Tennessee's Geohazard Management System

Moving from Disaster Recovery Towards Asset Management

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* formerly of Tennessee Department of Transportation, Geotechnical Engineering Section

Most people notice this.

Or this...

Sometimes they miss these...

INTERSTATE
24
But they definitely notice this.

Slides like this are fine...

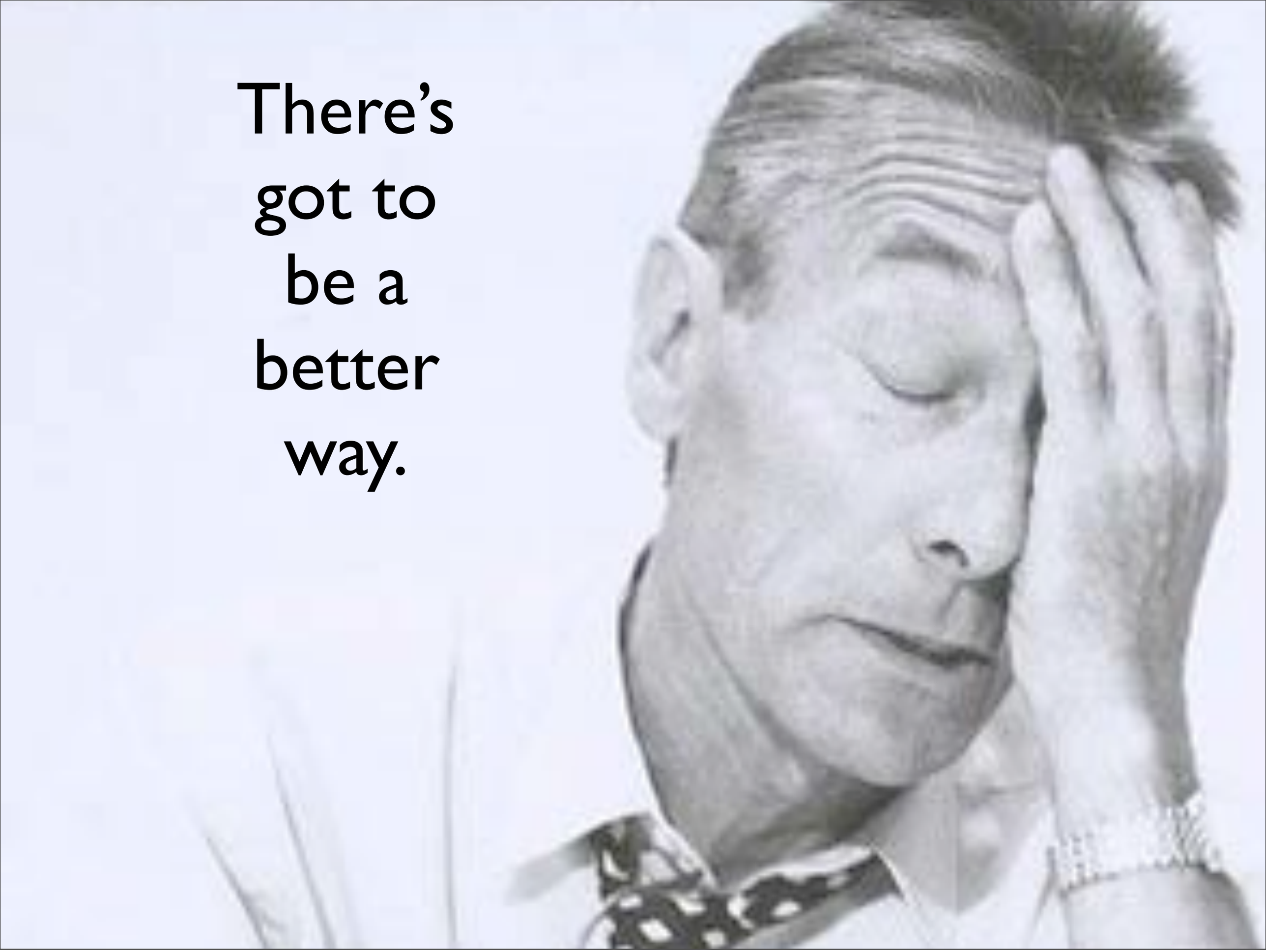
Until they gets worse.

