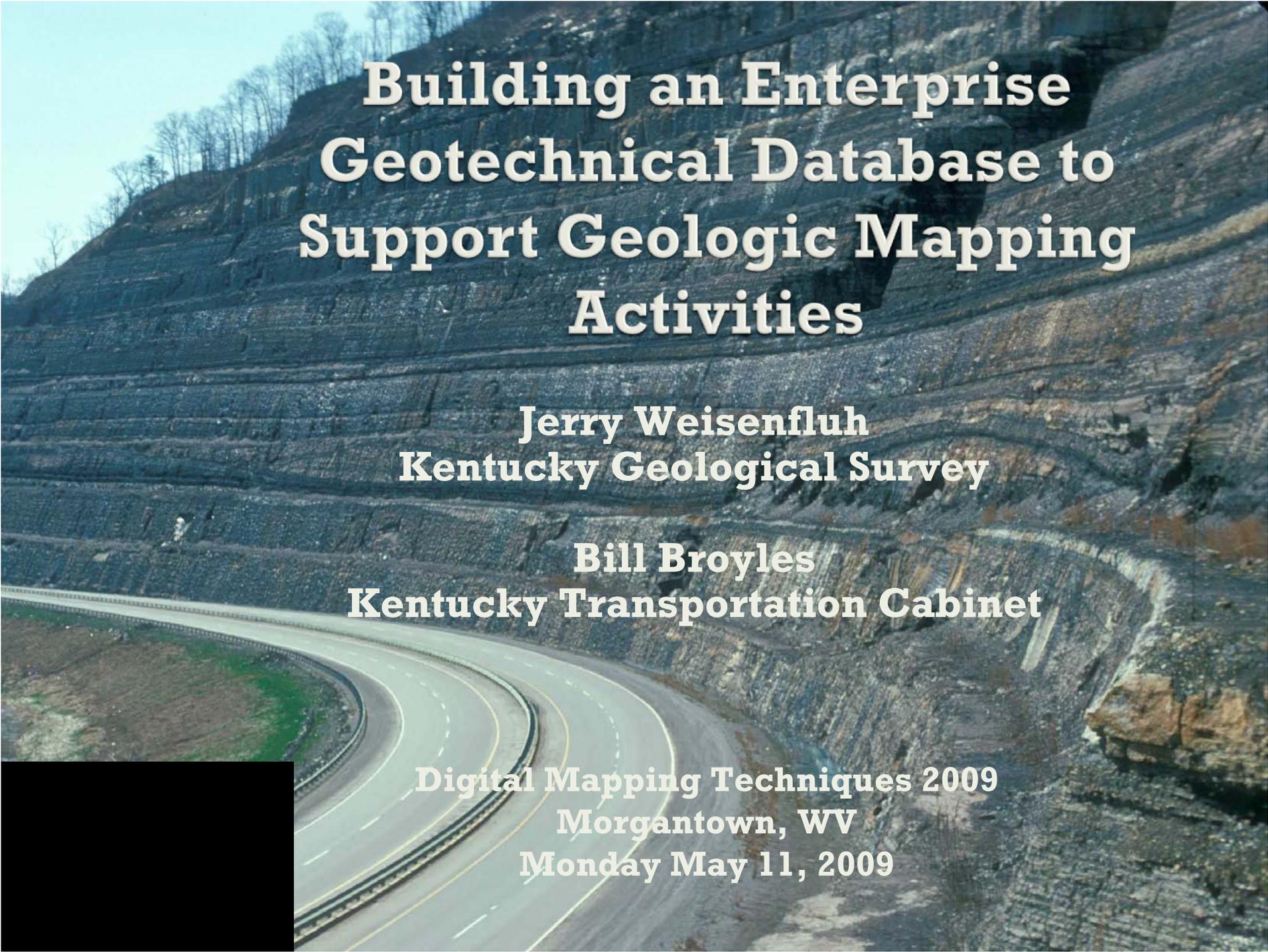


The following was presented at DMT'09
(May 10-13, 2009).

