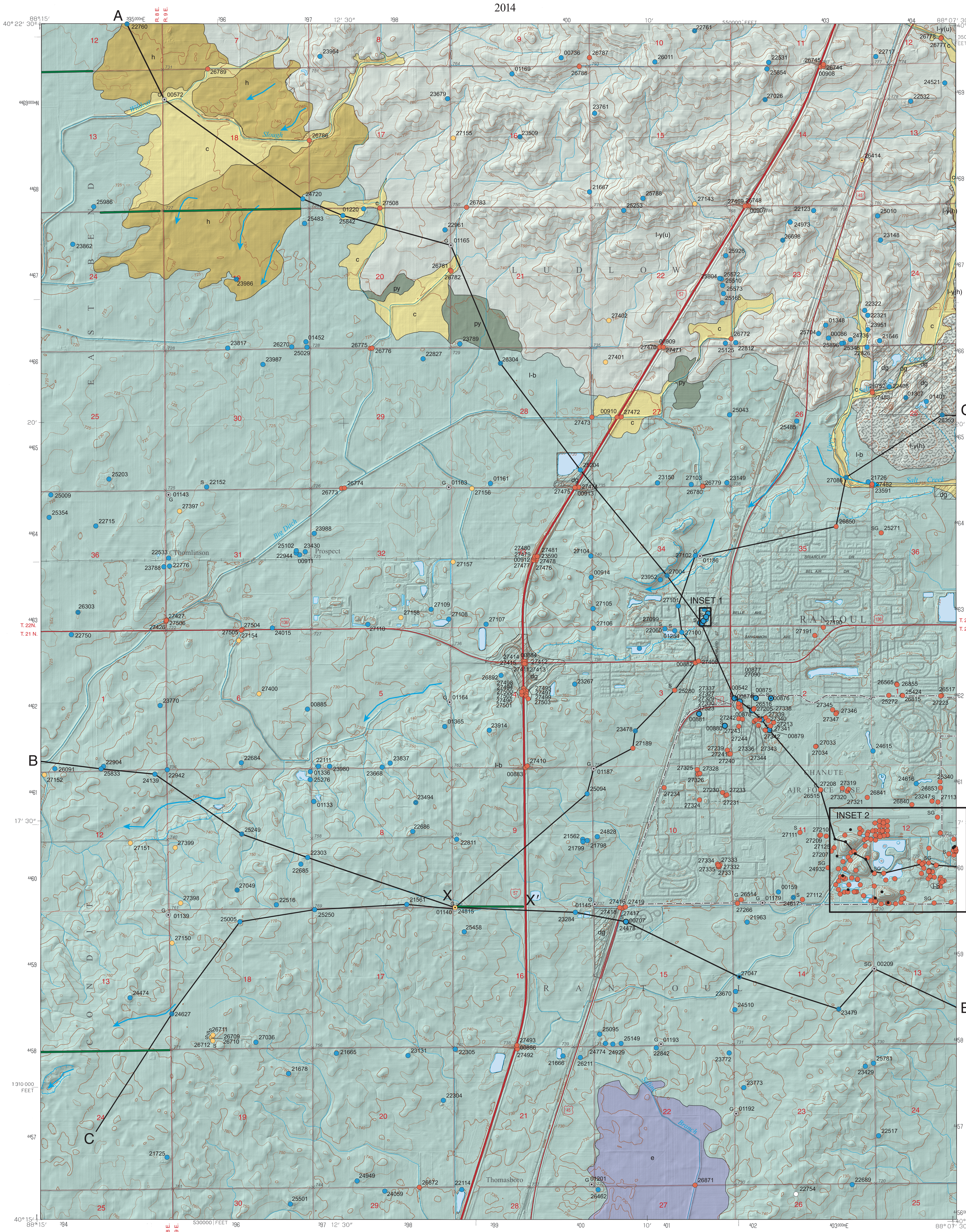
Prairie Research Institute
ILLINOIS STATE GEOLOGICAL SURVEY

SURFICIAL GEOLOGY OF RANTOUL QUADRANGLE
CHAMPAIGN COUNTY, ILLINOIS

STATEMAP Rantoul-SG

Andrew J. Stumpf
2014



QUATERNARY DEPOSITS

Description	Unit	Interpretation[1]
HUDSON EPISODE (~14,600 years before present (B.P.) to today)[2]		
Areas of disturbed or removed geologic materials; texture ranges from clay to gravel; may include waste or other rubble	Disturbed ground	**Deposits disturbed or modified by human activity** in gravel pits, landfills, and other excavations
Sand, silt, clay, and gravel; massive to stratified; locally oxidized; calcareous; poorly sorted; contains beds of organic material; up to 15 feet thick	Cahokia Formation (undivided) c	**Alluvium (stream deposits)** mapped in floodplains along creeks and drainage ditches and in fan-shaped deposits where streams emerge from the moraines onto lower gradient slopes
Diamicton; massive to crudely stratified; sandy loam to silty clay; yellowish brown to gray; calcareous; similar texture and composition to the materials lying upslope; 5 to 20 feet thick	Peyton Formation py	**Post-glacial slopewash and debris flow deposits** lying on nearly flat to moderately inclined slopes along the western edge of the Illiana Morainic System
HUDSON AND WISCONSIN EPISODES (~23,000– ~12,000 years B.P.)[2]		
Silt and clay; stratified to massive; grayish brown; calcareous; may contain beds of diamicton, sand, or gravel; 5 to 20 feet thick	Equality Formation e	**Proglacial and postglacial lake deposits** fills depressions or low-lying areas on land surface
WISCONSIN EPISODE (~55,000– ~23,000 years B.P.)[2]		
Sand and gravel; contains some beds of silt; brown to yellowish brown; calcareous; well to poorly sorted; up to 25 feet thick	Henry Formation h	**Glaciofluvial sediment (outwash)** deposited by glacial meltwater in streams and rivers that drained the former ice sheets
Diamicton; silt loam to silty clay texture; stiff to very stiff; calcareous; on steep-sided hillocks and hollows; 10 to 30 feet thick	Yorkville Member, Lemont Formation (hummocky facies) l-y(h)	**Till and ice-contact sediment** derived directly from glacial ice; surface topography is hummocky; formed by uneven downwasting of supraglacial sediment or collapse of ice surface over subglacial drainage channel; present in areas trending from southwest to northeast
Diamicton; silt loam to silty clay; gray to brown; stiff to very stiff; calcareous; contains beds of sand and gravel; found on moderately sloping to rolling terrain; 10 to 30 feet thick	Yorkville Member, Lemont Formation (undulating facies) l-y(u)	**Till and ice-contact sediment** derived directly from glacial ice; surface topography is undulating; present east of the western edge of the Illiana Morainic System
Diamicton or sand, silt and clay; diamicton is sandy loam to silt loam; gray to grayish brown; calcareous; stiff to very stiff; contains beds of sand, silt, and gravel; 25 to 75 feet thick	Batestown Member, Lemont Formation l-b	**Till and ice-marginal sediment** forms end moraines and ice disintegration topography present west beyond the Illiana Morainic System; may include hummocky moraine, deposits in sediment- and ice-dammed lakes, and outwash

