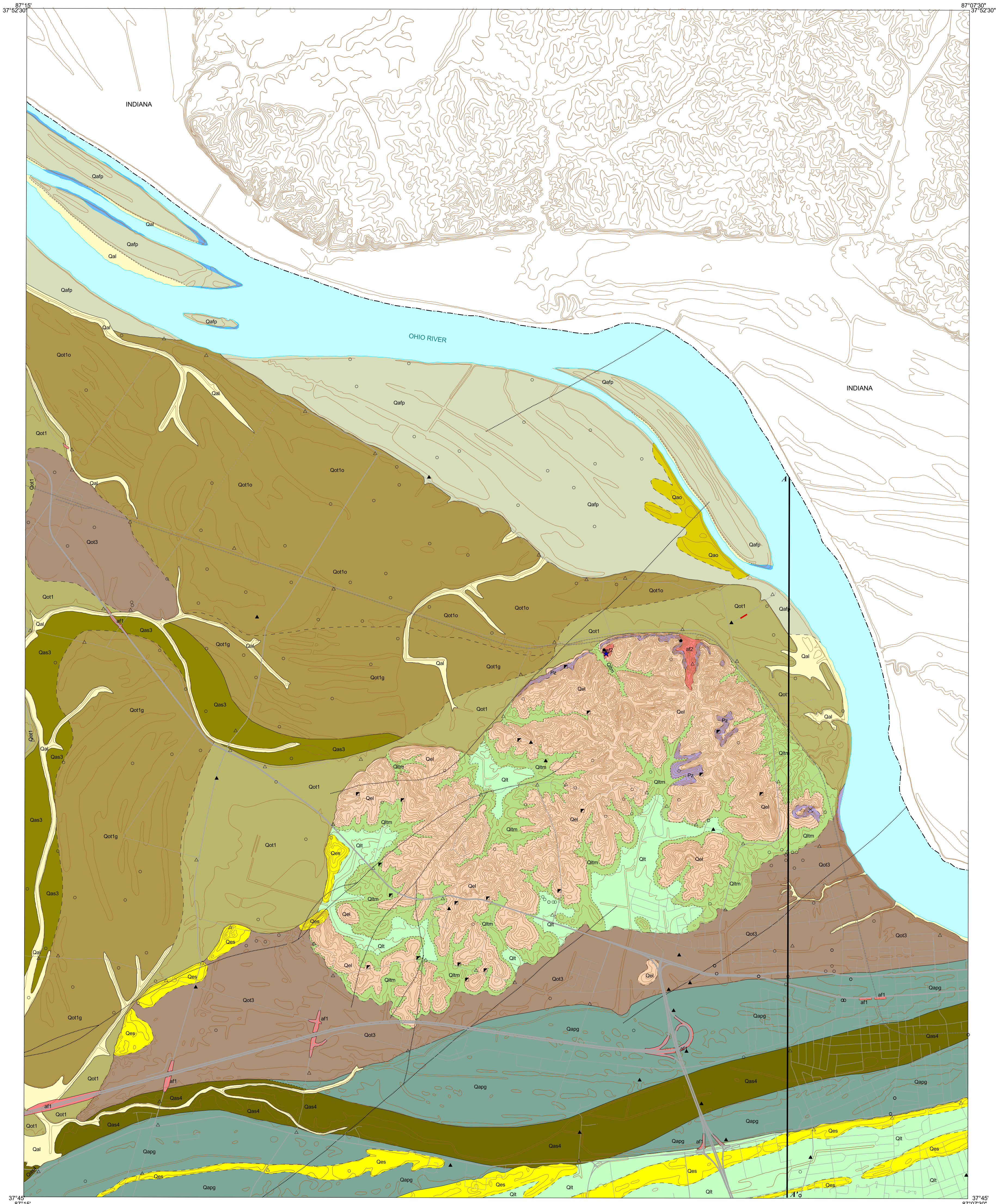
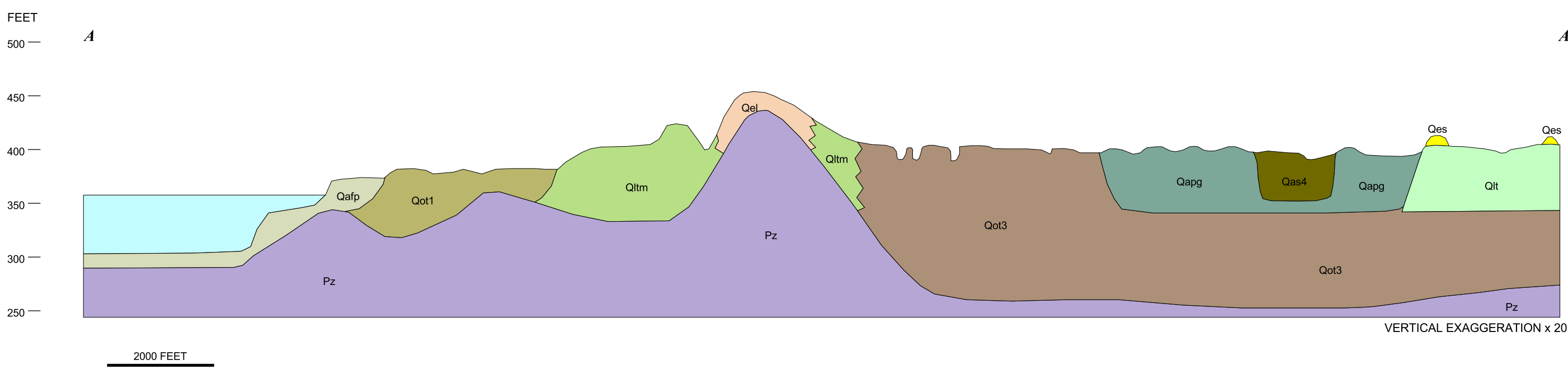
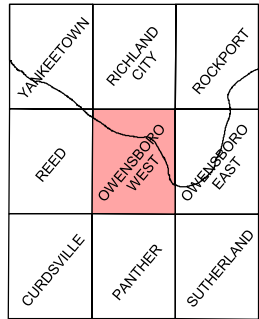