The contents are provisional and will be
superseded by a paper in the
DMT'09 Proceedings.

See also earlier Proceedings (1997-2008)

<http://ngmdb.usgs.gov/info/dmt/>



Building an Enterprise Geotechnical Database to Support Geologic Mapping Activities

**Jerry Weisenfluh
Kentucky Geological Survey**

**Bill Broyles
Kentucky Transportation Cabinet**

**Digital Mapping Techniques 2009
Morgantown, WV
Monday May 11, 2009**



KYTC conducts hundreds of geotechnical projects per year

Results in thousands of borings including:

Soundings

Rock cores

Soil samples

7,000 reports since 1956

- Depth to bedrock
- Soil composition , properties, and behaviors
- Rock lithology and physical properties
- Water table readings
- Fracture measurements

Geotechnical Report Data Input

KYTC Geotechnical Report Entry Form

Uploaded KYTC Report File is: S-999-2005.pdf

PublicationId: 11317

Company Name* Fuller, Mossberger, Scott, & May

County Name* Barren

Item Prefix 03

Item 1250 . 00

Project Type* State Bridge

Project Phase* Design

Mars Number 35899 - 01D

Report Number* 999

Report Year* 20 05

Route Prefix* Interstate (I)

Route Number* 65

Route Suffix

Route SectionID

Pages 6

Brief Description 3-span bridge ov

Parent Report

Calculated Fields(Do NOT EDIT)

District Number 03

Item Number 03-1250.00

Report Name S-999-2005

Report Type Structure

Route Label I-65

Bridge Identifier

Begin MP 3.2

S-008-05

cc: J. Ballinger
B. Billings
R. Mill
A. Calvin
B. Greene
D. Moses
R. Thomas
L. Williams
(ConSpan)

ager

01 D

Foundation Report

bridge has been completed. This structure is located on Lick Creek. The bridge is located in the Bighill (#900) spacing indicates that the bedrock at this site is part of the for the subsurface chart will be sent to the designer for

Enter stratigraphic Codes

Ste. Genevieve Limestone
(If it has more than one code, please use ; to separate them.)

IF you do not know FMCodes, You can Search Codes:

Ste. Gen.

Search Unit Name

Quaternary

Search by Age

You can **Assign Map Extent** from one of the following methods:

City Glasgow OR

Quad Austin OR

Custom Maparea

MapArea ID:

KYTC3455

Accessing Report Contents and Context

Kentucky Geological Survey

Kentucky Geologic Map Information Service

Note: please disable popup blocking software for full functionality:

[KGS Home](#) > [Maps, Pubs, & Data](#) > Geologic Map Service



[Map Legend](#) [Map Layers](#) [Geologic Information](#)

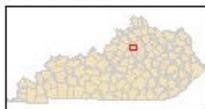
Geologic Units In Current View:

- hide geologic units

1:24,000 scale data (detailed geology)

Qal	Alluvium (Quaternary - Quaternary)
QTf	High-level fluvial deposits (Tertiary - Quaternary)
Ocf	Clays Ferry Formation (Middle Ordovician - Upper Ordovician)
Olu	Upper part of Lexington Limestone (Lower Ordovician - Middle Ordovician)
Olt4	Tanglewood Limestone Member (4) (Lower Ordovician - Middle Ordovician)
Olt3	Tanglewood Limestone Member (3) (Lower Ordovician - Middle Ordovician)
Olt2	Tanglewood Limestone Member (2) (Lower Ordovician - Middle Ordovician)
Olb	Brannon Member (Lower Ordovician - Middle Ordovician)
Olt1	Tanglewood Limestone Member (1) (Lower Ordovician - Middle Ordovician)
Ollr	Lower part of Lexington Limestone (Lower Ordovician - Middle Ordovician)
Ot	Tyrone Limestone (Lower Ordovician - Middle Ordovician)