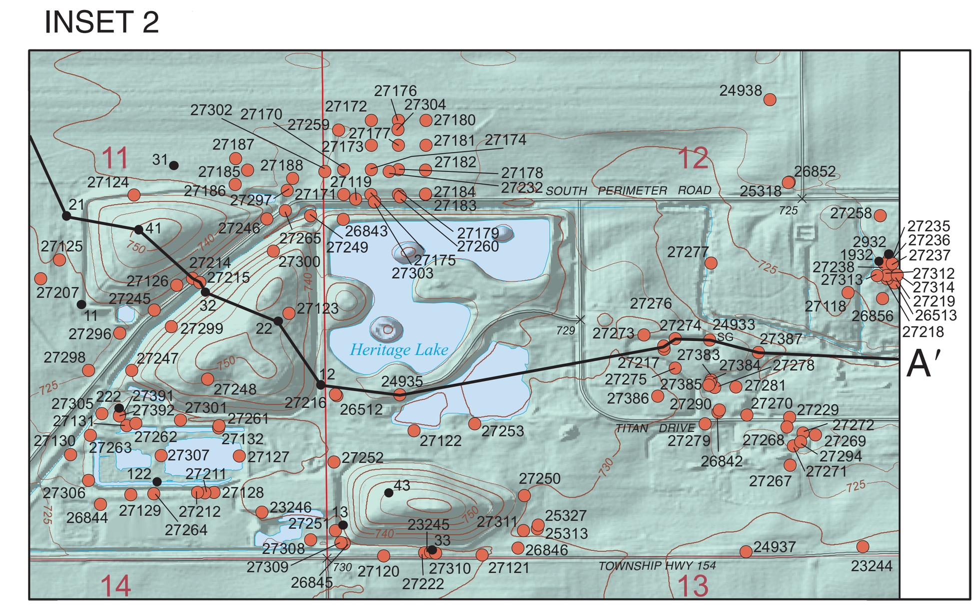
[1] Generally, the Wisconsin Episode sediments mapped at the land surface are overlain by 1 to 5 feet of wind-deposited silt (loess).

[2] The time periods for the Wisconsin Episode and the Hudson Episode are reported as calibrated radiocarbon years and can be directly compared to calendar years before 1950 (Stuiver et al. 2005).

INSET 1

200 Feet

INSET 2



0.5 Miles

Base map compiled by Illinois State Geological Survey from digital data (2012 US Topo) provided by the United States Geological Survey. Shaded relief and contours derived from 2008 LiDAR elevation data.

North American Datum of 1983 (NAD 83)
Projection: Transverse Mercator
10,000-foot ticks: Illinois Coordinate System of 1983, east zone
1,000-meter ticks: Universal Transverse Mercator grid system, zone 16

Recommended citation:
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SCALE 1:24,000
1 MILE — 7000 FEET — 1 KILOMETER

BASE MAP CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Geology based on field work by Andrew J. Stumpf, 2007–2014.

Digital cartography by Jennifer E. Carrell, Deette M. Lund, Jane E.J. Domier, and Dawn Heckman, Illinois State Geological Survey. Data entry by Jane Mumm.

This research was supported in part by the U.S. Geological Survey (USGS) National Cooperative Geologic Mapping Program (STATEMAP) under USGS award number G13AC00240. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

This map has not undergone the formal Illinois Geologic Quadrangle map review process. Whether or when this map will be formally reviewed and published depends on the resources and priorities of the ISGS.

ROAD CLASSIFICATION

Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Interstate Route
U.S. Route

Point Data Type

- Stratigraphic boring
- Water well boring
- Water well boring for irrigation
- Water municipal well
- Engineering boring
- Coal boring
- Oil and gas boring
- Electrical resistivity point

26211 Boring labels indicate the county number. Dot indicates boring is to bedrock

The county number is a portion of the 12-digit API number on file at the ISGS Geological Records Unit. Most well and boring records are available online from the ISGS Web site.

Line Data Type

- Contact
- scarp
- Glacial meltwater flow direction
- A — A′ Line of cross section
- Earth electrical resistivity survey