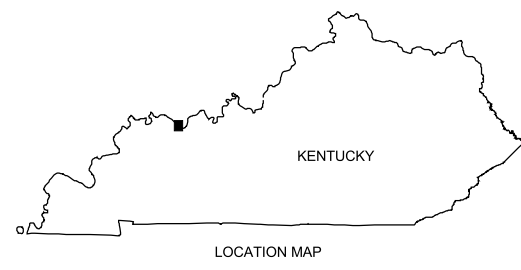
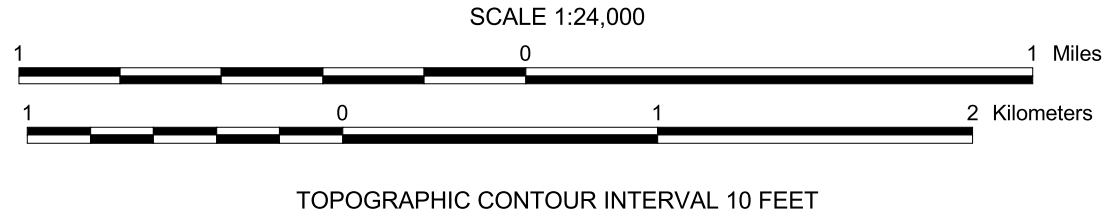
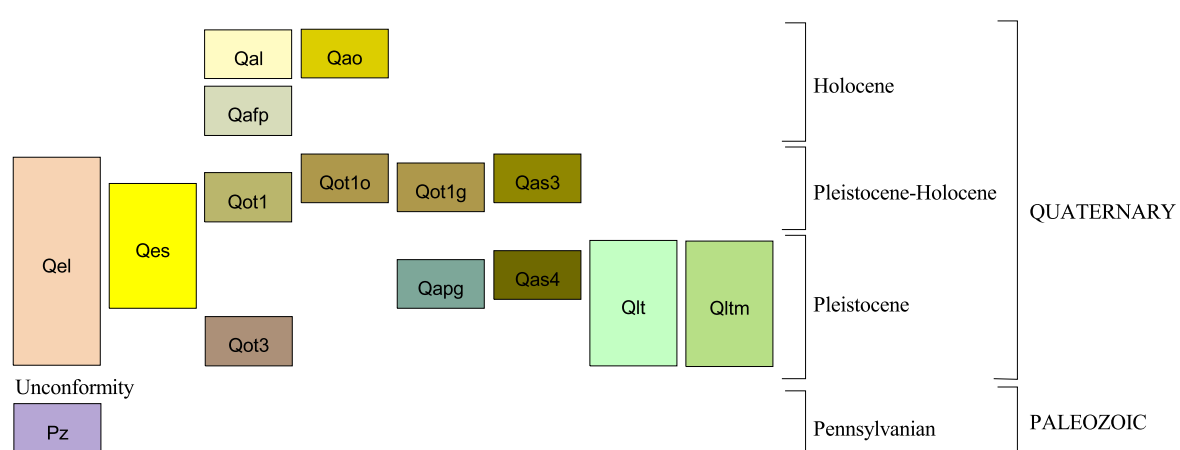