Scale = 1:5,673



Map Scale:

choose a map scale

Map Size:

half page (6.8 x 4.7 in)

KY MAPS
view other KY maps

• [General information about this service](#)

gINT® Drillhole Database

<input type="button" value="INPUT"/> <input type="button" value="OUTPUT"/> <input type="button" value="DATA DESIGN"/> <input type="button" value="REPORT DESIGN"/> <input type="button" value="SYMBOL DESIGN"/> <input type="button" value="DRAWINGS"/> <input type="button" value="UTILITIES"/>													
<input type="button" value="Main Group"/> <input type="button" value="Driller Forms"/> <input type="button" value="Geology Forms"/> <input type="button" value="Lab Testing"/> <input type="button" value="Rock Testing"/>													
<input type="button" value="Project"/> <input type="button" value="Drill Hole"/> <input type="button" value="Pay Estimate"/>													
Hole Number As Staked	Hole Complete	Station Footage (ft)	Offset (ft)	Hole Moved	Total Hole Depth (ft)	Surface Elevation (ft)	Latitude83	Longitude83	Hole Angle	Start Date	End Date	Hole Type	Observation Well
44	<input type="checkbox"/>	55400	30	<input type="checkbox"/>	6.5	726.27	37.53042802	-85.223101	-90	3/16/2008	3/16/2008	cut profile	<input type="checkbox"/>
30	<input type="checkbox"/>	52100	30	<input type="checkbox"/>	6.8	716.26	37.52505566	-85.21532489	-90	3/17/2008	3/17/2008	cut profile	<input type="checkbox"/>

<input type="button" value="INPUT"/> <input type="button" value="OUTPUT"/> <input type="button" value="DATA DESIGN"/> <input type="button" value="REPORT DESIGN"/> <input type="button" value="SYMBOL DESIGN"/> <input type="button" value="DRAWINGS"/> <input type="button" value="UTILITIES"/>										
<input type="button" value="Main Group"/> <input type="button" value="Driller Forms"/> <input type="button" value="Geology Forms"/> <input type="button" value="Lab Testing"/> <input type="button" value="Rock Testing"/>										
<input type="button" value="Geologist Lithology"/> <input type="button" value="Core Hole Geology"/> <input type="button" value="Hole Remarks"/> <input type="button" value="ABC"/>										
[Geology Forms group]										
Top Depth (ft)	Bottom Depth (ft)	Primary Lithology	Description	Comments	Graphic					
0	15.4	Limestone	Light Gray, Fine Crystalline, Laminated, Many Weathered Shale Partings to							
15.4	19.7	VOID								
19.7	35.2	Limestone (ND)	Dark Gray, Fine Grained and Crystalline, Highly Argillaceous, Many Shale							
35.2	43.9	Shale	Gray, Calcareous, w/Fine Grained Limestone Zones							
43.9	58.4	Limestone	Gray, Fine Crystalline, Laminated, Argillaceous Zones							
*										

Plus #4 (%)	Gravel (%)	Coarse Sand (%)	Fine Sand (%)	Silt (>.002) (%)	Clay (<.002) (%)	Colloid (<.001) (%)	AASHTO Symbol	AASHTO Group Index	USCS Symbol	USCS Group Name
0.0	0.0	6.0	5.6	39.1	49.3	42.4	A-7-6	(29)	CH	FAT CLAY
0.0	0.0	2.2	4.9	41.6	51.4	40.5	A-7-6	(36)	CH	FAT CLAY
10.8	18.0	11.4	8.7	38.8	23.1	16.5	A-6	(14)	CL	LEAN CLAY
0.0	0.0	5.5	7.1	49.5	37.8	27.8	A-7-6	(23)	CL	LEAN CLAY
24.9	24.9	16.7	13.9	34.3	10.3	7.0	A-4	(4)	CL-ML	SILTY CLAY

