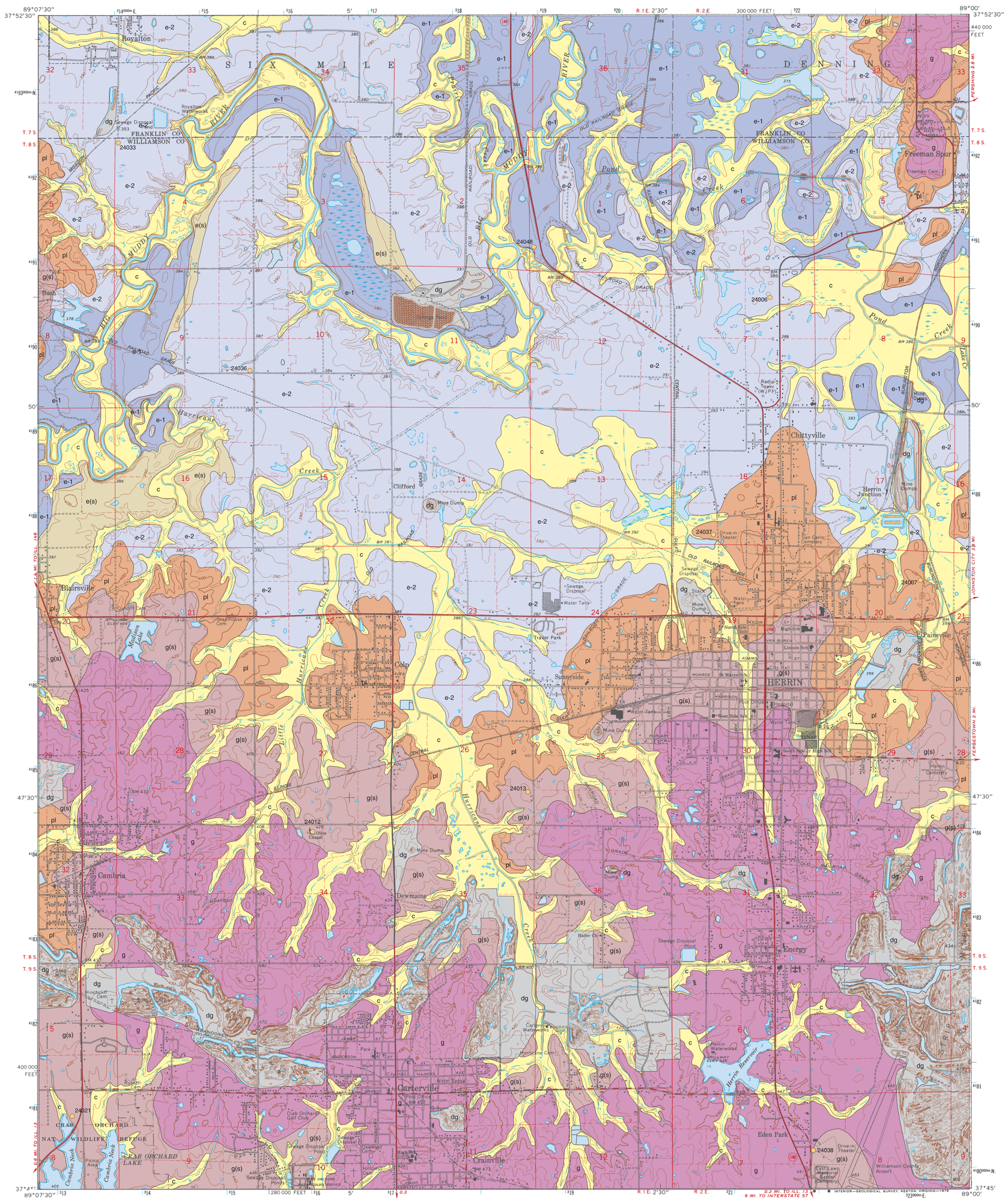
SURFICIAL GEOLOGY OF HERRIN QUADRANGLE
WILLIAMSON AND FRANKLIN COUNTIES, ILLINOIS

Institute of Natural Resource Sustainability
William W. Shilts, Executive Director
ILLINOIS STATE GEOLOGICAL SURVEY
E. Donald McKay III, Director