ILLINOIS STATE GEOLOGICAL SURVEY
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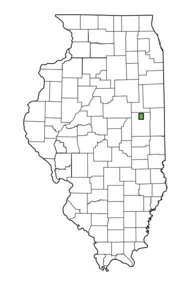
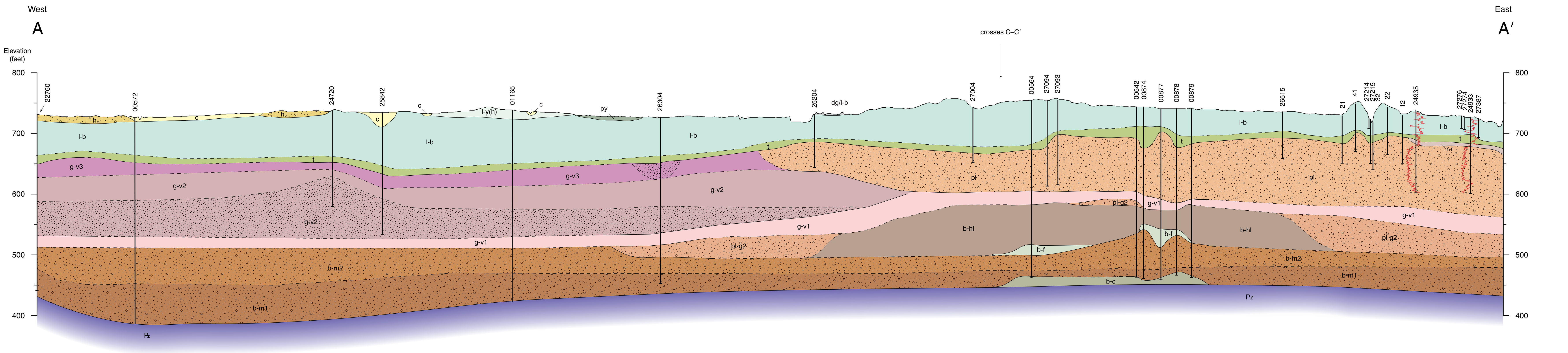
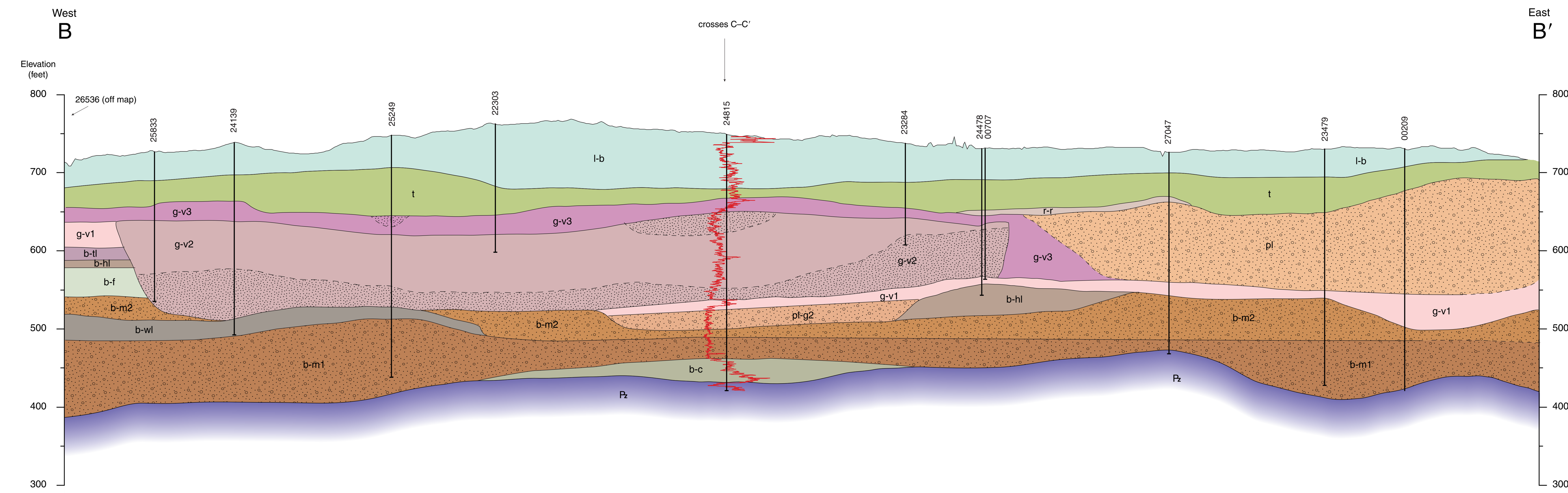


1	2	3
4		5
6	7	8

ADJOINING QUADRANGLES
1 Gibson City East
2 Penfieville
3 Paxton
4 Fisher
5 Gifford
6 Rising
7 Thomasboro
8 Flatville

3½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 2014

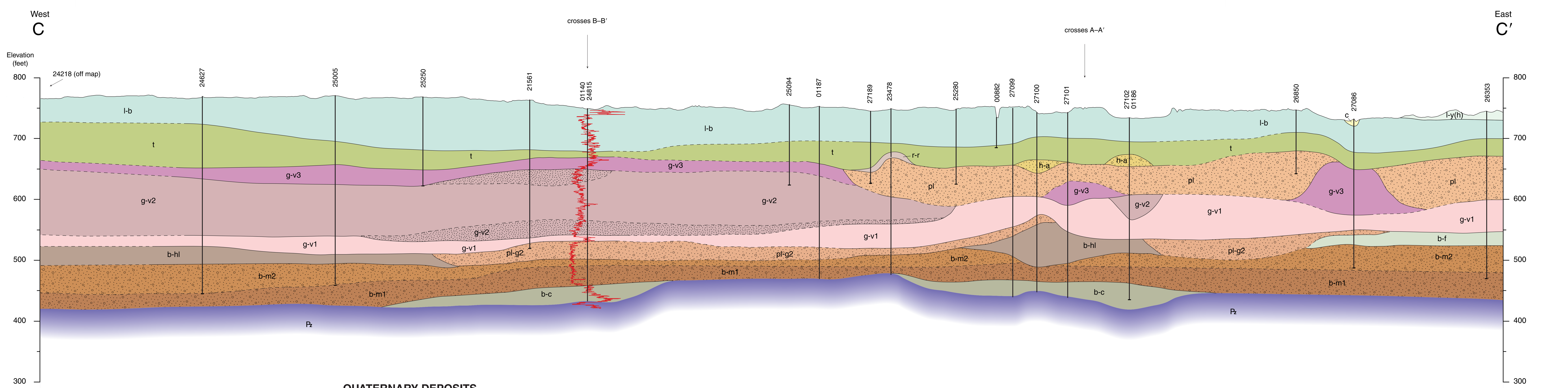




Cross Sections

(dotted pattern with circles)	Sand and gravel
(fine dotted pattern)	Mainly sand with some gravel; locally includes intervals of silt and clay or diamicton
(blank)	Diamicton, massive silt, or other fine-grained sediment
(solid line)	Contact
(dashed line)	Inferred contact
(red log)	Log of natural gamma radiation

