

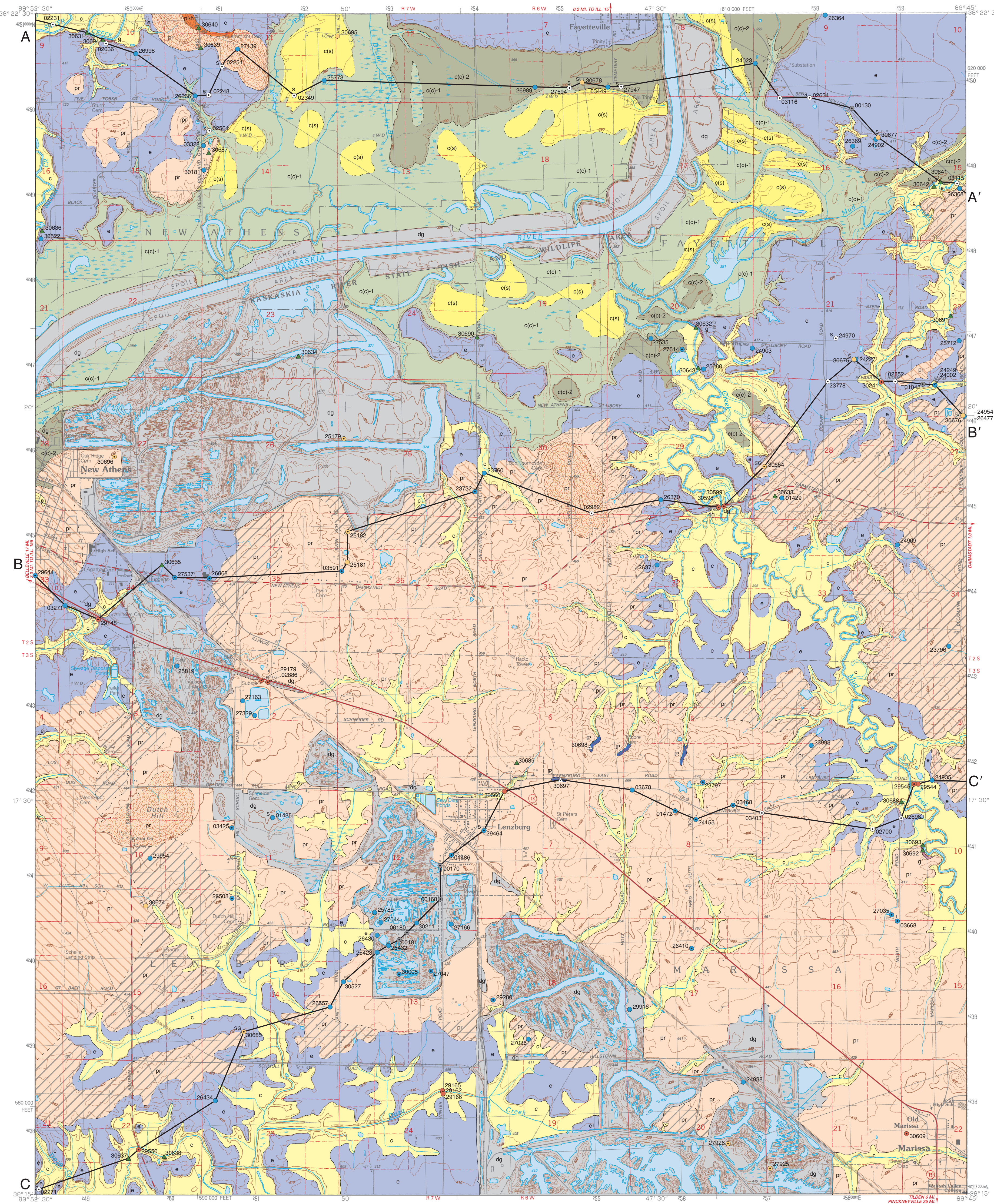
SURFICIAL GEOLOGY OF NEW ATHENS EAST QUADRANGLE

ST. CLAIR COUNTY, ILLINOIS

David A. Grimley and Nathan D. Webb
2009

Illinois Geologic Quadrangle Map
IGQ New Athens East-SG

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



Description	Unit	Interpretation
HUDSON EPISODE (~12,000 years before present [B.P.] to today)		
Fill or removed earth; surface mine areas typically contain chaotic diamicton with high variability in color and texture; many irregular contacts; contains large (3-4 feet) angular blocks of bedrock; includes significant sandstone, shale, coal, and limestone; variable thickness; material in dredge spoil and roadway fill not described	Disturbed ground dg	Anthropogenic fill or excavations; includes large areas of strip mining (for coal) in southern and western areas of the quadrangle; also includes spoil areas adjacent to the dredged Kaskaskia River channel; significant areas of fill along roadways, and a landfill site northwest of Marissa
Silt loam to silty clay loam to silty clay; contains some sandy/loamy zones; dark grayish brown to very dark gray; massive to weakly stratified; noncalcareous; soft to medium consistency; up to 15 feet thick	Cahokia Formation c	Alluvium (river deposits) in floodplains of tributaries to the Kaskaskia River (e.g., Doza Creek, Mud Creek valleys); derived primarily from reworking of fine-grained sediments exposed in adjacent uplands and slopes; includes some historical deposition likely related to deforestation and strip mining
Silt loam, silty clay loam, and silty clay; olive-gray to grayish brown to gray; massive to stratified; noncalcareous; contains weak soil development (lacks B horizon); up to 20 feet thick	Cahokia Formation (clay facies) c(c)-1	Abandoned channel fills, backswamp and overbank alluvium; frequently flooded; differentiated only in modern floodplain of Kaskaskia River
Fine to medium sand; may include beds of sandy loam and silty clay loam; dark yellowish brown to light olive-brown; moderately to well sorted; stratified; noncalcareous; soft; contains modern soil profile and finer deposits in upper few feet; up to 25 feet thick	Cahokia Formation (sandy facies) c(s)	Point bar and channel deposits; in modern Kaskaskia floodplain as well as in early to middle Holocene terraces; differentiated only in modern Kaskaskia Valley; interstratified with c(c)-1 and c(c)-2
Silty clay loam to silt loam; brown to yellowish brown to grayish brown; noncalcareous; includes relatively weak modern soil profile in upper 5 feet; soft; up to 50 feet thick	Cahokia Formation (clay facies-high level) c(c)-2	Overbank alluvial deposits; within early to middle Holocene terrace; differentiated only in Kaskaskia Valley; underlain by Equality and/or Henry Formation or Cahokia Formation (sandy facies)
WISCONSIN EPISODE (~75,000-12,000 years B.P.)		
Silt loam to silty clay loam to silty clay; may include interbeds of fine sand or coarse silt; light olive-brown to grayish brown to dark gray; massive to stratified; secondary carbonate concretions may occur along bedding planes; contains small (<1 cm) aquatic gastropod shells and conifer wood in less-weathered or lower portions; soft to medium consistency when moist; up to 50 feet thick	Equality Formation (high terrace) e	Lake deposits and/or fine-grained alluvium; mainly deposited as slackwater sediment during peak glacial aggradation of the Mississippi River; terraces generally occur at ~408 to 420 feet asl; includes ~3 feet of clayey silt; underlain by Henry, Peoria, or Glasford Formations