Leon R. Follmer and W. John Nelson
2010

Illinois Geologic Quadrangle Map
IGQ Herrin-SG



QUATERNARY DEPOSITS

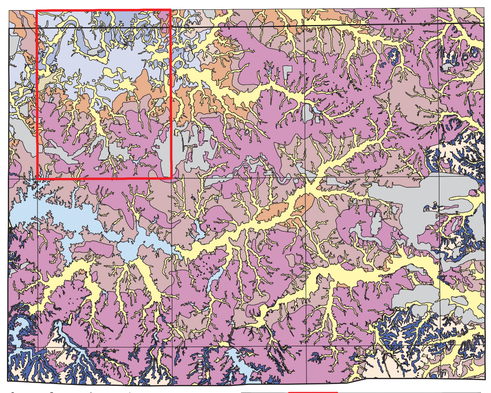
Material	Unit	Interpretation
HOLOCENE STAGE (Present to 10,000 years B.P.)		
Man-made deposits; mixtures of loess, glacial deposits, shale, and coal mine wastes	Disturbed ground dg	**Made land;** includes surface coal mines in varying states of reclamation, along with mine waste piles (gob and slurry)
Silt-rich deposits ranging from silt loam to silty clay; dark gray to brown, mottled below 3 feet, totally gray below 10 feet; weakly bedded in lower part; gravel lenses in lower parts of thick intervals; noncalcareous matrix but contains secondary calcite nodules below solum of soil in places; ranges up to 30 feet thick	Cahokia Formation c	**Alluvium;** mostly formed during post-glacial times (Holocene); largely derived from eroded Peoria loess; mildly weathered and leached; weakly developed soil profile in the upper 5 feet; underlain by Equality clay or fine sand at lower elevations and by bedrock at higher elevations
WISCONSINAN STAGE (10,000 to 75,000 years B.P.)		
General features: Silt loam to clay; brown, olive, or dark gray with common orange and black mottles; uniformly gray below about 20 feet; uniform in upper part, poorly to distinctly bedded at depth; few lenses of silt and coarse sand with some gravel in lower parts of thick intervals; calcareous in lower part and leached of carbonates from surface to 15 to 25 feet, calcite nodules common in upper few feet of calcareous interval; organic debris and calcareous fossils common in lower part; ranges up to 100 feet thick	Equality Formation (divided into three units)	**General characteristics:** Glacial slackwater lake deposits formed during the last glaciation (Late Wisconsinan); contains multiple fining-upward sequences with few erosion surfaces and no desiccation surfaces; moderately to strongly weathered in upper 10 feet forming well-developed soils (Alfisols); thin alluvial or eolian deposits cover most of unit; subdivided into three map units: e-1, e-2, and e(s)
Clay to silty clay with a silt loam surface layer many places; mostly olive or gray with orange and black mottles in upper part; ranges up to 100 feet thick; lower part may be unit e-2.	Equality Formation (fine facies) e-1	**Fine-grained facies** inset into e-2 forming a low terrace 0 to 10 feet above floodplains along main rivers; scarps rarely mark floodplain border; recent alluvium transgressing onto unit in places; mostly covered by well-developed, poorly drained clayey soils
Silty clay with a cover of silty or loamy deposits 3 to 6 feet thick; brown to mottled gray to uniform gray with depth; ranges up to 50 feet thick	Equality Formation (silty facies) e-2	**Silty facies** forming a complex high terrace; gentle scarps commonly separate e-1 from e-2; covered by eolian silt and local eolian sand with well-developed soils more oxidized than soils on the e-1 surface
Silt loam to fine sandy loam up to 10 feet thick over faintly bedded silty clay of e-2. Upper part is yellowish brown and becomes gray below a depth of about 20 feet	Equality Formation (sandy facies) e(s)	**Sandy facies** in bar or natural levee landforms superposed on e-2; mostly glaciofluvial scarps and low ridges; capped by eolian silt and sand overlying silty clay lake deposits; soils are well developed and more oxidized than soils on the e-2 surface
ILLINOIAN STAGE (128,000 to 180,000 years B.P.)		
Fine sand to clay loam covered by weathered silt loam to silty clay loam; yellowish brown to mottled brown to gray; strong pedogenic features and clay-rich in upper 10 feet; leached to a depth of about 20 feet below the ground surface; calcareous and bedded in lower part; commonly thin-bedded very fine sand, well sorted with a few thin lenses of silty clay; secondary calcite common in the upper part of the calcareous zone; thickness uncertain, may range up to 50 feet thick; beds of coarser sand and gravel are expected near base of unit	Pearl Formation pl	**Glacial fluvial and lacustrine deposits** of Illinoian age covered by 4 to10 feet of loess (three loess units are distinguishable where thicker than about 5 feet: upper–Peoria Silt, yellowish brown to gray with strong pedologic structure resulting from the formation of the modern soil; middle–Roxana Silt, reddish brown to reddish gray with weak pedologic structure resulting from the formation of the Farmdale Geosol; and lower-Loveland Silt, brown to dark gray with strong pedologic structure resulting from the formation of the Sangamon Geosol; the Peoria and Roxana occur at most locations; the Loveland Silt is often absent; loess units are largely distinguished by their pedogenic features); upper part contains Sangamon Geosol; forms several undifferentiated terrace levels above e-2 and tr units, separated by scarps in places producing a stepped geomorphic surface; underlies Equality formation north and west of Herrin; a facies member between Teneriffe (tr) and Glasford stratified deposits (g(s)) in Illinoian glacial sequence of Williamson County; formed during the next to the last glaciation (Illinoian) as the result of meltwater accumulation forming a large lake basin that later evolved into the modern Big Muddy River basin
General features: Silty diamicton dominated by silt loam and silty clay loam with variable amounts of clay, sand, and pebbles; covered by 5 to 10 feet of weathered silty clay loam at most locations; brown to gray colors with common yellowish and dark mottles; strong pedogenic features and more sand or clay in upper 5 feet; leached to a depth of about 20 feet below the ground surface; stratified in places; dark gray, compact, and unoxidized in lower part, which commonly contains detrital wood, pyrite, and other oxidizable minerals; average thickness 20 to 30 feet and can exceed 100 feet thick in places; pebble content from <1 to 5%, dominated by Pennsylvanian lithologies, mostly sandstone, quartz, chert, and an assortment of crystalline rocks	Glasford Formation (divided into two units)	**General characteristics:** Glacial till and associated water-laid and mass wasted deposits of Illinoian age covered by 5 to 10 feet of loess; largely derived from Pennsylvanian shale; forms a veneer of glacial drift deposits across the uplands of most of Williamson County and fills in preglacial valleys; loess cover thins on sloping land along the southern border of Williamson County; upper part contains Sangamon Geosol; divisible into two map units: Glasford stratified deposits (g(s)) and Glasford till (g); upland end member facies of Illinoian glacial sequence
Stratified clay loam, silt loam to silty clay loam with lenses of sand and loamy diamicton; deformed structures and variable fabric and textures; few fining-upward trends in places overlying sparse pebble bands	Glasford stratified deposits g(s)	**Ablation deposits; water transported and glacial debris-flow deposits** with soft-sediment deformation features; likely contains gravel at the base and overlies dense basal till where glacial deposits are thick; missing in places where loess overlies eroded bedrock (bench); laterally grades into till (g) or Pearl Formation sand (pl); largely restricted to discontinuous terrace levels (localized level areas) across the uplands at elevations from 420 up to 550 feet; formed on the Illinoian glacier after stagnation; temporary ice-walled lakes accumulated sediments that formed terraces now buried by loess; erosional benches common in some areas that form a continuous geomorphic surface with terraces
Silty clay loam diamicton that varies from pebbly silty clay to silt loam diamicton; very few pebbles in places; typical till fabric, compact and uniform	Glasford till g	**Till;** more dense and uniform than diamicton in g(s); underlies most of the gently rolling hills of the county; variable thickness ranging from a veneer of a few feet to over 100 feet thick in buried valleys; upland facies end member of Illinoian glacial sequence, made up of map units g, g(s), pl, and tr; discontinuous in places because of fluvial erosion or a nondepositional mode of the glacier (glacial erosion)