Horizontal scale: 1 inch = 2,000 feet
Vertical scale: 1 inch = 100 feet
Vertical exaggeration: 20×



QUATERNARY DEPOSITS

Description	Unit	Interpretation[1]
HUDSON EPISODE (~14,600 years before present (B.P.) to today)[2]		
Areas of disturbed or removed geologic materials; texture ranges from clay to gravel; may include waste or other rubble	Disturbed ground dg	**Deposits disturbed or modified by human activity** in gravel pits, landfills, and other excavations
Sand, silt, clay, and gravel; massive to stratified; locally oxidized; calcareous; poorly sorted; contains beds of organic material; up to 15 feet thick	Cahokia Formation (undivided) c	**Alluvium (stream deposits)** mapped in floodplains along creeks and drainage ditches and in fan-shaped deposits where streams emerge from the moraines onto lower gradient slopes
Diamicton; massive to crudely stratified; sandy loam to silty clay; yellowish brown to gray; calcareous; similar texture and composition to the materials lying upslope; 5 to 20 feet thick	Peyton Formation py	**Post-glacial slopewash and debris flow deposits** lying on nearly flat to moderately inclined slopes along the western edge of the Illiana Morainic System
HUDSON AND WISCONSIN EPISODES (~23,000– ~12,000 years B.P.)[2]		
Silt and clay; stratified to massive; grayish brown; calcareous; may contain beds of diamicton, sand, or gravel; 5 to 20 feet thick	Equality Formation e	**Proglacial and postglacial lake deposits** fills depressions or low-lying areas on land surface
WISCONSIN EPISODE (~55,000– ~23,000 years B.P.)[2]		
Sand and gravel; contains some beds of silt; brown to yellowish brown; calcareous; well to poorly sorted; up to 25 feet thick	Henry Formation h	**Glaciofluvial sediment (outwash)** deposited by glacial meltwater in streams and rivers that drained the former ice sheets
Diamicton; silt loam to silty clay texture; stiff to very stiff; calcareous; on steep-sided hillocks and hollows; 10 to 30 feet thick	Yorkville Member, Lemont Formation (hummocky facies) l-y(h)	**Till and ice-contact sediment** derived directly from glacial ice; surface topography is hummocky; formed by uneven downwasting of supraglacial sediment or collapse of ice surface over subglacial drainage channel; present in areas trending from southwest to northeast
Diamicton; silt loam to silty clay; gray to brown; stiff to very stiff; calcareous; contains beds of sand and gravel; found on moderately sloping to rolling terrain; 10 to 30 feet thick	Yorkville Member, Lemont Formation (undulating facies) l-y(u)	**Till and ice-contact sediment** derived directly from glacial ice; surface topography is undulating; present east of the western edge of the Illiana Morainic System
Diamicton or sand, silt and clay; diamicton is sandy loam to silt loam; gray to grayish brown; calcareous; stiff to very stiff; contains beds of sand, silt, and gravel; 25 to 75 feet thick	Batestown Member, Lemont Formation l-b	**Till and ice-marginal sediment** forms end moraines and ice disintegration topography present west beyond the Illiana Morainic System; may include hummocky moraine, deposits in sediment- and ice-dammed lakes, and outwash
Diamicton; loam; grayish brown to reddish gray; calcareous; very stiff; 10 to 50 feet thick	Tiskilwa Formation (cross section only) t	**Till and ice-marginal sediment** derived directly from glacial ice; encountered in the subsurface only, underlying the Batestown Member
Sand and gravel with silt; pebbly and cobbly; brown to grayish brown; calcareous; well to poorly sorted; 10 to 20 feet thick	Ashmore Tongue, Henry Formation (cross section only) h-a	**Glaciofluvial sediment (outwash)** deposited by glacial meltwater in streams and rivers that flowed from an advancing Tiskilwa ice margin; not consistently differentiable from underlying deposits correlated to the Pearl and Glasford Formations
Silt and fine sand; massive to crudely stratified; very dark grayish brown; leached; may contain humus, peat, wood, and/or fossil snails: 5 to 15 feet thick	Robein Member, Roxana Silt (cross section only) r-r	**Proglacial eolian or lacustrine sediment** containing a weakly developed paleosol (Farmdale Geosol) deposited on a former land surface that was well to poorly drained; includes silty slopewash sediment where deposited on or near slopes; originally widespread
SANGAMON AND ILLINOIS EPISODES (~200,000–130,000 years B.P.)		
Fine to coarse sand with gravel; yellowish brown to grayish brown; calcite cemented in places; incised into the Vandalia Member; upper part weathered in profile of Sangamon Geosol; 30 to 150 feet thick	Pearl Formation (cross section only) pl	**Glaciofluvial sediment (outwash)** deposited by glacial meltwater in streams and rivers that flowed from former Vandalia ice margins; contains the Sangamon Geosol in the upper part except where eroded
Diamicton, sand and gravel, and silt and clay; interstratified; includes sediments previously assigned to the Berry Clay, Radnor Member, Toulon Member, or Roby Silt; upper part weathered in profile of Sangamon Geosol; 30 to 90 feet thick	Vandalia Member, Glasford Formation upper unit (cross section only) g-v3	**Proglacial or ice-contact sediment** deposited by glacial meltwater or sediment gravity flows (debris flows) along or in front of former Vandalia ice margins; contains the Sangamon Geosol in the upper part except where eroded
Diamicton, sand and gravel, and silt and clay; interstratified; includes sediments previously assigned to the Radnor Member, Toulon Member, or Roby Silt; 15 to 130 feet thick	Vandalia Member, Glasford Formation middle unit (cross section only) g-v2	**Subglacial or ice-contact sediments** derived directly from glacial ice or deposited by glacial meltwater; deposition is interpreted to have occurred within an area of fast-flowing ice, possibly an ice stream; associated with the deglacial phase of the Illinois Episode glaciation
Diamicton; silt loam to loam; grayish brown; calcareous; contains beds of sand, silt, and gravel; hard; 5 to 70 feet thick	Vandalia Member, Glasford Formation lower unit (cross section only) g-v1	**Till and associated sediment** derived directly from glacial ice; nearly continuous deposit, region-ally
Sand and gravel; pebbly; grayish brown; contains some beds of silt or diamicton; calcareous; well to moderately well sorted; 10 to 50 feet thick	Grigg tongue 2, Pearl Formation (cross section only) pl-g2	**Fluvial and glaciofluvial sediment** deposited in front of advancing Vandalia ice margins, or outflow from lakes ponded behind these ice margins; not consistently differen-tiable from underlying deposits of the Mahomet Sand Member where intervening tills are absent
PRE-ILLINOIS EPISODES (>1,000,000–430,000 years B.P)[3] Sub-Episode 1		
Diamicton; silt loam to loam; grayish brown; calcareous; hard upper part weathered in profile of Yarmouth Geosol; 5 to 15 feet thick	Tilton Member, Banner Formation (cross section only) b-tl	**Till and ice-marginal sediment** derived directly from glacial ice; in a few places may contain evidence of Yarmouth Geosol weathering profile (i.e., oxidation, leaching of primary carbonate minerals, and pedogenic features) in upper 10 feet
Diamicton; loam; reddish brown to grayish brown; calcareous; contains beds of sand, silt, or gravel; hard; may contain material eroded from underlying deposits (e.g., wood and peat); upper part weathered in profile of Yarmouth Geosol; 5 to 90 feet thick	Hillery Member, Banner Formation (cross section only) b-hl	**Till and ice-marginal sediment** derived directly from glacial ice; in a few places contain evidence of Yarmouth Geosol weathering profile (i.e., oxidation, leaching of primary carbonate minerals, and pedogenic features) in upper 10 feet
Sub-Episode 2		
Sand, diamicton, and silt; sandy loam to silty clay loam; black to greenish gray; leached to weakly calcareous; hard; may contain peat, wood, and/or snail shells; 10 to 40 feet thick	Fisher member, Banner Formation (cross section only) b-f	**Fluvial or lacustrine sediment** deposited on a former floodplain of a river flowing in the Mahomet Bedrock Valley; the land surface was poorly drained and occasion-ally covered by overbank deposits or slopewash
Sand and gravel; brown to grayish brown; contains some beds of silt; calcareous; well to moderately well sorted; 10 to 50 feet thick	Mahomet Sand Member, Banner Formation, upper unit (cross section only) b-m1	**Glaciofluvial sediment (outwash)** deposited in the Mahomet Bedrock Valley by streams flowing in front of advancing/retreating ice margins located to the northeast of the map area
Diamicton; sandy loam to clay loam; brown to pinkish gray; calcareous; contains intervals of sand and gravel or silt and clay; hard; 5 to 30 feet thick	West Lebanon Member[4] Banner Formation (cross section only) b-wl	**Till and associated sediment** derived directly from glacial ice flowing into the area from a northern or eastern ice source
Sand and gravel; pebbly to cobbly; brown; locally contains beds of silt or diamicton; calcareous; well to moderately well sorted; 20 to 100 feet thick	Mahomet Sand Member, Banner Formation lower unit (cross section only) b-m2	**Glaciofluvial sediment (outwash)** deposited in the Mahomet Bedrock Valley by streams flowing in front of advancing ice margin located to the northeast of the map area

