SURFICIAL MATERIAL GEOLOGIC MAP OF THE WELDON SPRING, CHESTERFIELD, MANCHESTER, HOUSE SPRINGS AND MAXVILLE 7.5' QUADRANGLES
ST. CHARLES, ST. LOUIS AND JEFFERSON COUNTIES, MISSOURI

Geology and Digital Compilation by
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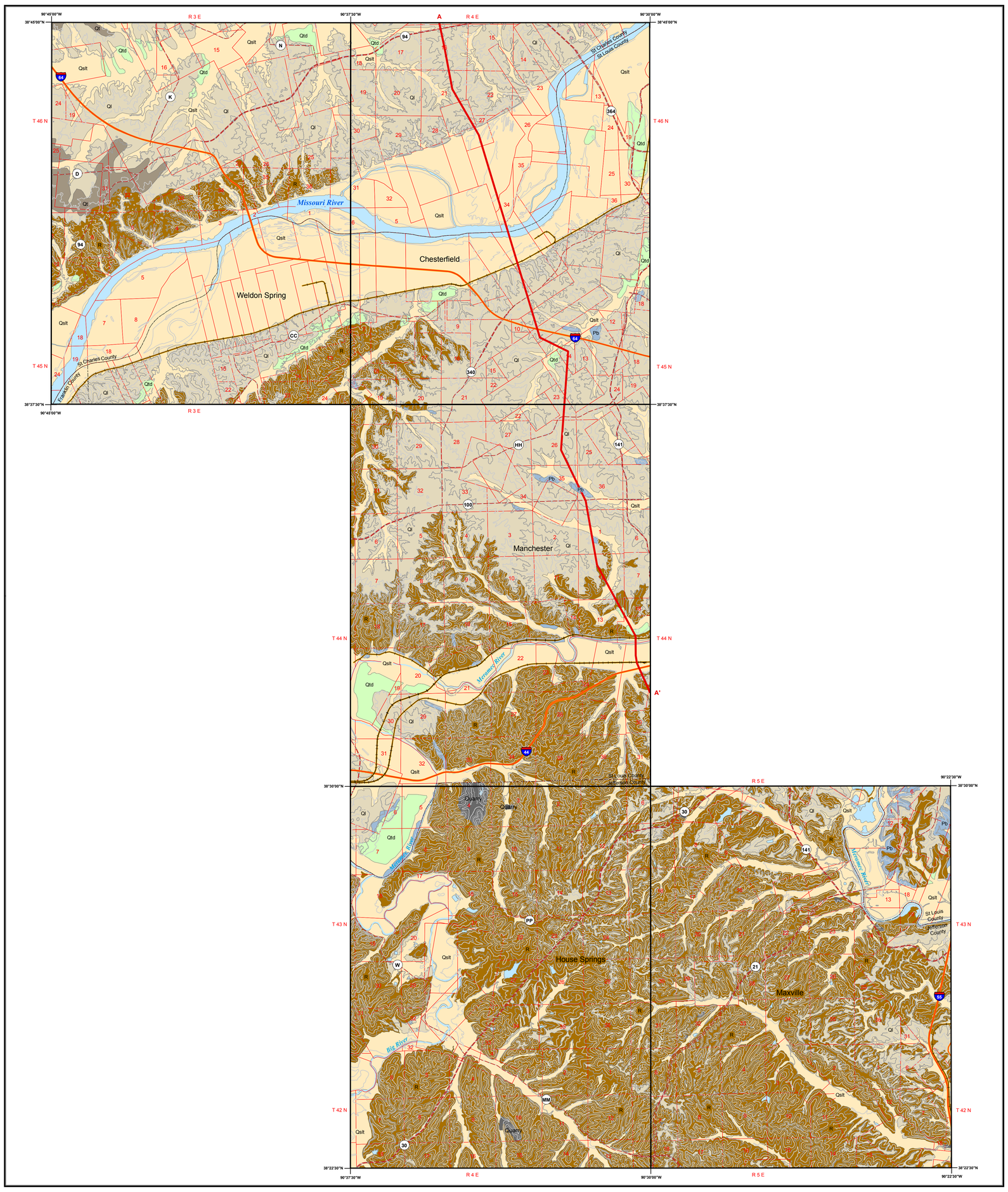

Produced by the Missouri Department of Natural Resources, Division of Geology and Land Survey, Geological Survey Program.