Searching for Drillhole Data

Route:

note: click "Route" above to see a list of route numbers for a selected route prefix/county combo

US / Federal Route (US) - [] -

60

(ex: KY-165-20 / I-65 / US-25 / JC-9003)

Select a Geographic Limit Method (county or GQ) [v]

Project Type:

--ALL-- [v]

Hole Type:

--ALL-- [v]

Primary Lithology:

--ALL-- [v]

Geologic Unit:

New Albany

note: search for codes below

[+ Display Formation Code Finder](#)

AASHTO Classification:

--ALL-- [v]

USCS Symbol:

--ALL-- [v]

Limit Results To Holes With:

Hole Data:

observation well refusal slope indicator

Core Hole Data:

depth to bedrock base weathered rock RDZ Depth Scour Depth Std RQD KY RQD

Search Results – Project List



Kentucky Geological Survey
University Of Kentucky

[Search KGS](#) | [Contact KGS](#) | [KGS Home](#) | [UK Home](#)

[KGS Home](#) > [Data, Maps, & Pubs](#) > [Search Geotechnical Borehole Information](#) > [Geotechnical Borehole Results](#)



Geotechnical Borehole Results

Search Date: 5/1/2009

Search Limits:

Upper Geologic Unit Code: 341NALB

[<<< back to search page](#) | [email feedback](#)

Holes Returned (listed by project):

- [Project R-030-2008](#): [Powell](#) | [KY-9000](#) | [Roadway: RSD](#) | [Project Report \(.pdf\)](#) | [Hole Geology Report](#)

Note: click the Station Number link to view hole location on the KYTC map viewer

Hole Number	Hole Type	Station Number	Offset (ft)	Start Date	Elevation (ft)	Depth (ft)	County	Lat	Lon
1	core: Reports and Data	21 + 00.00	60.00	9/16/2008	728.21	78.00	Powell	37.844883	-83.918772
2	core: Reports and Data	21 + 00.00	182.00	9/16/2008	763.47	52.00	Powell	37.844557	-83.918713

+ [Project S-268-2007](#): [Bullitt](#) | [KY-1494](#) | [Structure: State Bridge](#) | [Project Report \(.pdf\)](#) | [Hole Geology Report](#)

Hole Geology Report



KYTC Information Service
Kentucky Geological Survey

[KGS Home](#) > [Data, Maps, & Pubs](#) > [KYTC Data Results](#)

KYTC Geology Report (Project: R-030-2008)

Hole Geology Report:

Hole Number	Quadrangle	Hole Type	Elevation	Depth To Bedrock	Base Weathered Rock	RDZ	Scour Depth	Upper Geo Unit	Lower Geo Unit	Bedrock Lithology	ABC Report
1	Clay City	core	728.21	1		2		New Albany Shale	n/a	Bedrock: vegetated	
12	n/a	cut profile	649.28	4				n/a	n/a		
13	n/a	cut profile	652.5	5				n/a	n/a		
14	n/a	cut profile	763.663	4				n/a	n/a		
15	n/a	cut profile	738.702	3				n/a	n/a		
16	n/a	sample	628.544	38.5				n/a	n/a		
17	n/a	sample	606.39	16.5				n/a	n/a		
18	n/a	sample	611.305	20.4				n/a	n/a		
19	n/a	sample	610.926	21.4				n/a	n/a		
2	Clay City	core	763.467	4		4		New Albany Shale	n/a	Bedrock: shale	
3	n/a	fill profile	611.444	23				n/a	n/a		
4	n/a	fill profile	630.544	16.5				n/a	n/a		

Rock and Soil Sample Report



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KYTC Information Service
Kentucky Geological Survey

[KGS Home](#) > [Data, Maps, & Pubs](#) > [KYTC Data Results](#)

KYTC Reports and Data (Project: S-268-2007 | Hole: 1002)

Logs (core and sample):