PRE-ILLINOIS EPISODE AND OLDER

Diamicton, silt, clay, and sand and gravel; crudely stratified; olive brown; calcareous or leached; contains a higher proportion of fragments of the local bedrock; 10 to 40 feet thick	Canteen member, Banner Formation (cross section only) b-c	**Fluvial and lacustrine sediment, colluvium, or weathered bedrock** that accumulated in the Mahomet Bedrock Valley prior to the latest pre-Illinois Episode glaciation
Shale, siltstone, claystone, and underclay; upper part is soft, fissile, and fractured; locally contains siderite nodules, plant macrofossils, and slickenslides	Pennsylvanian or Mississippian bedrock (cross section only) Pz	**Bedrock;** includes strata having a marine or terrestrial origin that form an irregular surface with valleys and uplands, shaped by multiple cycles of erosion from water and glacial ice

[1] Generally, the Wisconsin Episode sediments mapped at the land surface are overlain by 1 to 5 feet of wind-deposited silt (loess).
[2] The time periods for the Wisconsin Episode and the Hudson Episode are reported as calibrated radiocarbon years and can be directly compared to calendar years before 1950 (Stuiver et al. 2005).
[3] The subdivision of sediments assigned to the pre-Illinois Episode is discussed in Stumpf and Dey (2012).
[4] The West Lebanon "Till" Member was previously only mapped in western Indiana by Bleuer (1976).

Purpose

Detailed geologic mapping on the Rantoul USGS 7.5-minute quadrangle was undertaken to better understand the distribution of geologic materials over the Mahomet Bedrock Valley area in east-central Illinois (figs. 1 and 2). This work also supports the ISGS geologic mapping program to produce 1:24,000-scale three-dimensional maps of the glacial geology from land surface to the top of bedrock for the entire state.