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Topography was derived from a USGS 10 meter Digital Elevation Model using contouring software.
Universal Transverse Mercator (UTM), Zone 15
North American Datum 1983 (NAD 83)

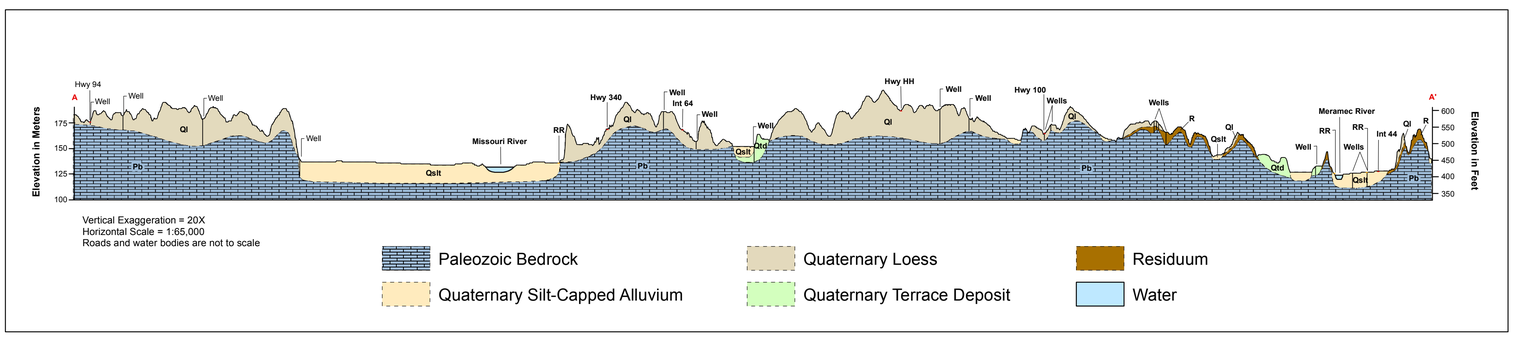
MN GN 1° 27' 26 Mils 1 1/2° 27 Mils
UTM and 1994 Magnetic North Declination at Center of Sheet
2011 Magnetic North Declination
~ 0° - 45' East, Field Strength: 53110.2 nT

SCALE 1:65,000

3 1.5 0 Kilometers 3 6
3,000 1,500 0 Meters 3,000 6,000
1 0.5 0 Miles 1
6,000 0 6,000 12,000 18,000 24,000 Feet

Missouri
Quadrangle Location

Road and Contour Symbology
Interstate Highways .....
Missouri Highways .....
Elevation Contour.....
Index Contour.....
Contour Interval..... 50 Feet



PHYSIOGRAPHY

The Weldon Spring and Chesterfield quadrangles include part of the floodplain of the Missouri River. The floodplain is up to three miles wide in this area. The Weldon Spring, Chesterfield and Manchester quadrangles include portions of the loess covered uplands and lie within the Dissected Till Plains Section of the Central Lowlands Province of the Interior Plains Physiographic Division. The House Springs and Maxville quadrangles lie within the Salem Plateau Section of the Ozark Plateau Province of the Interior Highlands Physiographic Division. The lowest recorded elevation is 390 feet mean sea level (msl) and occurs along the edge of the Meramec River in the eastern corner of the Maxville quadrangle. The highest recorded elevation is 940 feet msl and occurs in the northeastern corner of the House Springs quadrangle. Total relief of the five quadrangle area is approximately 550 feet.

GEOLOGICAL OVERVIEW

The five quadrangle area is underlain primarily by deposits of Paleozoic limestone and shale. The majority of the Chesterfield quadrangle and the northeast portion of the Maxville quadrangle are underlain by Mississippian-age St. Louis, Salem and Warsaw formations. The majority of the Weldon Spring quadrangle through the northwest corner of the Maxville quadrangle is underlain by the Mississippian-age Burlington-Keokuk Formation. The southwest corner of the Manchester, majority of the House Springs, and southwest corner of the Maxville quadrangle are underlain by Ordovician-age St. Peter, Joachim and Plattin formations.

DESCRIPTION OF MAP UNITS

Qsilt — **QUATERNARY SILT-CAPPED ALLUVIUM -** This unit has been deposited by the Missouri River. The approximate upper 15 feet of these deposits are composed predominantly of silt with variable amounts of clay and organic material. Material residing below the silt is predominantly sand and gravel to the top of bedrock. Thickness of this unit ranges from 80 to 100 feet. The water table is approximately five to 15 feet below ground surface, resulting in an interval of saturated sand and gravel greater than 80 feet thick.