Fine to medium sand; tan to grayish brown; stratified; may contain interbeds of fine-grained deposits (silt); moderately to well sorted; calcareous to noncalcareous; up to 35 feet thick	Henry Formation (cross sections only) h	Outwash (glacial meltwater river deposits) or nonglacial alluvium; underlain by the coarser Peoria Formation; overlain by the fine-grained Equality or Cahokia Formations; may also be intertongued with the Equality Formation
Silt loam to silty clay loam; brown to yellowish brown to gray; leached to gray to pinkish gray; massive; iron leached; contains modern soil solum in upper 5 feet; soft to very stiff; up to 15 feet thick	Peoria and Roxana Silt (5-6 feet thick) pr	Loess (windblown silt); includes redoxidized loess in sloping areas; contains modern soil; typically underlain by Glasford Formation at surface elevations greater than 445 feet asl; areas underlain by Peoria Formation outwash facies or Tenebris Silt (see below) are indicated by a diagonal line pattern
SANGAMON AND ILLINOIS EPISODES (~150,000-75,000 years B.P.)		
Silty clay to clay loam to silt loam; yellowish brown to gray; leached to calcareous; faintly stratified in places; soft to medium in silty zones and medium to very stiff in clayey zones; up to 20 feet thick	Berry Clay Member and/or Tenebris Silt (cross sections only) bcl (buried by >5 feet loess)	Accretionary deposits, loess, lake deposits and alluvium; contain strong pedogenic alteration of the Sangamon Geosol (interglacial paleosol); can be intertongued with the Peoria Formation; diagonal line pattern shown where buried and not underlain by Peoria Formation; Berry Clay may be an upper member of either Glasford or Peoria Formation.
ILLINOIS EPISODE (~200,000-130,000 years B.P.)		
Intermixed loam, diamicton, and sand; reddish brown to yellowish brown to light olive-gray; upper 10 to 15 feet is often more weathered; soft to moderately stiff; noncalcareous to calcareous; up to 45 feet thick	Hagarstown Member, Peoria Formation pi-h (buried by >5 feet loess)	Ice-contact sediment deposited in isolated hills; upper portion contains Sangamon Geosol weathering; may contain debris flows, inclusions of older paleosols and deposits, and/or melt-out deposits; intertongued with the Glasford Formation and Peoria Formation outwash facies
Fine to coarse sand to gravely sand to loamy sand; gravel generally less than 1 cm; yellowish brown; stratified below zone of alteration; may contain zones of iron stains or cementation; predominantly well to very dark gray; iron and manganese oxide staining common along fracture faces; leached to calcareous; very stiff; up to 55 feet thick	Peoria Formation (outwash facies) (cross sections only) pi(o) (buried below loess in terrace)	Outwash (glacial meltwater deposits); diagonal line pattern shown on loess-covered Illinois Episode terraces and below Berry Clay Member on map, typically at depths of 20-25 feet; also occurs widely underlain by Equality or Henry Formations; in Mud Creek and Kaskaskia River valleys