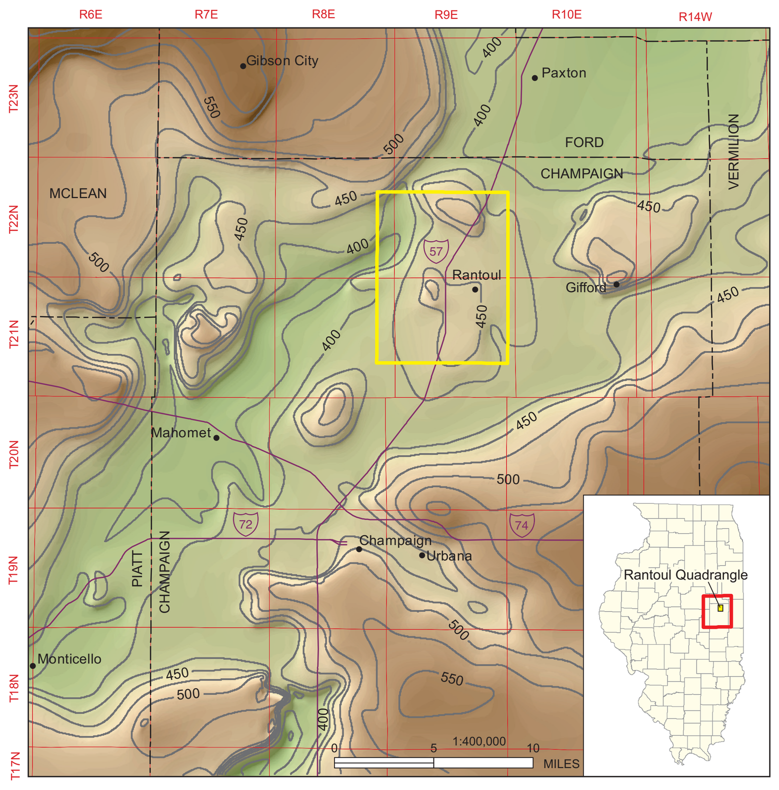


Figure 1 Contours of the bedrock topography in east-central Illinois overlain on a colored shaded relief of the bedrock surface. The Rantoul Quadrangle is outlined in yellow.

The geologic materials found at the land surface and in the subsurface have complex distributions that are mappable. These materials are the source of important earth and water resources. This geological information can be used by decision-makers in the area to address a wide variety of local and county-wide issues, including water-supply planning, remediation of contaminated sites, identifying potential aggregate resources, designing and constructing foundations and structures, and preserving natural areas. Having an understanding of the surficial and subsurface geology can assist in identifying opportunities and limitations for future development as well as determining the environmental consequences of past and future land-use decisions. This mapping will form a basis upon which other derivative maps can be produced for specific purposes such as assessment of groundwater resource, mineral resources, and earth hazards.

Introduction

The Rantoul Quadrangle is located in the northeastern part of Champaign County and includes portions of the Villages of Rantoul and Thomasboro, and unincorporated areas (fig. 3). The land surface ranges in elevation from a minimum of approximately 685 feet above sea level in the southeastern part of the map area to higher than 830 feet on the Illiana Morainic System. The map area contains a variety of landforms including end moraines, undulating to hummocky morainal uplands, glacial outwash plains, and glacial lake plains. Glaciers flowed into the map area from ice sources located over Canada north and northeast of the Great Lakes (fig. 4). The ice margin positions associated with their advances or retreats are marked by the end moraines, specifically the Rantoul, Urbana, and moraineforming the Illiana Morainic System (fig. 3).

Mapping Techniques

A preliminary surficial geology map for the quadrangle was compiled from soil-parent material data (Endres 2003). A digital database accompanying the soil survey was queried to classify the parent material for each soil horizon. The parent material class of the lowest-most horizon of each soil was used to construct the surficial geology map. The parent material classes then were grouped into mapped lithostratigraphic units following Hansel and Johnson (1996), Willman and Frye (1970), and Stumpf and Dey (2012).

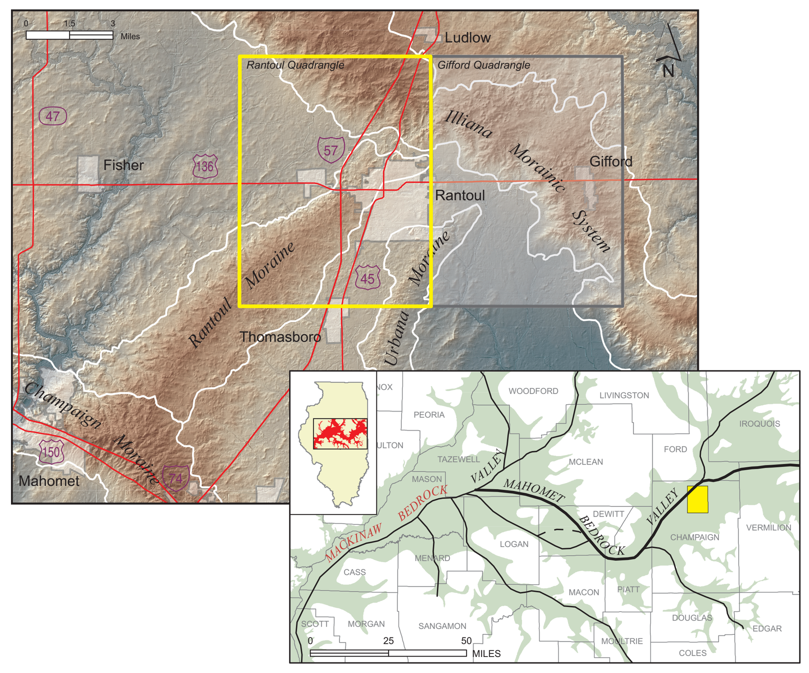


Figure 2 Location of the Rantoul and Gifford Quadrangles in east-central Illinois. The surficial geology of the Gifford Quadrangle was completed in 2011. The underlying shaded relief map was compiled from a digital elevation model (DEM) with a 2-foot resolution. The named moraines are outlined in white. On the inset map, the axes (black lines) and extent (green shade) of bedrock valleys in east-central Illinois are shown. The bedrock valleys lie below ~500 feet above mean sea level. The extent Rantoul Quadrangle is outlined in yellow.

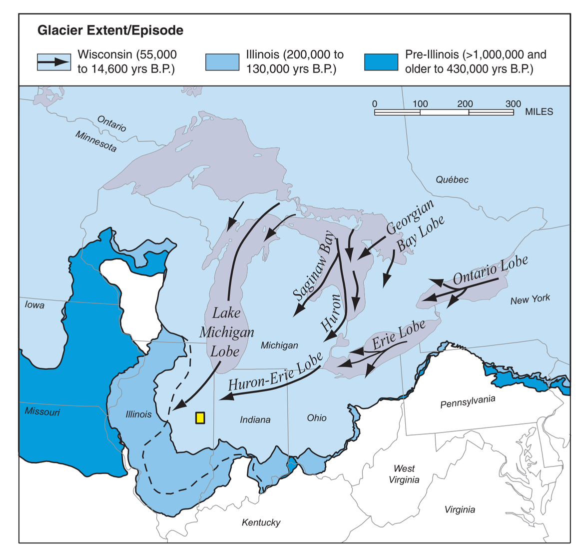


Figure 3 Extent of glaciers lobes along the south-central margin of the Laurentide Ice Sheet during the Quaternary Period. The approximate flow lines of glacial lobes during the last glaciation (Wisconsin Episode) are shown (modified after Gwyn and Dreimanis 1979). Glacial lobes during the Illinois and pre-Illinois Episodes followed similar flow paths. The dashed line delineates the maximum extent of pre-Illinois glaciers. The Rantoul Quadrangle is delineated by the yellow-filled box.