Ql — **QUATERNARY LOESS -** This unit is a wind-blown deposit of silt and clayey silt with occasional pockets of clay, sand and gravel. The unit is composed of two separate loess layers, the Roxana below and the Peoria above (Goodfield, 1965). Total thickness of the two units may reach 140 feet. The Roxana is higher in clay content and may have a paleosol developed in the upper few feet. The contact between the two units forms a potential slide plane in areas of high topographic relief. The loess overlies Mississippian-age bedrock comprised of limestone and shale creating two unique environments. Where the loess is thin, the limestone may be karstic. Where the underlying unit is predominantly shale, water will perch, destabilizing the contact zone. Where the loess rests on shale, the slide potential is increased.

Qt — **QUATERNARY TILL -** Deposits of clayey till are located in the western portion of the Weldon Spring quadrangle. Quarternary till was deposited as a drift blanket during glaciation north of the Missouri River. The till is a mixture of clay, silt, sand, gravel and cobbles that covers the bedrock surface. The till varies in thickness from 10 to 25 feet with the thickest deposits inland from the river and in depressions of the bedrock surface.

Qtd — **QUATERNARY TERRACE DEPOSIT -** Terrace deposits in this area are slightly different than previously mapped terrace deposits (Brill, 1991; Harrison, 1997; and Goodfield, 1965). All were deposited during fluvial events, leaving the terrace above low flow stage of the river. However, the terrace deposits in this area have a lacustrine signature of sensitive organic clays approximately 20 feet below the surface. After high stage flow returned to normal, low lying areas within the terrace were filled with organic clay material. This zone has a very low shear wave velocity and underlies considerable infrastructure.

R — **RESIDUUM -** Areas of residual material are found on the slope and toe slope of high relief areas. Content is dependent on the bedrock parent material but typically has high clay content with fragments of parent material.

Pb — **PALEOZOIC BEDROCK -** Exposures in these quadrangles are typically found in areas of high topographic relief.

A —— A' Line locates the placement of the cross section with end line symbols.

Public Land Survey System including Spanish land grants.