Pebbly silt loam to silty clay loam to loam diamicton; contains pebbles mainly less than 2 inches in diameter; may include thin sand and gravel lenses; brown to light olive-brown to very dark gray; iron and manganese oxide staining common along fracture faces; leached to calcareous; very stiff; up to 40 feet thick	Glasford Formation g	Till and ice-marginal sediment; upper few feet of diamicton may contain evidence of Yarmouth Geosol weathering; consists mainly of subglacial till with some supraglacial deposits; crops out in rare instances along Silver Creek and Mud Creek
Silty clay loam to silty clay with some clay loam and loamy sand beds; dark gray to dark grayish brown to dark brown; may contain small gastropod shells (<1 cm); massive to weakly stratified with more prominent stratification in lower portion of unit; strongly calcareous to noncalcareous at depth; stiff to very stiff; up to 30 feet thick	Petersburg Silt (cross sections only) pb	Lake deposits, with minor areas of debris flow; contains silty clay sediment resulting from aggradation of the Mississippi River in advance of Illinois Episode glacial maximum; immediately underlies Glasford Formation; occurs primarily in bedrock valleys at maximum elevations of 380 feet asl
YARMOUTH EPISODE (~420,000-200,000 years B.P.)		
Sandy clay loam to clay loam; light brownish gray; can contain strong soil structure with clay skins, iron and manganese oxide staining; faintly stratified in places; may contain small pebbles; noncalcareous; very stiff; up to 10 feet thick	Lerie Clay Member, Banner Formation (cross sections only) b-l	Accretionary deposits, alluvium, and lake sediment; deposited and strongly weathered during the Yarmouth interglacial episode
PRE-ILLINOIS EPISODE (~700,000-420,000 years B.P.)		
Pebbly clay loam diamicton to sandy loam to silty clay loam diamicton; grayish brown; may include some sand and gravel lenses; iron oxide staining along fractures; noncalcareous to calcareous; very stiff; up to 40 feet thick	Omphigment member, Banner Formation (cross sections only) b-o	Till and ice-marginal sediment; may contain evidence of Yarmouth Geosol weathering (oxidation, leaching, and pedogenic features) in upper portions; the alteration zone may be truncated by younger units
Sandy loam to loamy sand to silt loam; dark grayish brown; stratified; may contain horizontal conifer wood fragments or organic-rich zones; micaceous; calcareous; very soft where sandy and silty to very stiff where clayey; up to 20 feet thick	Harkness Silt Member, Banner Formation (cross sections only) b-h	Lake deposits, deltaic sediment, and alluvium; likely deposited during pre-Illinois Episode glacial aggradation in the Mississippi River and Kaskaskia River valleys; deposits occur typically below 380 feet asl in bedrock valleys
Clay to sandy loam to loamy sand; brown to greenish gray; weakly stratified; noncalcareous to weakly calcareous; contains pebbles of locally derived subangular shaly sandstone, and chert (no erratics); generally a thin upward sequence with stratified sand and gravel at base; soft in sandy zones and very stiff in clayey zones; up to 25 feet thick	Canton member, Banner Formation (cross sections only) b-c	Alluvium, with some colluvium and residual; proglacial, preserved mainly in basal portions of deep bedrock valleys; immediately underlain by Pennsylvanian bedrock; may contain paleosol development in upper portions; typically occurs below 350 feet asl