INTERSTATE 24

Standstill Traffic for 10+ miles

This is getting old.

There's got to be a better way.



Is a hole an asset?
Asset Management

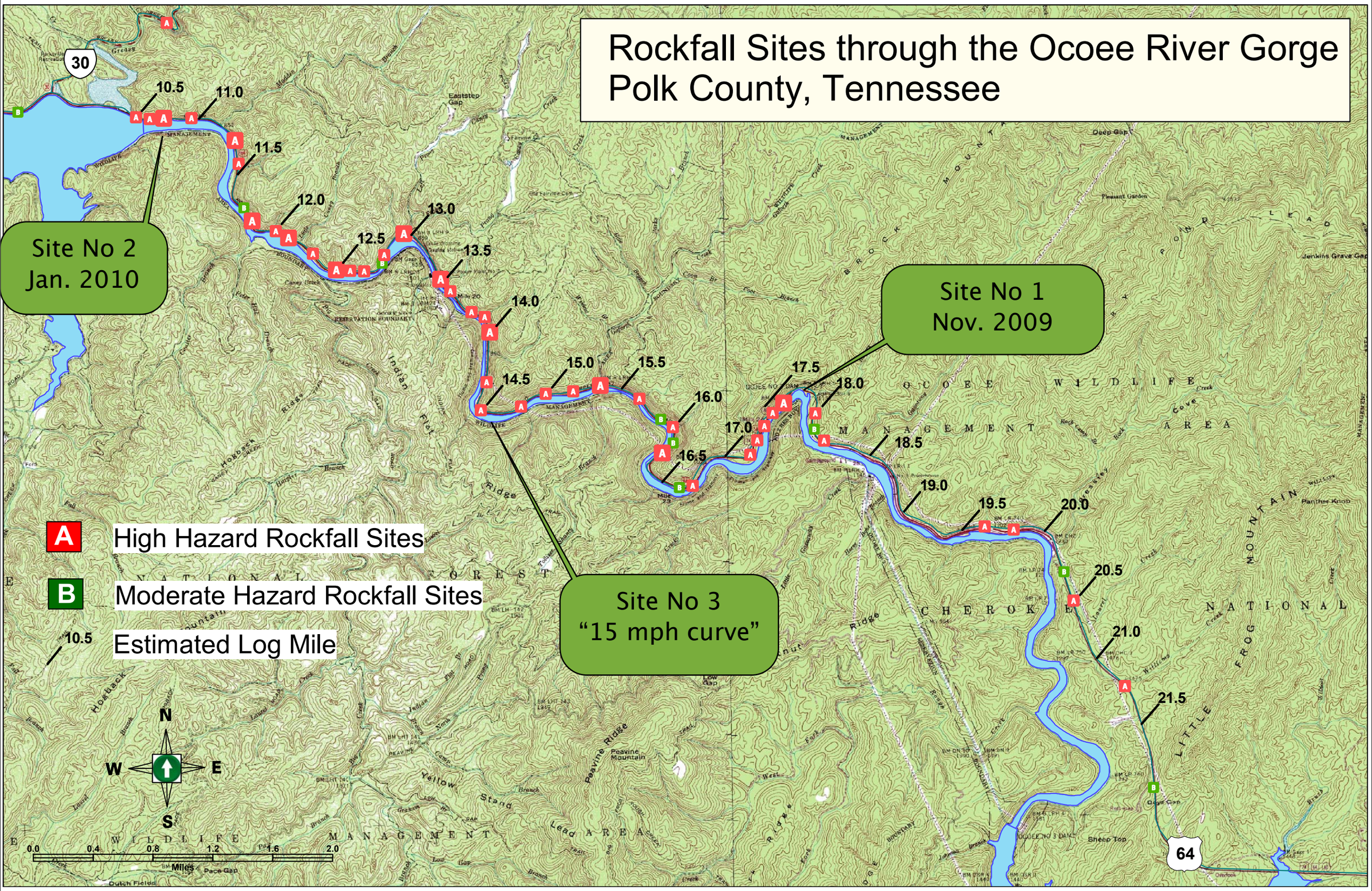
Our asset is the roadway

But how do we get there?