Topographic base from USGS Tagged Vector Contour file for Owensboro West quadrangle.  
Highway locations from Kentucky Transportation Cabinet digital files.  
Universal Transverse Mercator projection, zone 16, North American Datum of 1927.



#### CORRELATION OF MAP UNITS



#### DESCRIPTION OF MAP UNITS

- Qal Alluvium, modern (Holocene)**  
Silty clay and sandy silt with minor sand and sparse gravel; thickness 10 to 30 feet (3 to 10 m); found along banks of Ohio River and in floodplains along streams tributary to the Ohio River; deposited by modern historic stream processes; deposit is inset into adjacent map units; contact with adjacent units varies from sharp to poorly defined; mapped on the basis of topographic expression.
- Qao Alluvium, natural levee deposits (Holocene)**  
Sand and silt; deposited in levee ridges or overwash deposits on floodplains of major rivers (Qafp) and on the Ohio River low outwash terraces (Qot1); grades into adjacent floodplain deposits; typically sandier than adjacent floodplain deposits.
- Qafp Alluvium, Ohio River floodplain (Holocene)**  
Sand, silt, fine gravel, and clay; surface mantled by silty clay and sandy silt; surface forms the lowest well-developed terrace along the Ohio River; 30 to 45 feet (10 to 15 m) thick; overlies sand and gravel deposits of older outwash terraces; contact is sharp, drawn at scarp of next higher terrace; estimated to range in age up to 6,500 years.
- Qot10 Outwash, Ohio River scrollwork terrace (Pleistocene - Holocene)**  
Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to adjacent outwash terraces; surface mantled with alluvial silty sand and sandy silt; 30 to 45 feet (10 to 15 m) thick; surface forms well-developed, swell-and-swale topography on Ohio River low terrace; deposited as glacial outwash reworked during postglacial adjustment of the Ohio River; overlies older outwash deposits (Qot3); contact is approximate, inferred from surface topography.
- Qas3 Alluvium, young slough (Holocene), abandoned Green River channel (Pleistocene - Holocene)**  
Silty sand, clayey silt, and silty clay; 30 to 45 feet (10 to 15 m) thick; forms sinuous, low-lying trough (Katie Meadow Slough); represents an abandoned channel of Green River as it migrated across the low terrace (Qot1g); overlies older outwash deposits (Qot3); contact sharp, identified by surface topography; floods frequently.
- Qot1g Outwash, Green River scrollwork terrace (Pleistocene - Holocene)**  
Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to adjacent outwash terraces (Qot3); surface mantled with alluvial silty sand and sandy silt; 30 to 45 feet (10 to 15 m) thick; surface forms well-developed, swell-and-swale topography on Ohio River low terrace; deposited as point bar deposits of glacial outwash reworked by meandering postglacial Green River; overlies older outwash deposits (Qot3); contact is approximate, inferred from surface topography.
- Qot1 Outwash, low terrace (Pleistocene - Holocene)**  
Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to adjacent outwash terraces (Qot3); surface mantled with alluvial silty sand and sandy silt; 30 to 45 feet (10 to 15 m) thick; surface forms well-developed, low-relief terrace along Ohio River valley; deposited as glacial outwash reworked by post-glacial Ohio River; overlies older outwash deposits (Qot3); contact is sharp, drawn at scarp of next higher terrace or upland.
- Qel Loess (Pleistocene - Holocene)**  
Silt, clayey silt, and fine sand deposited by wind; typically massive; unit thickest (up to 40 feet) near Ohio River valley and thins gradually to the south; mantles bedrock upland; not mapped where locally found on lacustrine terrace (Qot3) and high outwash terraces (Qot3); estimated to range in age from 2,500 to 10,000 years old based on new radiocarbon and luminescence dates (Newell, 1965; others, pers. comm.); locally includes thin layers of loess inferred to be older than 30,000 years.