PRE-QUATERNARY DEPOSITS

Description	Unit	Interpretation
Sandstone, limestone, shale, coal, and underlay; ranges from gray to dark gray; yellowish brown to black; laminated to bedded to massive; may contain marine fossils; noncalcareous to calcareous	Pennsylvanian bedrock p	Bedrock or near-surface bedrock (within 5 feet of land surface); shaly marine, deltaic, and terrestrial sequences; small outcrops of sandstone occur in ravines along north-west-south-east-trending ridge in central portions of quadrangle

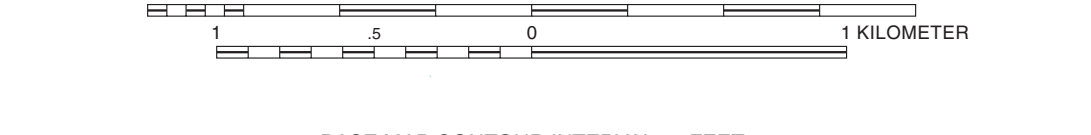
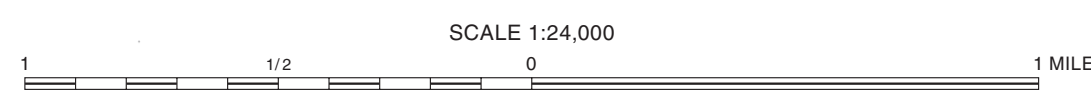
Data Type	Symbol	Interpretation
Outcrop	▲	Contact
Outcrop in field notes (IGS archives)	△	Inferred contact
Stratigraphic boring	○	Line of cross section
Water well boring	●	
Engineering boring	●	
Coal boring	●	
Other boring, including oil and gas	○	
Labels indicate samples (s) or geophysical log (G). Boring and outcrop labels indicate the county number. Dot indicates boring is to bedrock.		