A central system component of a policy based asset management program is the inventory (FHWA, 2007).

Rockfall is the model

Rockfall Sites through the Ocoee River Gorge
Polk County, Tennessee



Not all the work was "worst first"

Rockfall is the model

Database
Inventory
Costs/Benefits
Budget
Select Projects

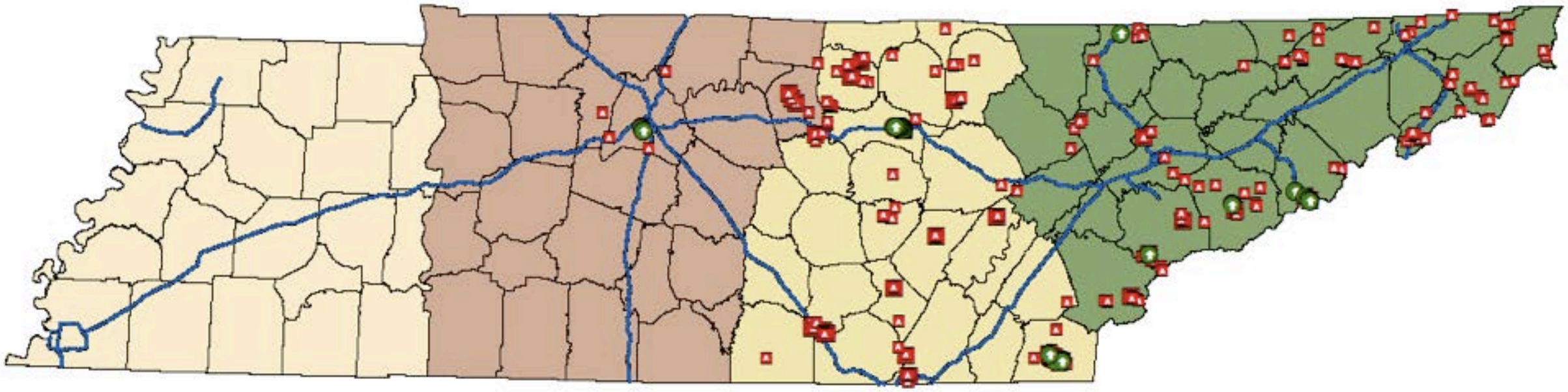
Priority Repair List for Rockfall Sites in Tennessee

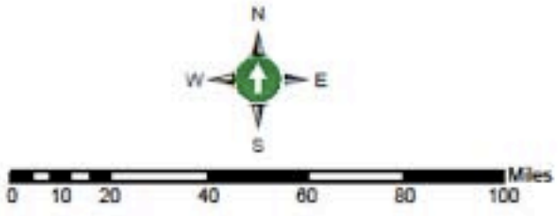
State Routes, US Highways and Interstates

Priority repair sites are those which have a preliminary assessment of A (High Hazard) and which have a total hazard score above 350. Projects marked as priority are then selected based upon impact of a fall (Road Closure Impact) at a particular location, hazard rating, costs and site conditions.

