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MEMORANDUM

TO: Keith Dotson
Division of Planning

BY: Bart Asher, P.E., P.L.S.
Geotechnical Branch Manager

DATE: December 12, 2013

SUBJECT: **Marion County**
KY 49 Lebanon to Loretto
Item # 4-8707.00
1100 C35 D625 04 FD04 0410 C078 E143
8761401P
Mars # 8761401P
Preliminary Geotechnical Assessment

The Division of Planning is conducting a planning study for the subject project. This project is located in Marion County, KY along KY 49 from Lebanon to Loretto as depicted on the site map. The site is at the edge of the Outer Bluegrass and Mississippian Plateau region, close to the Knobs Region. This abbreviated review will discuss some general geotechnical concerns with the area.

The approximate coordinates for the center of this site is site are: 37.595347 degrees North and -85.595347 degrees West. The site is located in the Lebanon West, Raywick and Loreto Geologic Quadrangles as depicted on the attached maps.

Bedrock types in the subject area are depicted on the attached maps. The project could potentially encounter New Albany Shale at the beginning and ends of the proposed project. New Albany shale is known to produce acidic runoff and often requires remediation measures, such as encapsulation, for roadway projects. It was also noted that the bedrock exposed in Cissels Creek is thinly bedded and subject to scouring during flood events. Special measures may be required to avoid issues with structures founded in this material.



Outlet of existing culvert – rock scour of thin layers.

Mapping indicates that limestone has been quarried from the Bardstown and Rowland Members of the Drakes Formation (in segment 2 of the planning study). Shales in this area can be highly weatherable. Limestone in this area, where it can be separated from the shales, is suitable for embankment construction and rock roadbed.

Hillsides in the area showed some signs of instability, such as pop-out failures. Springs could be present.

Foundations for bridges in the study area are generally rock bearing (end bearing piles, drilled shafts or spread foundations). Smaller structures such as retaining walls and box culverts may be founded on soil or bedrock. As indicated above, some measures may be required where the bedrock is thinly bedded and considered erodible.

Soils in the area are generally suitable for embankment construction. Generally embankments built from the native soils and bedrock can be constructed to a height of 60 feet with 2H:1V sideslopes if the foundation is suitable and proper compaction methods are used. Soil cuts over approximately 10 feet often require analyses to design proper sideslopes. In no case should soil cuts be steeper than 2H:1V.

Low lying areas may be wet and saturated, creating problems during construction. Ponds and springs may be encountered and require remediation efforts.

California Bearing Ratio (CBR) values used in pavement design are generally low for soils subgrades in the area (in the range of 1-2). Chemical modification of subgrade or the use of rock roadbed is common in the area.

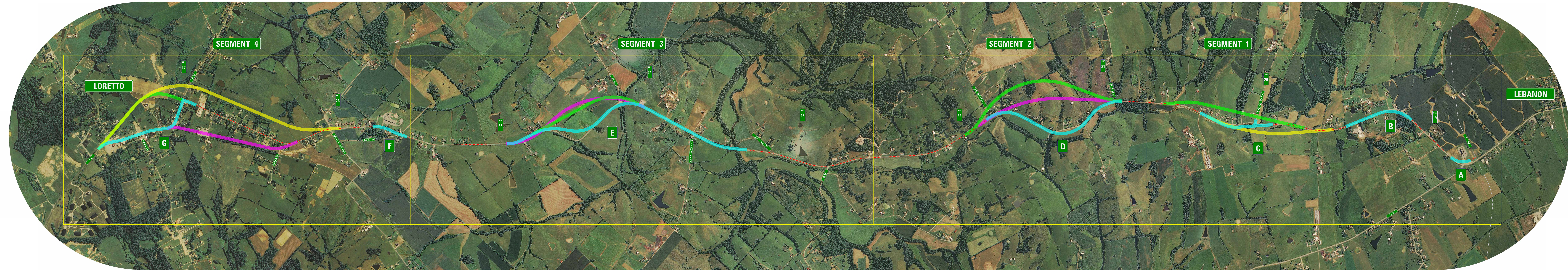
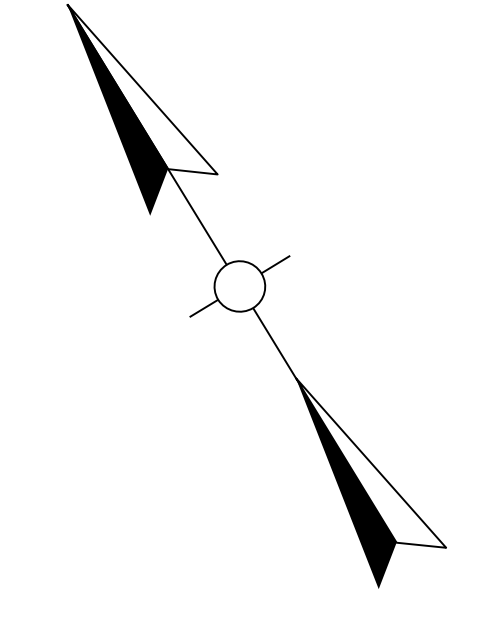
P-010-2013
Marion County
KY 49 Lebanon to Loretto