It is assumed the thickness of each soil unit is at least 6 to 10 feet or more based upon the depth to which the soil scientists sample during their mapping. The distribution of specific mapping units was adjusted according to information from boreholes logs, field observations, or other geologic records. The parent material/surficial geology information was draped on a shaded relief map (representing the topography of the land surface that was developed from newly acquired LiDAR data) and orthophotography (compiled from historical aerial photographs taken in 1940) to better define the boundary of geologic units.

Data compilation, analysis, and map and cross section construction was accomplished using ESRI's ArcGIS® software (version 10.1.1) and Adobe's Illustrator® software (version CS6). The three cross sections (A–A´, B–B´, and C–C´) were constructed to portray the sequence of geologic materials in the subsurface above bedrock. A record of these materials encountered at each borehole site is available from the ISGS Geologic Records Unit.

Geophysical Surveys

Electrical earth resistivity surveys were conducted over 3.5 miles of roadway in the quadrangle (See surficial geology map), over part of the Mahomet Bedrock Valley where the bedrock surface is 250–300 feet below the land surface. This geophysical method determines the contrast in electrical properties of geologic materials by transmitting an electric current into the ground and measuring the resulting electrical potential. Deposits of sand and gravel have relatively high electrical resistance or resistivity to the passage of an electrical current, whereas clay tends to conduct electrical current. Resistivity (the resistance of a unit area of material divided by a unit length) is reported as ohm-meters, is the same regardless of the volume of the material. For this test, we used the dipole-dipole configuration with the High Resolution Electrical Earth Resistivity (HREER) method (cf. Stumpf and Dey 2012). Profiles of continuous resistivity measurements were obtained every 5 feet to a depth of 300 feet (fig. 5). The corresponding geologic mapping units are shown on the profile.

Chanute Air Force Base

The Chanute Air Force Base (CAB) was one of thirty-two facilities established by the United States Air Force (USAF) during the First and Second World Wars. From 1917 to its closure in 1993 it was a state-of-the-art facility for pilot training, technical training, storage, maintenance and aerospace systems support (USAF 2007). As part of these activities a great amount of waste was generated and subsequently disposed of or stored on base. Four landfills, and a number of smaller sludge pits, lagoons, and tanks (above and below ground) were installed to store the waste (US EPA 2000). The landfills were excavated into the surficial geologic materials to a depth of 5–13 feet (IEPA 2013). The materials that were discarded included office trash, shop wastes (solvents), herbicides (e.g., 2,4-D and 2,4,5-T), other chemicals, aircraft parts, and construction rubble (ES 1983, 1992). Because of the perceived human health risk to the surrounding area from contamination, the Illinois Environmental Protection Agency (IEPA) proposed that the CAB be designated on the Superfund National Priorities List (NPL) to expedite the cleanup (IEPA 2013). Since 2000 when it was proposed to the NPL, substantial progress has been made in the cleanup, and the IEPA now finds the final NPL listing option to be unnecessary. The cleanup and Whole Base Transfer to the Village of Rantoul is expected sometime in 2015 (AFCEC 2013).

Since the base closure, the USAF has undertaken many base-wide and site-specific studies and operations to monitor, remediate, and cleanup contaminated soil, and surface and ground waters. As part of these activities over 5900 logs were collected from boreholes, probings, pits, trenches, and excavations made on the base. The USAF through their consultant Chicago Bridge & Iron Company (CB&I) provided the ISGS access to a database containing geologic information from these workings. In addition, geologic logs from additional boreholes completed when the CAB was opened were also analyzed. Geological information was obtained from project reports filed under the USAF's Administrative Record (http://afcec.publicadminrecord.us.af.mil/Search.aspx).

Of these data, only 225 boreholes were selected to input into the database used for making the surficial geology map. These boreholes are the deepest drilled, and a large number of them penetrate underlying geologic units portrayed in the cross sections. It is important to note, over half of the boreholes were not included in the database from CB&I. Information from the selected boreholes support the conceptual geologic model of the CAB previously developed for the USAF (e.g., Mitretek Systems 2003). Between 35 and 60 feet of silt loam till (Batestown Member, Lemont Formation) covers the base and overlies the 15–20 of silty clay loam till (Tiskilwa Formation). Over the northwestern part of the base, the Batestown Member is overlain by discontinuous deposits of sand and gravel (Henry Formation). The Tiskilwa Formation overlies a deposit of sand and gravel (Pearl Formation) that was mapped to the east for another 7 miles (Stumpf 2011), and is up to 120 feet thick on the CAB. The upper part of the Pearl Formation contains the Sangamon Geosol that is weathered (oxidized and contains no carbonate minerals) and clayey. In places, the Tiskilwa and Pearl Formations are separated by organic-rich sediment (Robein Member). The Pearl Formation overlies older deposits of till, glacial outwash, and alluvium correlated to Glasford and Banner Formations (See cross section A–A´).

Acknowledgments

Many individuals assisted in this project by providing information and services including database management and development, data entry, cartographic and graphic production, technical review, and in-depth discussions on geology. T. Larson conducted the HREER surveys. J. Duncan provided assistance with data entry and database management and J. Carrell, D. Lund, J. Domier, and D. Heckman, compiled the cartography and graphics. The Champaign County Regional Planning Commission (CCGIS) provided updates for various GIS layers. The CCGIS through the Illinois Height Modernization Program provided detailed land surface elevation data (LiDAR) to the ISGS, which staff member D. Luman processed to develop a 2-foot resolution DEM and associated shaded relief map of the land surface topography of the quadrangle.