Contracts Let for Mitigation Projects

Program Year	Fed Fiscal Year	No. Sites	Contracts	Contract Letting Costs
1	07/08	3	2	$1,994,697.10
2	08/09	24	4	$5,950,713.30
3	09/10	2	3	$2,706,024.40
			Sum	$11,947,876.05





Program Statistics

Region	Priority Sites	A Sites	Mitigated Sites*
1	119	576	9
2	104	283	21
3	69	88	3
4	0	2	0
Statewide	232	949	33

* As of 10/04/10

Legend

- Mitigated Sites
- A site with Hazard Score >350
- A site with Hazard Score >500
- Interstates
- County Boundary

As of 10/04/10

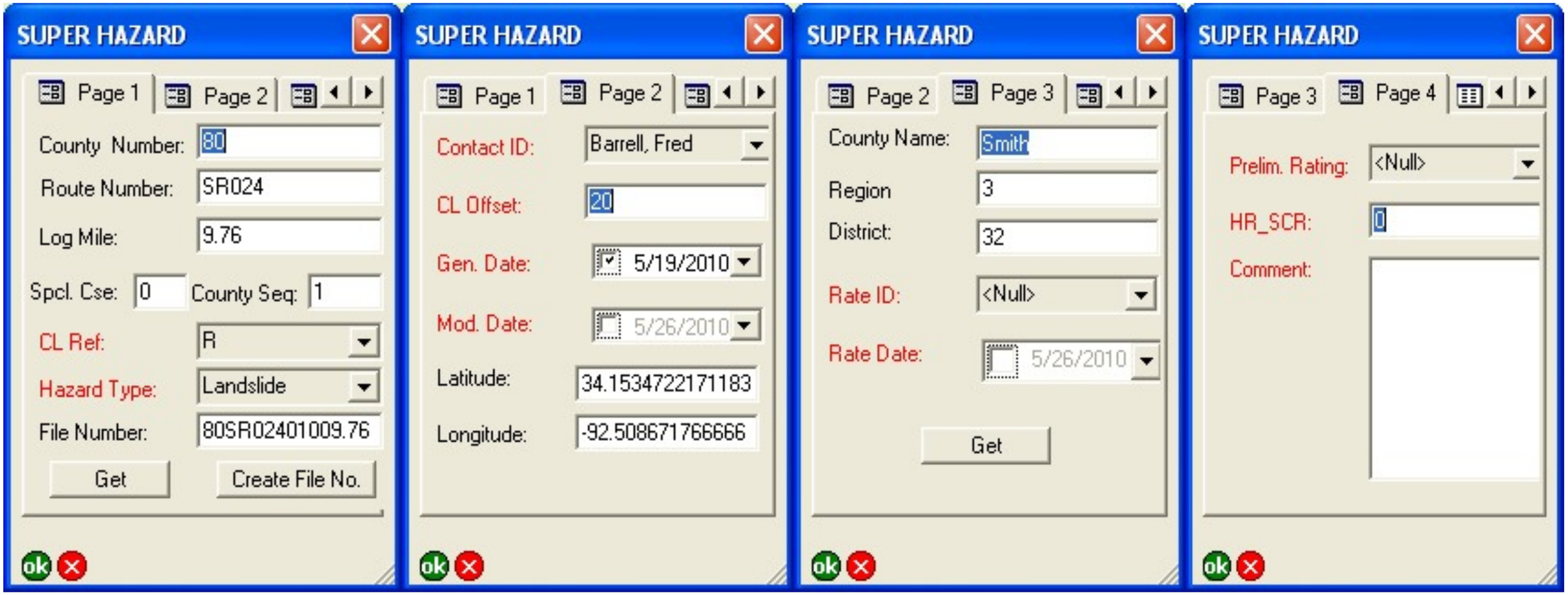
TDOT Go.

Road closure impact rating

Criteria	Score = 3	Score = 9	Score = 27	Score = 81
ADT (Average Daily Traffic)	Little Traffic ADT>300	Some Traffic ADT 300-1000	Moderate Traffic ADT 1000-3000	Major Traffic ADT >3000
Impedance	Shoulder	1 lane	2 lanes	>=3 lanes or Total
Impedance Duration	Hours	1 Day	Days	Weeks
Detour Length	Very Short <1 mile or lane still open	Short 1-2 miles	Medium 3-4 miles	Long or None >4 miles
Facility Degradation RF-DF= DOF	0	1	2	3

