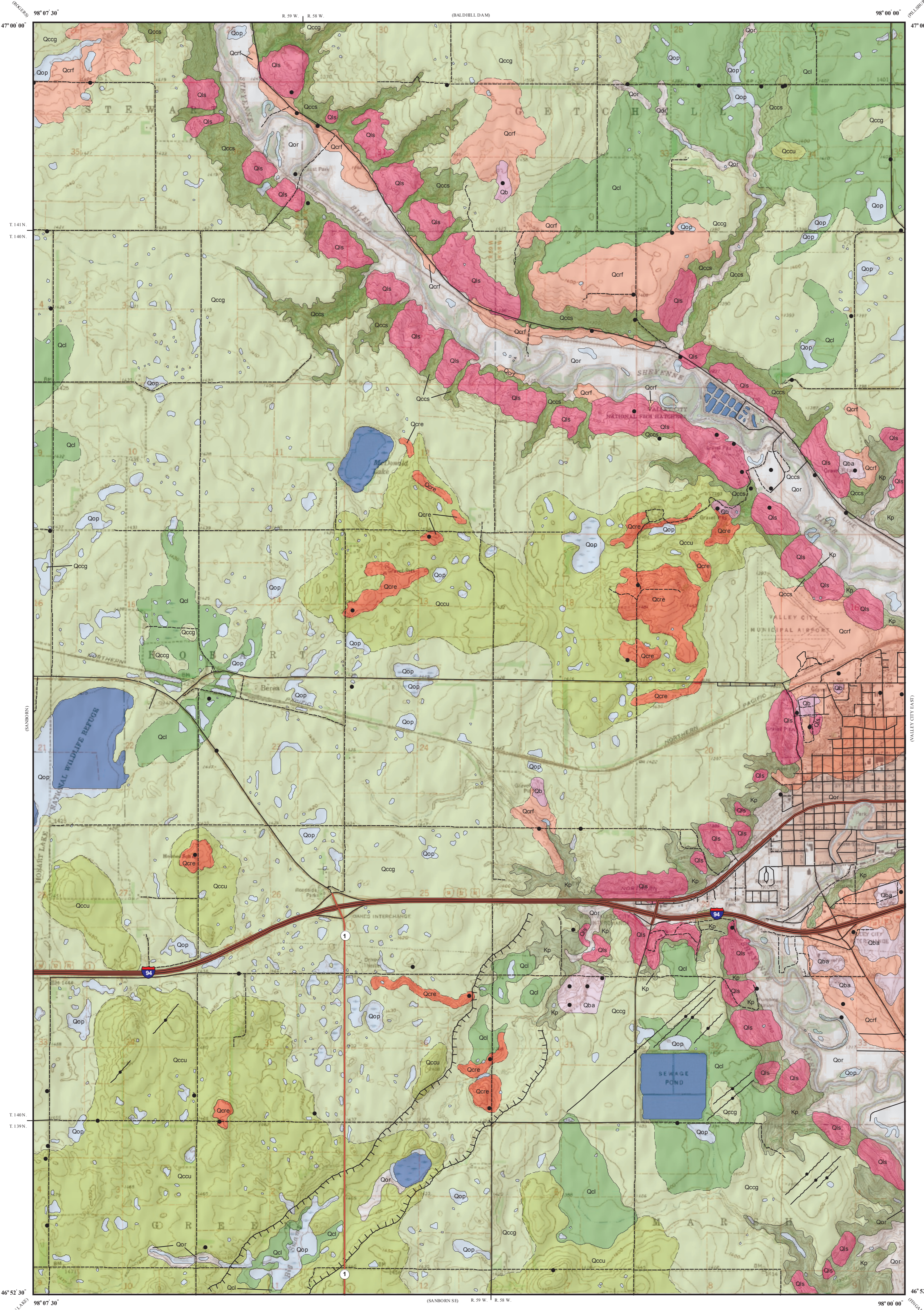
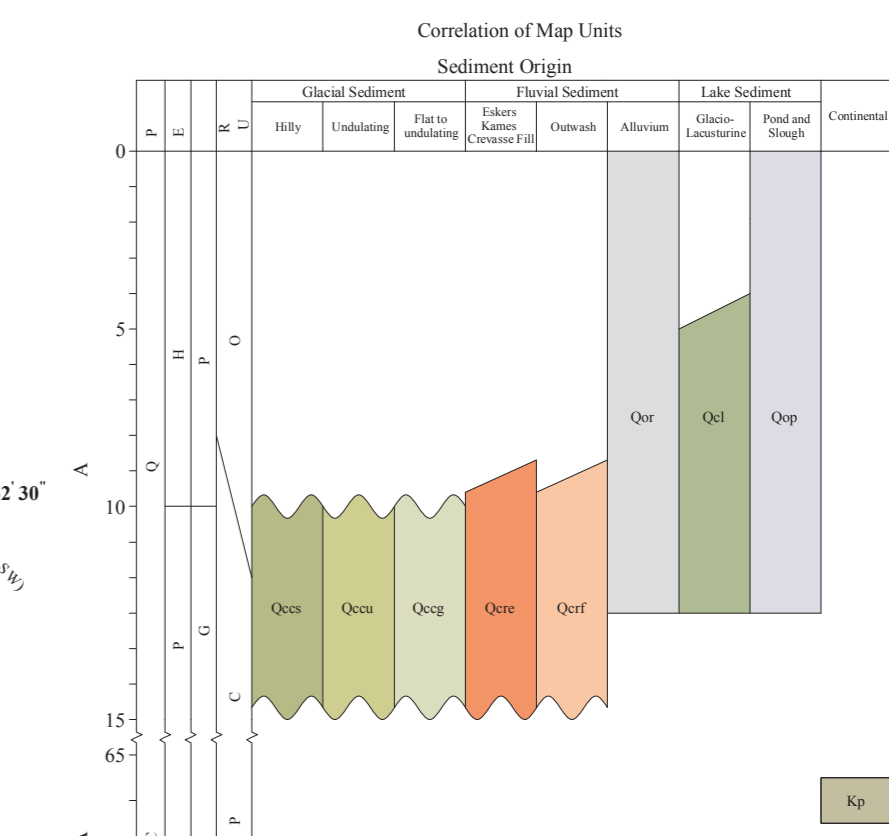
Dark gray, fissile, non-calcareous shale with abundant small iron-manganese concretions (DeGrey Member?); marine of shore sediment. Exposed only along the slopes of the Sheyenne River valley and its tributaries. Prone to slope failure.

#### Geologic Symbols

- Known contact between two geologic units.
- - - Approximate contact between two geologic units.
- ▬ Abandoned meltwater channel partly buried by glacial sediment.
- Crest of longitudinal glacial ridge.
- Control Points  
Test holes, observation wells, and field observations.

#### Other Features

- Water
- State Highway
- Interstate Highway
- Paved Road
- Unpaved Road



Lambert Conformal Conic Projection Standard Parallels 46° 52' 30" and 47° 00' 00"  
1927 North American Datum NGVD 1929  
USGS 7.5 Minute Topographic Map Contour Interval 10 Feet  
Road Layer Recultured to 2003 NAIP Digital Orthophoto

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.  
Cartographic Compilation: Elroy L. Kadmas