- Qes Sand dunes (Pleistocene - Holocene)**  
Very fine to fine sand; locally contains lenses of clayey silt; thickness uncertain, base not observed; deposited by wind in long, linear ridges; mantled by loess up to 15 ft (5 m) thick.
- Qas4 Alluvium, slough (Holocene), abandoned Green River channel (Pleistocene)**  
Clayey silt, silty clay, and silty sand; 30 to 45 feet (10 to 15 m) thick; forms sinuous, low-lying trough inset into Green River paleovalley (Qapg); represents an abandoned channel of Green River as it migrated across the high terrace (Qot3); overlies older outwash (Qot3); contact sharp, identified by surface topography; floods occasionally.
- Qapg Green River paleovalley (Pleistocene)**  
Silty sand, clayey silt and silty clay with minor chert gravel; 30 to 45 feet (10 to 15 m) thick; includes Beds at Hubert Court of Ray (1965); forms broad, linear trough inset into and overlying deposits of adjacent high outwash terrace (Qot3) and lacustrine terrace (Qlt); represents abandoned Pleistocene paleovalley of the Green River; contact is sharp, drawn at scarp of adjacent high outwash or lacustrine terrace; wood from about 40 feet deep has been radiocarbon dated to 23,150 ±500 ypb (Ray, 1965).
- Qlt Lacustrine terrace (Pleistocene)**  
Clayey silt and silty clay; 30 to 45 feet (10 to 15 m) thick; thicker in tributary valleys; overlying complex deposits of sand, silt, clay and minor gravel; locally mantled by loess (Qel, not mapped); forms prominent low-relief terrace in tributary valleys and sheltered portions of Ohio River valley; unit deposited in lacustrine and slackwater environments associated with alluviation of the Ohio River valley by glacial outwash and resulting impoundment of tributary valleys; underlying material is of apparent mixed fluvial and fluvio-lacustrine origin; contact with fluvial units is sharp, and drawn on scarps separating adjacent terraces; contact with collan and upland units (Qel, Qes) is gradational and approximate, inferred by surface topography; estimated to range in age from >23,000 to 18,000 years old.
- Qltm Marginal lacustrine deposits (Pleistocene)**  
Clayey silt, silt, and fine sand; thickness uncertain; surface forms moderate slope and benched upland areas bordering lacustrine deposits (Qlt); represents complex transition between lacustrine deposits and loess mantling upland; deposits include loess, loess-derived slopewash, colluvium, lacustrine silt and clay, and lacustrine shoreline deposits; contacts gradational and approximate, mapped on the basis of topographic expression.
- Qot3 Outwash, high terrace (Pleistocene)**  
Fine to coarse sand and gravel, with local lenses of silt and clay; gravel includes chert, quartzite, sandstone, siltstone, igneous and metamorphic rocks, limestone, and coal; lithologically similar to adjacent outwash terraces; surface mantled with collan and alluvial silty sand and sandy silt; up to 170 feet (52 m) thick; surface forms well-developed, dissected terrace along Ohio River valley; deposited as glacial outwash; represents maximum valley filling by glacial outwash valley train deposits; overlies bedrock (Pz) or older pre-glacial alluvial deposits (not shown); contact is sharp, drawn at scarp of adjacent terrace or upland; age estimated to be 120,000 to 22,000 years old.
- Pz Bedrock (Pennsylvanian)**  
Consolidated shale, sandstone, coal, and overlying poorly sorted regolith, comprising the core of the uplands in the study area; includes areas of loess thinner than 3 ft (1 m).
- af1 Artificial fill, engineered fill (Modern)**  
Unconsolidated material used as fill for the construction of roads, railroads (not mapped), or buildings (not mapped).
- af2 Artificial fill, mine spoil (Modern)**  
Disturbed bedrock and regolith produced from coal mining operations or loess borrow pits.
- New water (Modern)**  
Areas of former land which have been removed by active erosion or dredging since the completion of topographic mapping.