DOF=Degree of Facility (RF=Degree of Road Facility; DF= Degree of Detour Facility)

0 = Local Roads / 1 Lane Road
1 = 2 Lane, no shoulder
2 = 2 lane, adequate shoulder
3 = 3 lane
4 = 4 lane
5 = 4 lane, divided highway, 5 lane highway
6 = Interstate



Field Data Gathering Forms for GPS or Tablet

TDOT GeoHazards

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GeoHazards Viewer

TDOT Geotechnical

X: -85.6879, Y: 37.4574

Current Action: Move Map

Live Maps

Layer Visibility

View Legend

GeoHazards

Tennessee Base Layers

TNMap Imagery

Saint Louis, Mount Vernon, Louisville, Frankfort, Charleston, Evansville, Carbondale, Owensboro, Madisonville, Paducah, Bowling Green, Somerset, Salyersville, Beckley, Poplar Bluff, Murray, Jonesboro, Jackson, Memphis, Corinth, Forrest City, Huntsville, Decatur, Tupelo, Clarksdale, Grenada, Starkville, Columbus, Birmingham, Gadsden, Atlanta, Athens, Asheville, Greenville, Rock Hill, Columbia, Augusta, Belvedere, Tuscaloosa

KENTUCKY, SOUTH CAROLINA

200 km / 100 mi

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TDOT GeoHazards Web Application Legend

The online legend listed below outlines the symbols used within the web application. Where available, descriptions for some layers can be viewed by clicking the '-show description-' text.

GeoHazards

The GeoHazard group of layers controls display of the different types of GeoHazard data.

- **Super Hazards by Type** -show description-

Rockfall
- A
- B
- C

Landslide
- A
- B
- C

Sinkhole
- A
- B
- C

Settlement
- A
- B
- C

Spring Seep
- A
- B
- C

Incomplete
- Required data is missing

Symbols with a diamond in the upper right corner have the following mitigation:

- Completed Full

Badges identify sites that have received some work.