Data Type

35547 — Stratigraphic boring with continuous samples of surficial sediments examined by the authors

Contact

Note: Numeric labels indicate the county number, a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Online well and boring records are available from the ISGS Web site.



Williamson County surficial geology and 7.5-minute quadrangles.

Base map compiled by Illinois State Geological Survey from digital data provided by the United States Geological Survey. Topography by photogrammetric methods from aerial photographs taken in 1965. Field checked in 1968. Revision from aerial photographs taken in 1976. Map edited in 1978.

North American Datum of 1927 (NAD 27)
Projection: Transverse Mercator
10,000-foot ticks: Illinois State Plane Coordinate system, east zone (Transverse Mercator)
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

Recommended citation:
Follmer, L.R., and W.J. Nelson, 2010, Surficial Geology of Herrin Quadrangle, Williamson and Franklin Counties, Illinois: Illinois State Geological Survey, Illinois Geologic Quadrangle Map, IGQ Herrin-SG, 1:24,000.

SCALE 1:24,000

1 1/2 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

BASE MAP CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology based on field work and data analysis by Leon R. Follmer and W. John Nelson, 2001–2004.

Natural Resource Conservation Service staff, Carbondale office, assisted with field work and the drilling of stratigraphic test borings.

Digital cartography by Jane E.J. Domier, Jennifer E. Carrell, Amanda Tovey, Joseph B. Magnotta, and Daniel R. Stevenson, Illinois State Geological Survey.

The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. Maps in this document are not meant to be enlarged.

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

For more information contact:
Institute of Natural Resource Sustainability
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820-6964
(217) 244-2414
http://www.isgs.illinois.edu

1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Elkville
2 Christopher
3 West Frankfort
4 De Soto
5 Johnston City
6 Carbondale
7 Crab Orchard Lake
8 Marion

1½° TRUE NORTH MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2010

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
State Route

IGQ Herrin-SG