A list of previously completed Geotechnical Investigations close the study area is located below. The reports can be accessed through the KYTC Geotechnical Branch Database which can be accessed through the KYTC Division of Structural Designs home page (Click on Geotech and Search KYTC Completed Projects).

RA-001-2012 KY 49 reconstruction from Lebanon to Caney Creek Bridge
R-021-2013 Spot improvements on Toad Mattingly Road and Cowherd Lane

Site specific Geotechnical investigations are critical in this region for design due to the karst potential of the area and the potential for problematic soils.

Attachments:
Project Overview
GQ Site Maps



LEGEND

- EXISTING (WIDENING & IMPROVEMENTS)
- SPOT IMPROVEMENT #
- BLUE ALTERNATE (SPOT IMPROVEMENTS)
- GREEN ALTERNATE
- PINK ALTERNATE
- YELLOW ALTERNATE

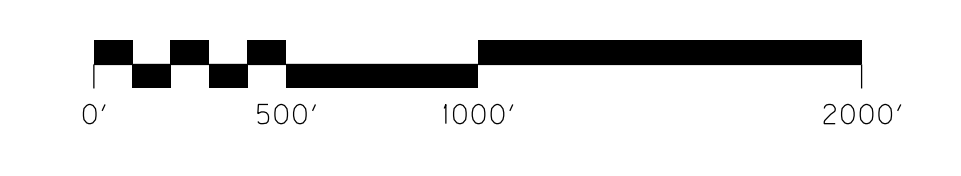
TYPICAL SECTIONS

URBAN 2 LANE

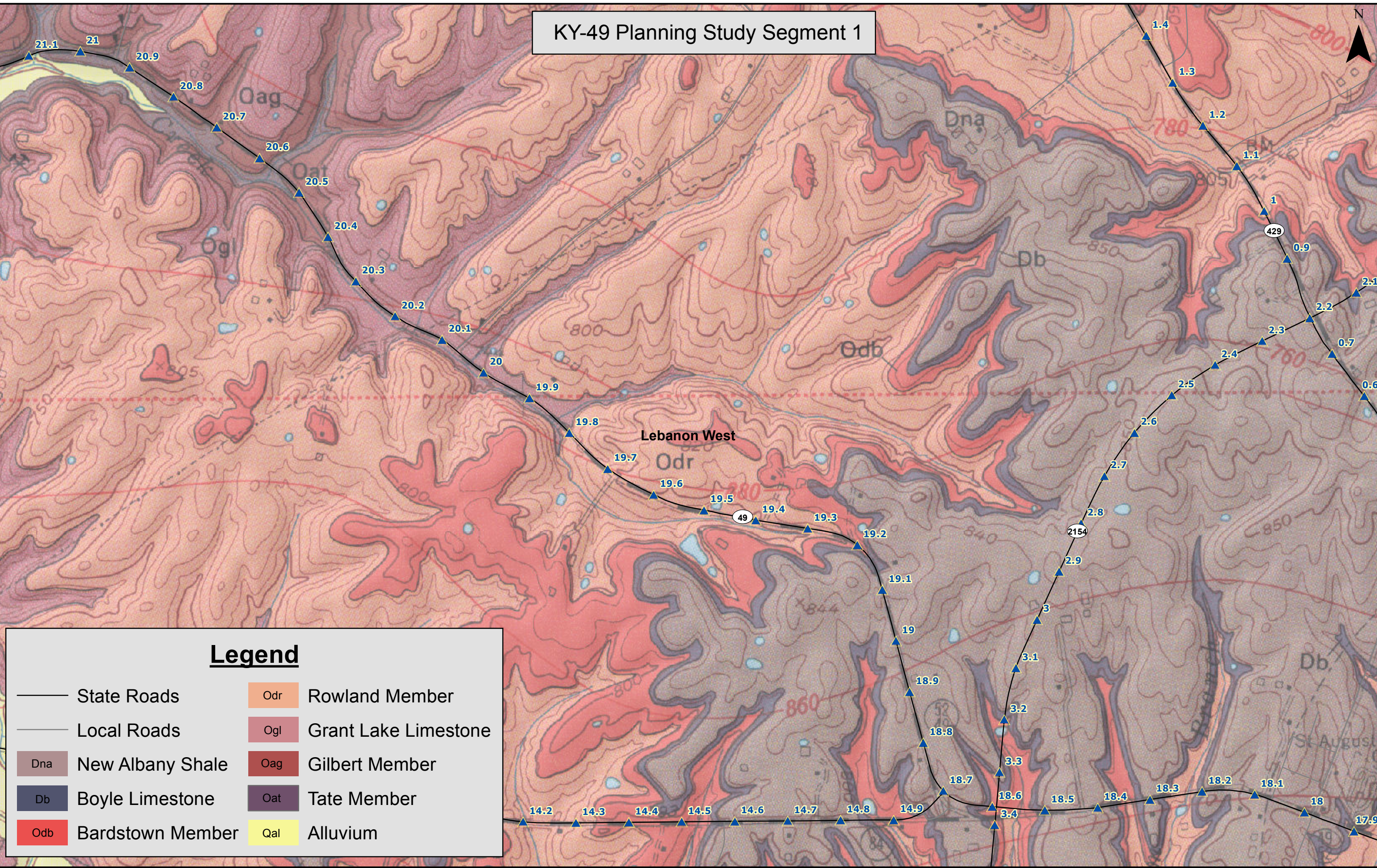
URBAN 3 LANE

RURAL

**KY 49 PLANNING STUDY
LEBANON TO LORETTO**



KY-49 Planning Study Segment 1

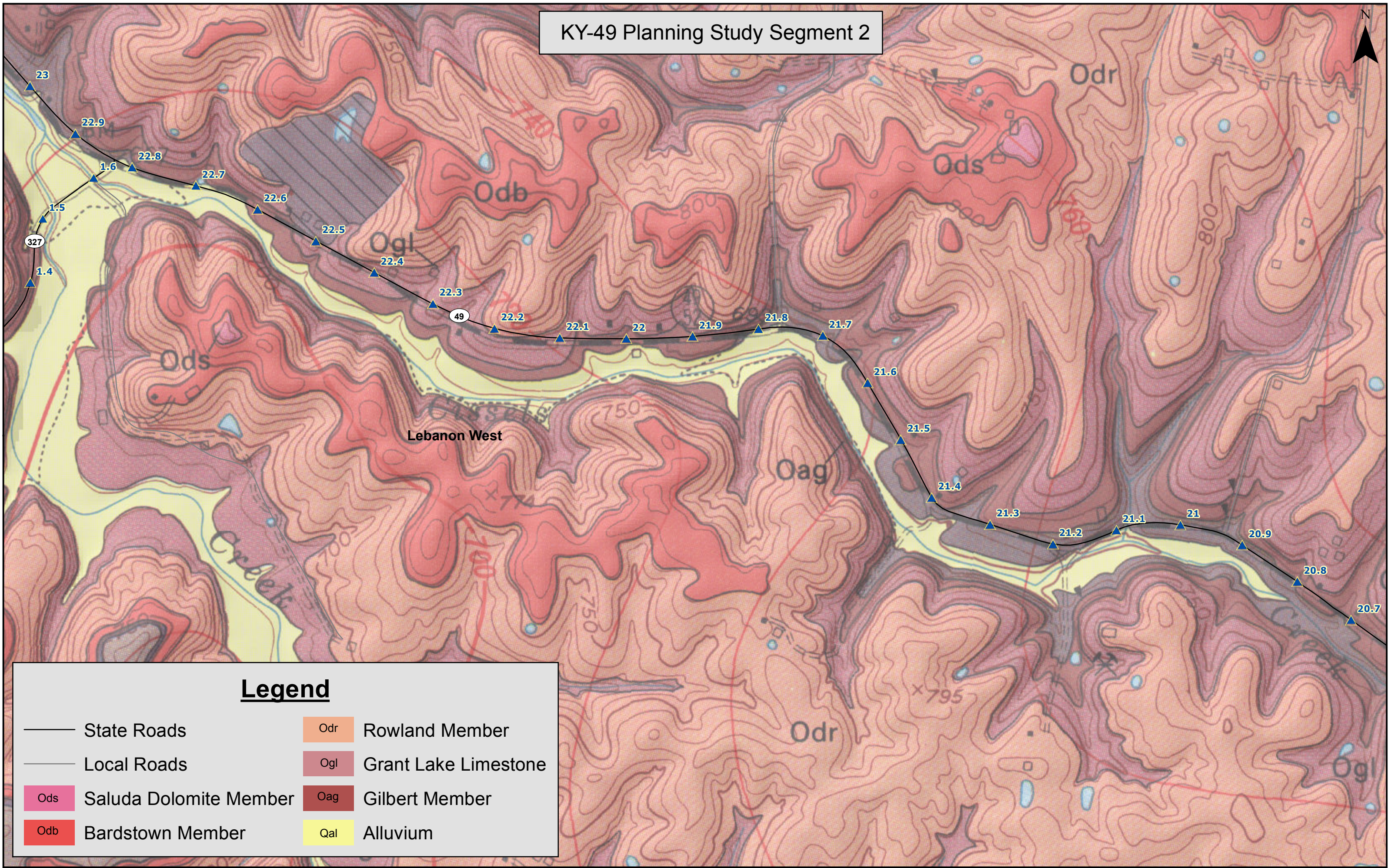


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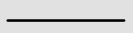
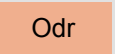
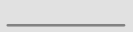
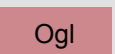
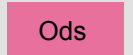
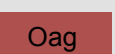
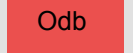
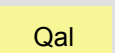
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	Local Roads		Ogl	Grant Lake Limestone	
	Dna	New Albany Shale		Oag	Gilbert Member
	Db	Boyle Limestone		Oat	Tate Member
	Odb	Bardstown Member		Qal	Alluvium