B site, partial mitigation

B site, complete mitigation

C site, complete mitigation

You don’t want to lose track of old repairs

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GeoHazards Viewer

TDOT Geotechnical

X: -86.9376, Y: 36.3198

Current Action: Move Map

Live Maps

Layer Visibility

View Legend

GeoHazards

Tennessee Base Layers

TNMap Imagery

Chapmansboro

Ashland City

Joeltor

Goodlettsville

Hendersonville

Whites Creek

Madison

Old Hickory

Hermitage

Nashville

Belle Meade

Oak Hill

Forest Hill

Antioch

Green H

Dickson County

Cheatham County

10 km

5 mi

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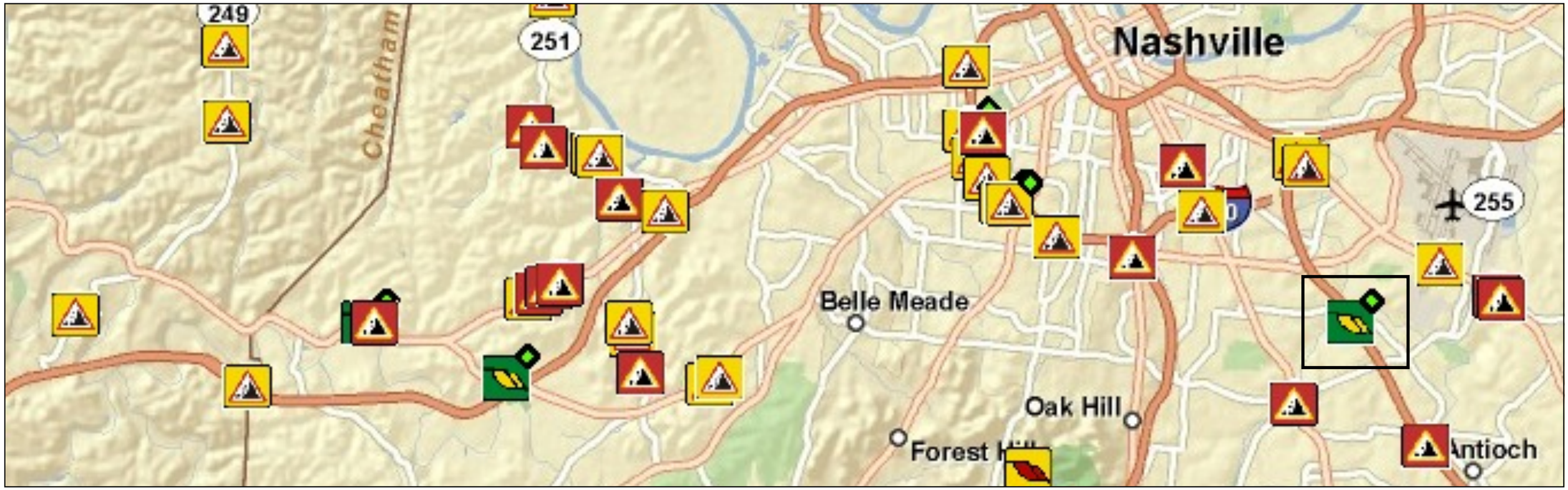
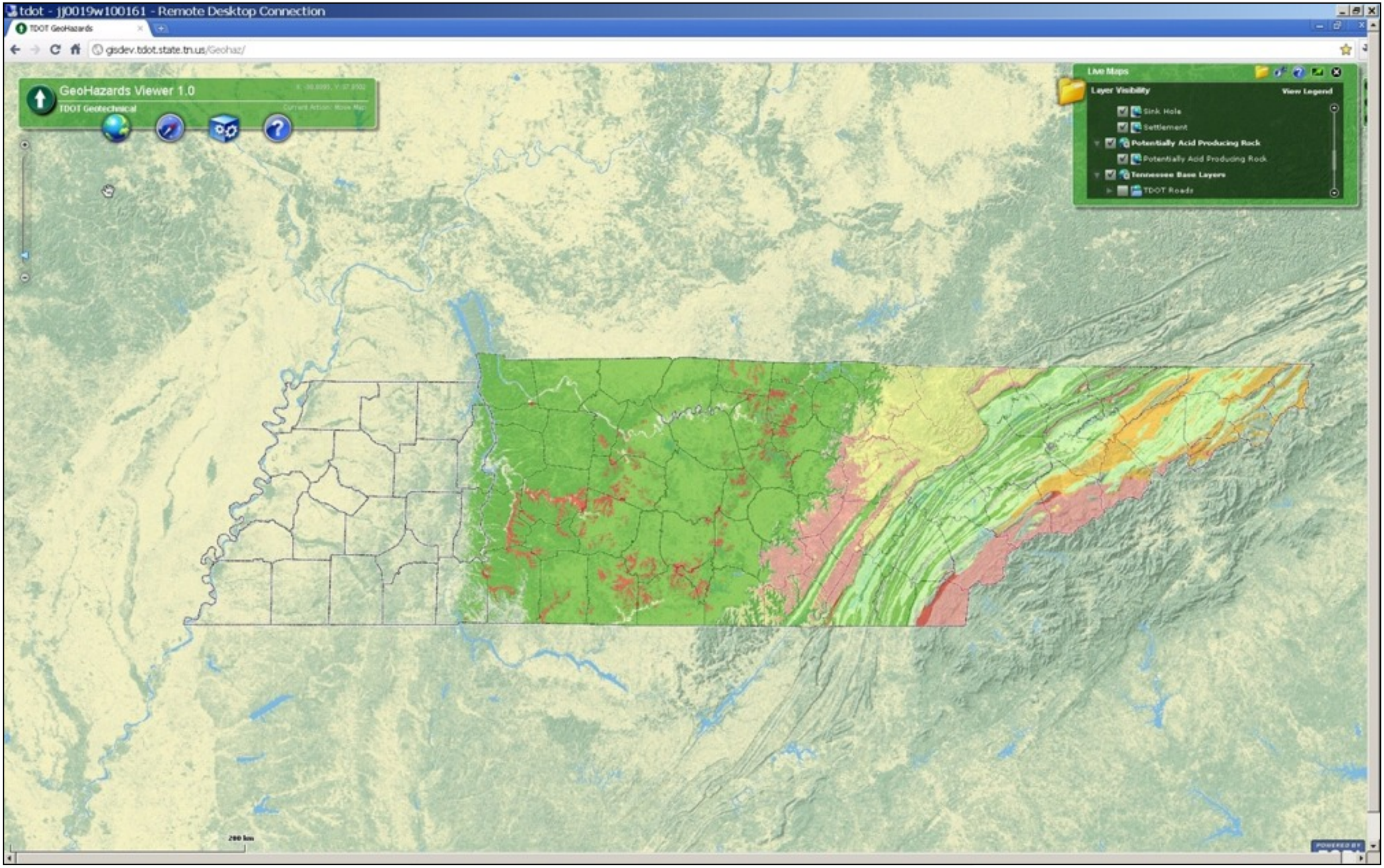