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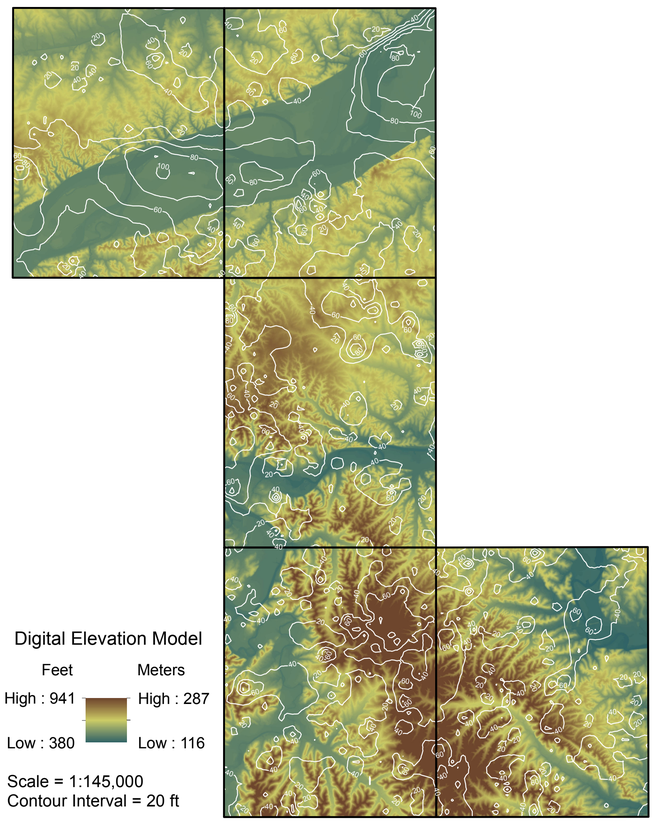
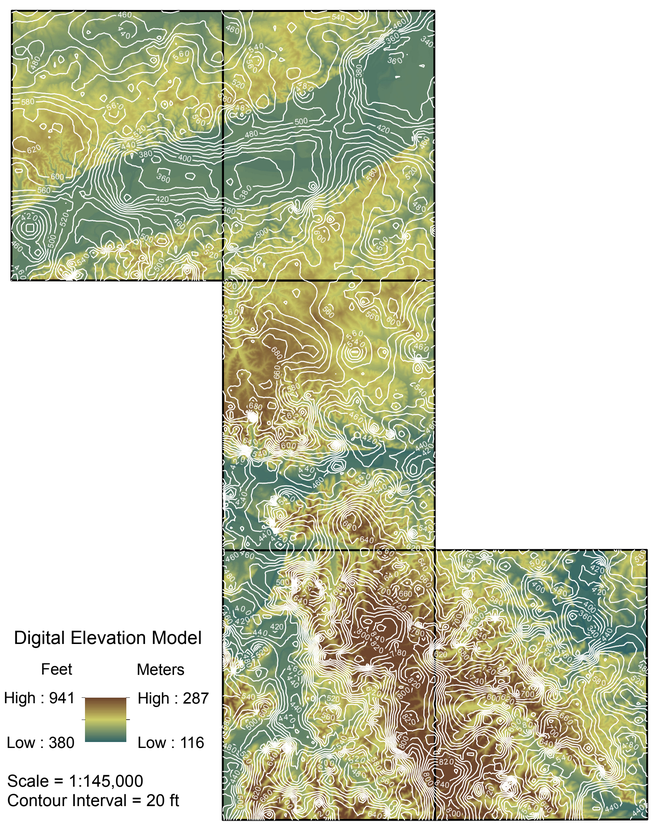
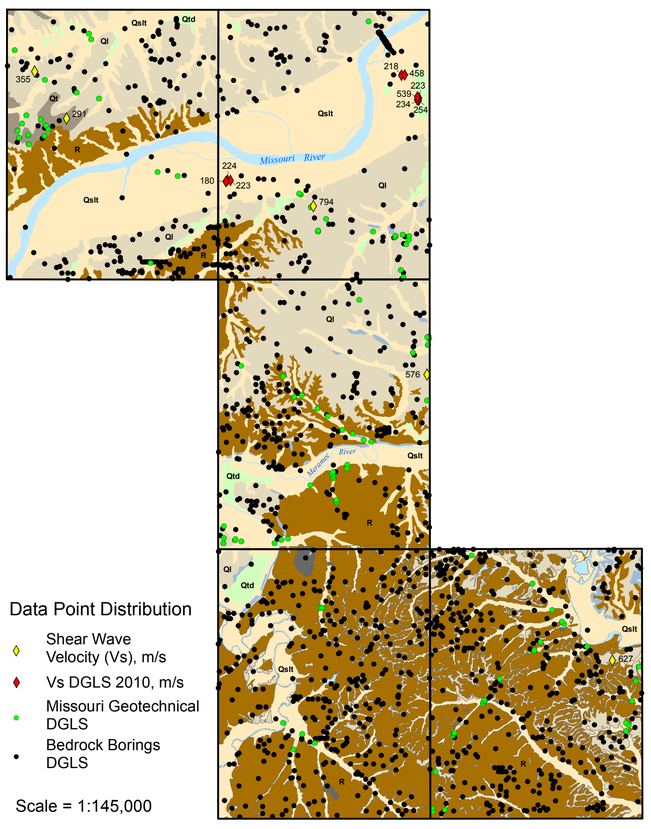
SURFICIAL MATERIAL THICKNESS

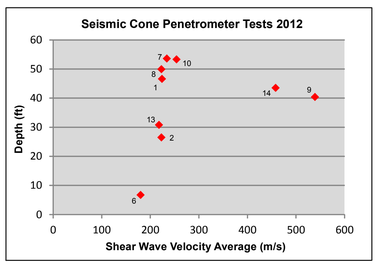


TOP OF BEDROCK



DATA POINT LOCATIONS





The Seismic Cone Penetrometer Testing (SCPT) data from the Chesterfield quadrangle displays averaged shear wave velocities (Vs). The nine SCPT results show the distribution of a majority of the borings are between 175 and 250 meters per second (m/s).

Shear Wave Velocity, Averaged			
Site	**Vs (m/s)**	**Depth (ft)**	**Depth (m)**
CH-01	224	46.6	14.2
CH-02	223	26.5	8.1
CH-06	180	6.7	2
CH-07	254	53.3	16.2
CH-08	223	49.9	15.2
CH-09	539	40.4	12.3
CH-10	234	53.6	16.3
CH-13	218	30.8	9.4
CH-14	458	43.5	13.3

Shear wave velocity testing was conducted in the Chesterfield quadrangle during June of 2010. Seismic Cone Penetrometer Testing is displayed above.

Acknowledgements

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