0 750 1,500 3,000 Feet

KY-49 Planning Study Segment 2

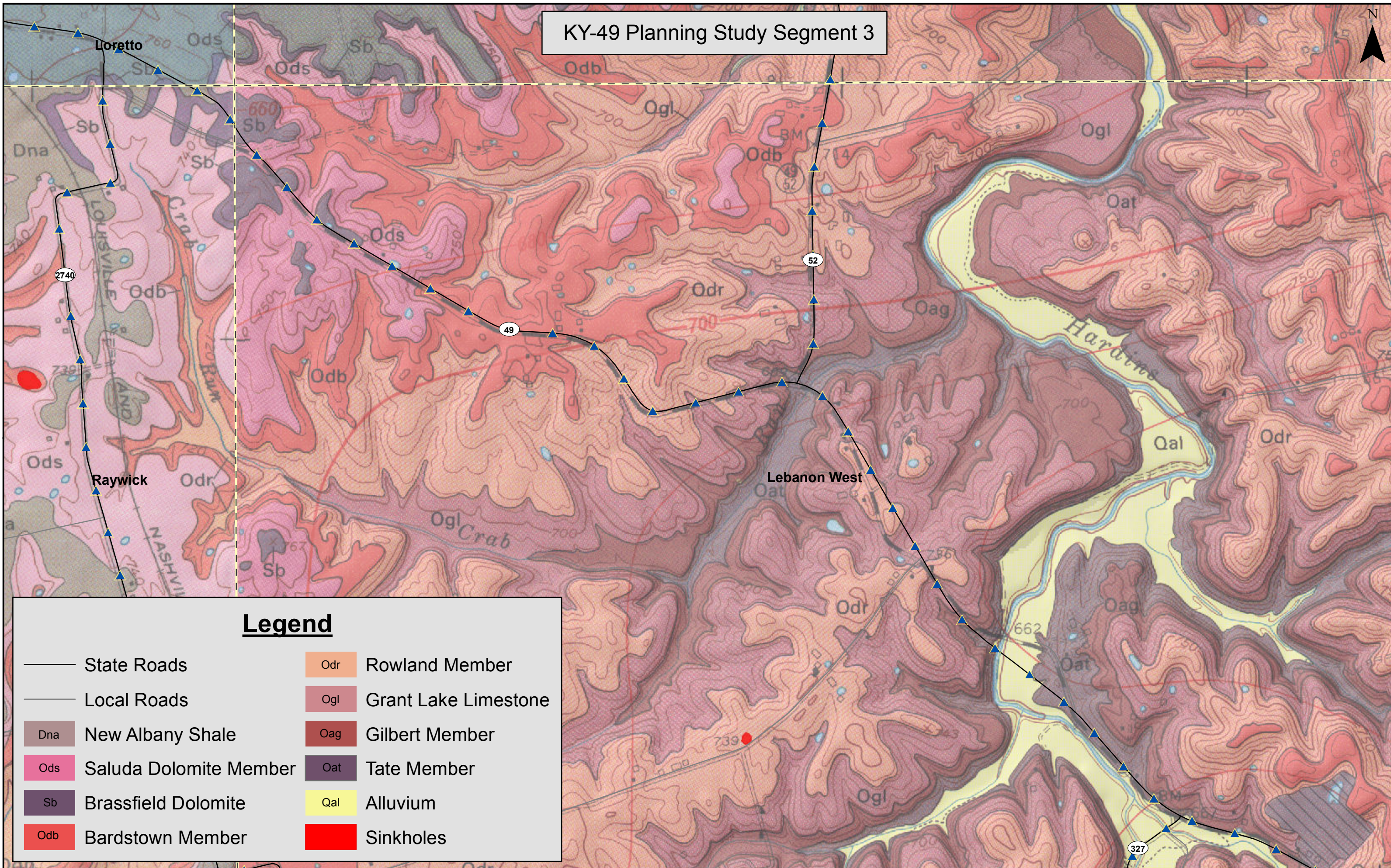


Legend

	State Roads		Odr	Rowland Member	
	Local Roads		Ogl	Grant Lake Limestone	
	Ods	Saluda Dolomite Member		Oag	Gilbert Member
	Odb	Bardstown Member		Qal	Alluvium