This mapping was supported in part by the U.S. Geological Survey (USGS) National Cooperative Geologic Mapping Program under USGS STATEMAP award number G13AC00240. The views and conclusions contained in this document are those of the author and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government. Also, the Rantoul Quadrangle lies in the area of a multi-year project (2007-2010) funded by a private company (Illinois-American Water) to study the Mahomet aquifer in Champaign County and adjacent areas. Funds from this project were used to collect geological and geophysical information that were used in this mapping.

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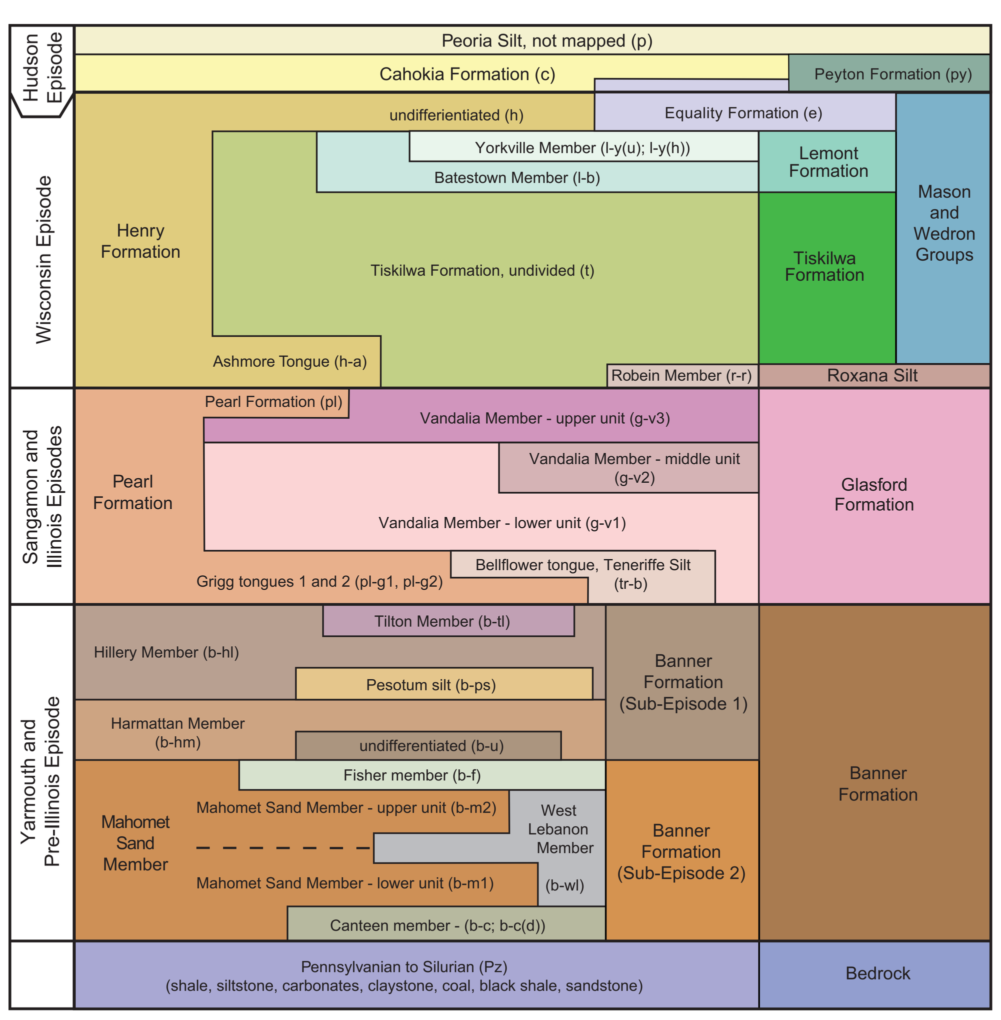

Figure 4 Schematic vertical and intertonguing relationships among the lithostratigraphic units for Quaternary sediments in east-central Illinois (modified from Stumpf and Dey 2012). The lithostratigraphy shown on the left side of the diagram is encountered only along the Illinois River valley, located west of the map area.

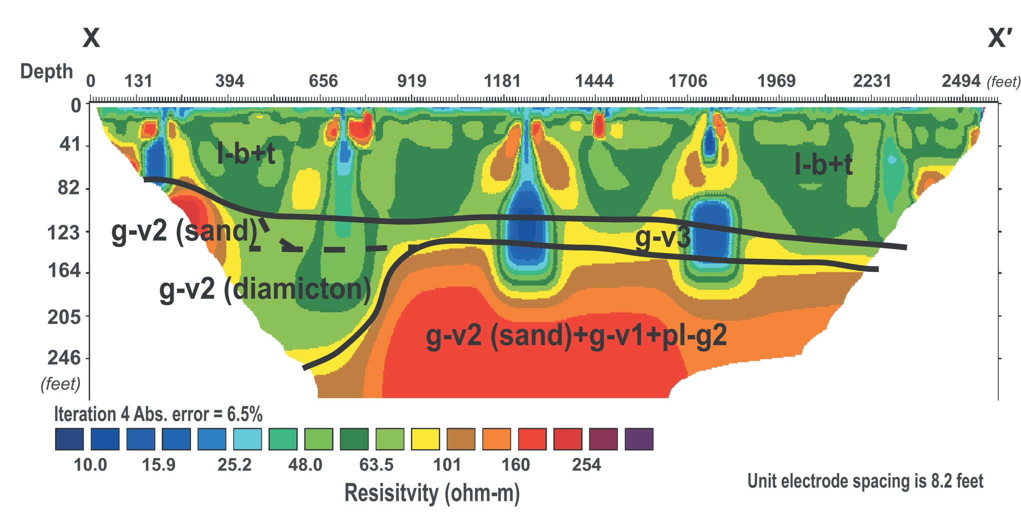

Figure 5 Resistivity profile along line X–X′ in the Rantoul Quadrangle. The estimated accuracy of the inversion model, or the overall RMS error is 2.3 percent. The corresponding geologic mapping units are shown. The finite element inversion program used to calculate the model (RES2DINV; Loke and Barker, 1996) partially compensates for the effects of topography and lateral resistivity changes.

CORRELATION OF MAPPING UNITS