#### EXPLANATION

- State boundary  
River bank  
Contact, observed  
Contact, approximately located  
Contact, inferred  
Faults (concealed)  
Railroads  
Roads  
Parkway or Federal highway  
State highway  
County roads, city streets
- Surface observations  
Landform and soil  
Landform only  
Lithologic data  
New data, this study  
KGS databases  
Abandoned shale pit  
Abandoned mine shaft  
Geochronology locations  
Cross section location  
Seismic refraction profile

#### ACKNOWLEDGEMENTS

This map was generated using new field mapping and compilation of unpublished and previously published data under the STATEMAP Program authorized by the National Geographic Mapping Act of 1992, Grant No. 05HQAG0007, and was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program and by the Kentucky Geological Survey.

New geochronology on lacustrine and loess samples was provided by the U.S. Geological Survey (Newell and others, pers. comm.). Location of sample sites shown on map.

Field mapping was completed by William Andrews May 2004 to February 2006, with assistance from R. Counts, S. Martin, M. Thompson, M. Crawford, M. Murphy, and G. Weisenfluh (KGS); M. Dixon (Indiana Geological Survey); R. Forsythe (USDA-NRCS); and W. Newell (USGS).

Subsurface information was compiled from data on file at the Kentucky Geological Survey as well as from data contributed by the Kentucky Transportation Cabinet, Owensboro City Engineer, Daviess County Sand and Gravel, the Indiana Geological Survey, and the U.S. Geological Survey.

#### REFERENCES

- Cox, F.R., Jr., 1974, Soil survey of Daviess and Hancock counties, Kentucky: U.S. Department of Agriculture, 108 p.
- Gallagher, J.T., 1963, Geology and hydrology of alluvial deposits along the Ohio River in the Lewisport and Owensboro areas, Kentucky: U.S. Geological Survey Hydrologic Atlas HA-74, scale 1:24,000.
- Gallagher, J.T., 1964, Geology and hydrology of alluvial deposits along the Ohio River in the Stanley area, Kentucky: U.S. Geological Survey Hydrologic Atlas HA-110, scale 1:24,000.
- Goudarzi, G.H., and Smith, A.E., 1971, Geologic map of the Owensboro West quadrangle, Daviess County, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-890, scale 1:24,000.
- Ray, L.L., 1965, Geomorphology and Quaternary geology of the Owensboro quadrangle, Indiana and Kentucky: U.S. Geological Survey Professional Paper PP-488, 72 p.
- Solis, M.P., and Terry, J., 2000, Spatial database of the Owensboro West quadrangle, Daviess County, Kentucky: Kentucky Geological Survey, ser. 12, Digitally Vectorized Geologic Quadrangle Data DVGQ-890. Adapted from Goudarzi, G.H., and Smith, A.E., 1971, Geologic map of the Owensboro West quadrangle, Daviess County, Kentucky: U.S. Geological Survey Geologic Quadrangle Map GQ-890, scale 1:24,000.

#### DISCLAIMER

Although these data have been processed successfully on a computer system at the Kentucky Geological Survey (KGS), no warranty, expressed or implied, is made by KGS regarding the utility of the data in any other system, nor shall the act of distribution constitute any such warranty. KGS does not guarantee this map or digital data to be free of errors or inaccuracies. KGS disclaims any responsibility or liability for interpretations from this map or digital data, or decisions based thereon.

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.

## QUATERNARY GEOLOGY OF THE OWENSBORO WEST 7.5'-MINUTE QUADRANGLE, WESTERN KENTUCKY

By  
William M. Andrews Jr.  
revised March 2006