0 750 1,500 3,000 Feet

KY-49 Planning Study Segment 3

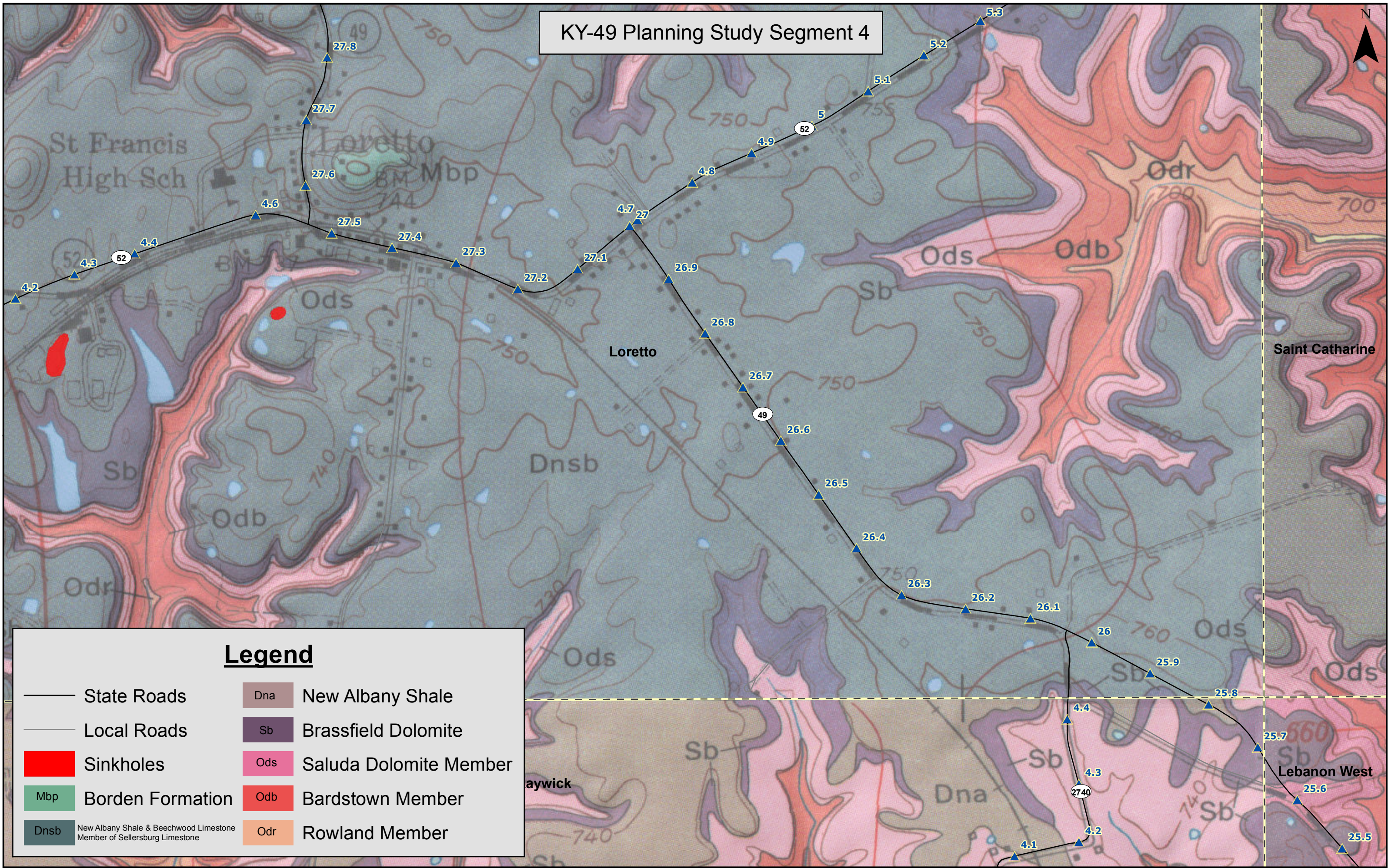


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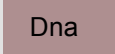
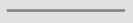
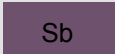
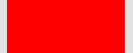
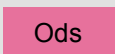
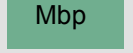
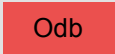
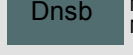

	State Roads		Odr	Rowland Member	
	Local Roads		Ogl	Grant Lake Limestone	
	Dna	New Albany Shale		Oag	Gilbert Member
	Ods	Saluda Dolomite Member		Oat	Tate Member
	Sb	Brassfield Dolomite		Qal	Alluvium
	Odb	Bardstown Member			Sinkholes

0 750 1,500 3,000 Feet

KY-49 Planning Study Segment 4



Legend

	State Roads		Dna New Albany Shale
	Local Roads		Sb Brassfield Dolomite
	Sinkholes		Ods Saluda Dolomite Member
	Mbp Borden Formation		Odb Bardstown Member
	Dnsb New Albany Shale & Beechwood Limestone Member of Sellersburg Limestone		Odr Rowland Member

0 750 1,500 3,000 Feet