- [Geologist Log \(.pdf\)](#)
- [Driller Log \(.pdf\)](#)

+ Soil Summary:

Note: instruction place holder

Depth	Sample Type	Sample Number	Penetrometer	Description	Sieve Type	Proctor	CBR	Consolidation Report	QU Report	UU Report	CU Report
5 ft	ST	1	3.5	brw & grey clay	No Raw Data	NO	NO				
10 ft	ST	2	3.5	BRW & GREY CLAY	No Raw Data	NO	NO				
15 ft	ST	3	4	brw clay	No Raw Data	NO	NO				
20 ft	ST	4	3.5	brw grey clay	No Raw Data	NO	NO				

+ Rock Sample Summary:

Slake Durability:

Depth	SDI Result	Jar Result
32 ft	86.65414	4
37 ft	97.4122	5

**No Strength Test Report For This Hole



Improving lithology characterization

**Established a representative
collection of specimens from
Kentucky Ordovician units**

**Developed a megascopic
classification**

Sonic Velocity Testing of Rock Core



Fracture Mapping for Cut Stability Predictions



Photo by Steve Martin

Presenting Fracture Orientation Data

KGS Geologic Map Service - Windows Internet Explorer

http://kgmap.uky.edu/website/KGSGeology/viewer.asp?LayoutID=1&QueryZoom=Yes&startLeft=5340002.47&startRight

File Edit View Favorites Tools Help

Convert Select

KGS Geologic Map Service



Petroleum Geology Map | about
Coal Information Map | about

Bookmark Map:
create a bookmark

- Customize Map:
• dimmed layers are invisible at current scale:
[scale info](#)

- Geology:
 1:24K Scale Geology (detailed geology) [?]
 1:24K Geology Labels [?]
 Structure contours [?]
 Geologic Contacts (1:24K Scale) [?]

1:12000 - 24K geologic map data
Kentucky Geological Survey, 5/4/2009

Scale = 1:12,000

Map Scale:
choose a m

Enter a Cus

Map Size (v
half page (6

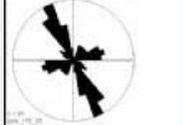
Lithologic descriptions available
for areas outlined in orange.

Arell

KGS Geologic Information Service - Photo Zoom - Windows Internet Explorer

http://kgmap.uky.edu/website/KGSGeology/photoDisplay.asp?x1

More than one photo found at this location:

photo id	photo caption (link to photo)	thumbnail
2531	Fractures in Cowbell Member of the Borden Formation along I-75 south of Berea, KY.	
2587	Rose diagram showing fracture orientations for field ID bere I75 05.	

Internet 100%

kgsweb.uky.edu/main.asp

KYTC Geotechnical Data



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[KGS Home](#) > [Data, Maps, & Pubs](#) > [KYTC Geotechnical Data](#)



TRANSPORTATION CABINET

KYTC Geotechnical Data

The **Kentucky Transportation Cabinet** and the **Kentucky Geological Survey** have partnered to provide the results of geotechnical investigations to the public:

- **Search Geotechnical Report Information**

Search for KYTC geotechnical design reports issued between 1956 and the present using a variety of geographic, engineering, and geologic criteria. Download reports in Adobe PDF format and view the project location on a geologic or topographic map for context.

- **Search Geotechnical Borehole Information (under development)**

Search for KYTC drill holes completed for projects beginning in 2007. Select holes based on geographic, engineering, or geologic criteria and limit the selection according to the kinds of samples and laboratory testing performed. View a list of selected projects and their respective holes and get summary results or formatted reports for a variety of geotechnical descriptions and tests.

- **View Geotechnical Information on an Interactive Map**

Search for KYTC geotechnical reports and drilling data using a Web-based interactive base map. Link to a variety of other internet map and data sources for a specific area of interest to harvest information for a project area using the KYMAPS tool.

- **[Kentucky Transportation Cabinet Home Page](#)**