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

Base map compiled by Illinois State Geological Survey from digital data provided by the United States Geological Survey. Topography compiled from imagery dated 1986. Field checked 1988. Map edited 1991.

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

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Geology based on field work by David A. Grimley and Nathan D. Webb, 2007-2008.

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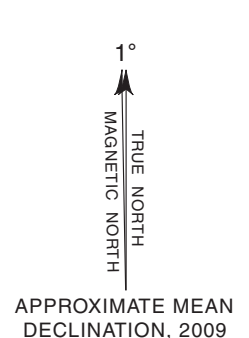
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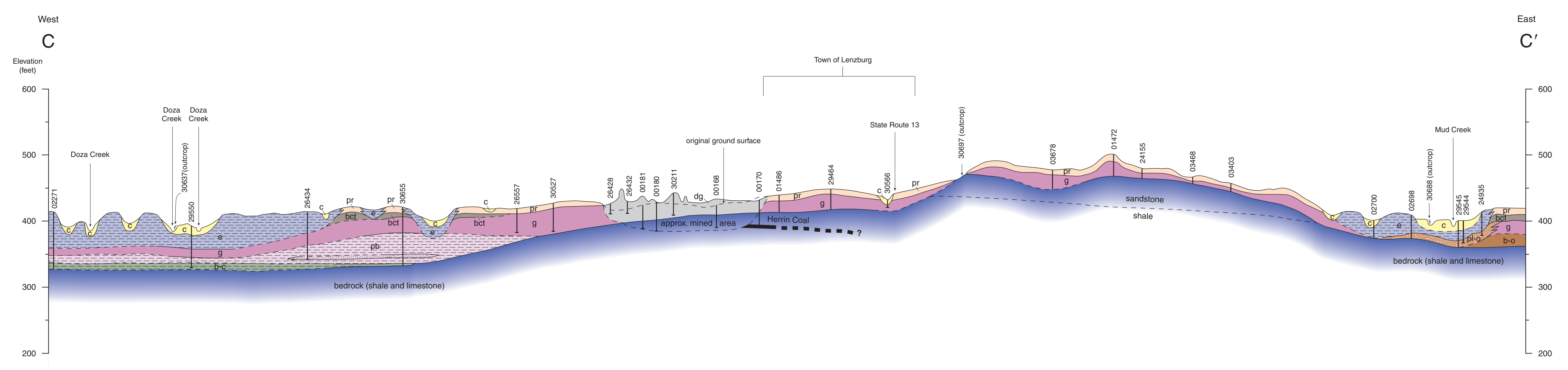
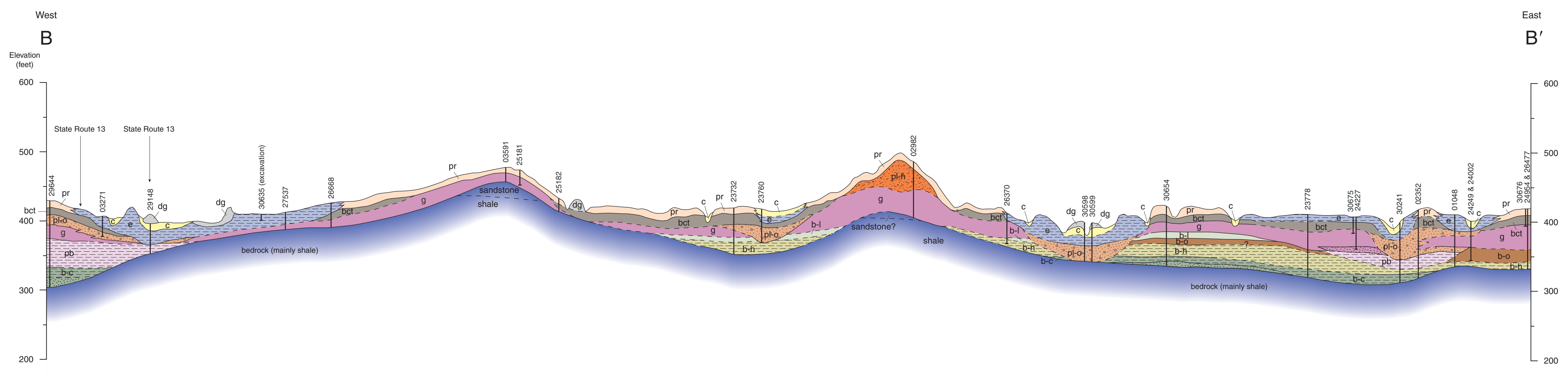
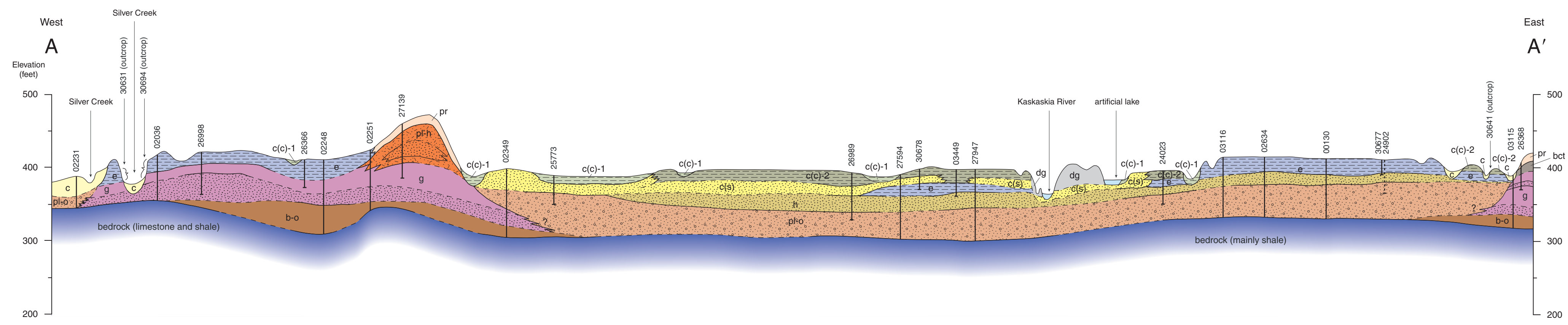
For more information contact:
Illinois State Geological Survey
615 East Peabody Drive
Champaign, Illinois 61820-6964
(217) 244-2414
http://www.igs.illinois.edu



ADJOINING QUADRANGLES
1 Freeburg
2 Mascouah
3 Venedy
4 New Athens West
5 Saint Liberty
6 Red Bud
7 Baldwin
8 Tilden



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



dg	Disturbed ground	c(c)-1	Cahokia Formation (clayey facies)	c(c)-2	Cahokia Formation (clayey facies - high level)	h	Henry Formation	bct	Berry Clay and/or Tenerife Silt	pl(o)	Pearl Formation (outwash facies)	pb	Petersburg Silt Formation	b-o	Omphgent member, Banner Formation	b-c	Canleen member, Banner Formation
c	Cahokia Formation (tributaries)	c(s)	Cahokia Formation (sandy facies)	e	Equality Formation	pr	Peoria and Roxana Silts	pl-h	Hagarstown Member, Pearl Formation	g	Glasford Formation	b-l	Lierle Clay Member, Banner Formation	b-h	Harkness Silt Member, Banner Formation		Pennsylvanian bedrock

Cross Sections

- Mainly sand with some gravel
- Mainly sand; may contain some gravel or silt
- Laminated silt and clay
- Mixture of loam, sand and gravel, diamicton, and/or silty clay
- Diamicton, massive silt, or other fine-grained sediment
- Contact
- Inferred contact
- Boring on line of cross section
- Boring projected to line of cross section

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