Background layers and feature mapping

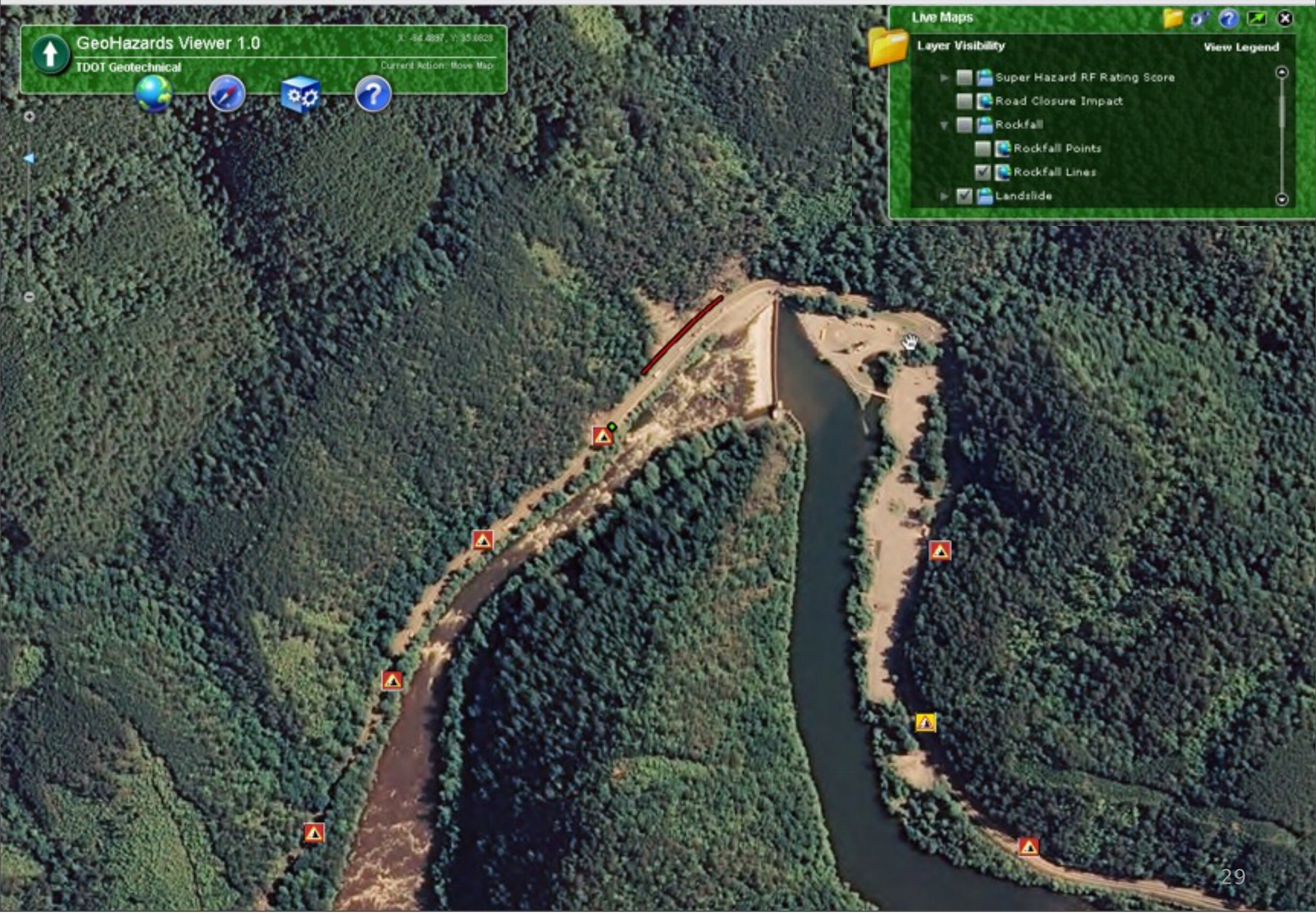


Potentially Acid Producing Rock Layer

tdot - jj0019w100161 - Remote Desktop Connection

TDOT GeoHazards

gisdev.tdot.state.tn.us/Geohaz/



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GeoHazards Viewer

TDOT Geotechnical

X:-86.7877, Y:36.1504

Current Action: Move Map

Live Maps

Layer Visibility

View Legend

GeoHazards

Tennessee Base Layers

TNMap Imagery

Georgia Ave | Delaware Ave | Indiana Ave | Trevor St | Park Ave | Elkins Ave | Richland Park | Centennial Park | Utah Ave | Nebraska Ave | Colorado Ave | Murphy Rd | Park Dr | Brandau Pl | Hawkins St | Sigler St | South St | Archer St | Pierce Ave | Capers Ave | Vanderbilt University | Dees Park | Magnolia Blvd | Wade Ave | Barton Ave | Essex Pl | Whitland Ave | Rolland Rd | Brighton Rd | Saratoga Dr | Wyn Oak | W Linden Ave | Linden Ave | Sunset Pl | Lawrence Ave | Gilmore Ave | Paris Ave | Cedar Ln | Hillwood Blvd | Wilsonia Ave | Nashville State Tech Institute | McCabe Field Golf Course | Aquinas Junior College | Sloan Rd | Cherokee Rd | Central Ave | Richland Ave | Knob Rd | White Bridge Rd | Rural Ave | Murphy Rd | Park Dr | W End Pl | Love Cir | Natchez Trce | Elmington Ave | Craighead Ave | Bowling Ave | Ensworth Ave | Estes Rd | Timber Ln | Medial Ave | Oman St | Normandy Cir | Whitworth Way | Woodmont Blvd | Sugartree Ln | Poston Ave | W End Cir | Park Cir | Park Plz | Fisk St | Pearl St | Herman St | Britt Pl | Booker St | Felicia St | Leslie Ave | McMillan St | Grundy St | McGavock St | Lea | Divisi | Hawthorne Pl | Oakland Ave | Belmont Blvd | Bernard Cir | S Douglas Ave | Bradfor | Hillvie | Vaughn Ln | ES Rose Park | Music Sq E | Music Sq S | Snyder Ave | Hite St | Delray Dr | 49th Ave N | 46th Ave N | 40th Ave N | 53rd Ave N | 52nd Ave N | 47th Ave N | 45th Ave N | 42nd Ave N | 38th Ave N | 37th Ave N | 32nd Ave N | 28th Ave N | 25th Ave S | 24th Ave S | 19th Ave S | 16th Ave S | 15th Ave S | 14th Ave S | 11th Ave S | 32nd Ave S | 31st Ave | 23rd Ave S | 21st Ave N | 20th Ave N | 19th Ave N | 17th Ave N | 12th Ave S | 7th Ave N | 6th Ave N | 5th Ave N | 40 | 155 | 70S | 440

1 km | 1 mi

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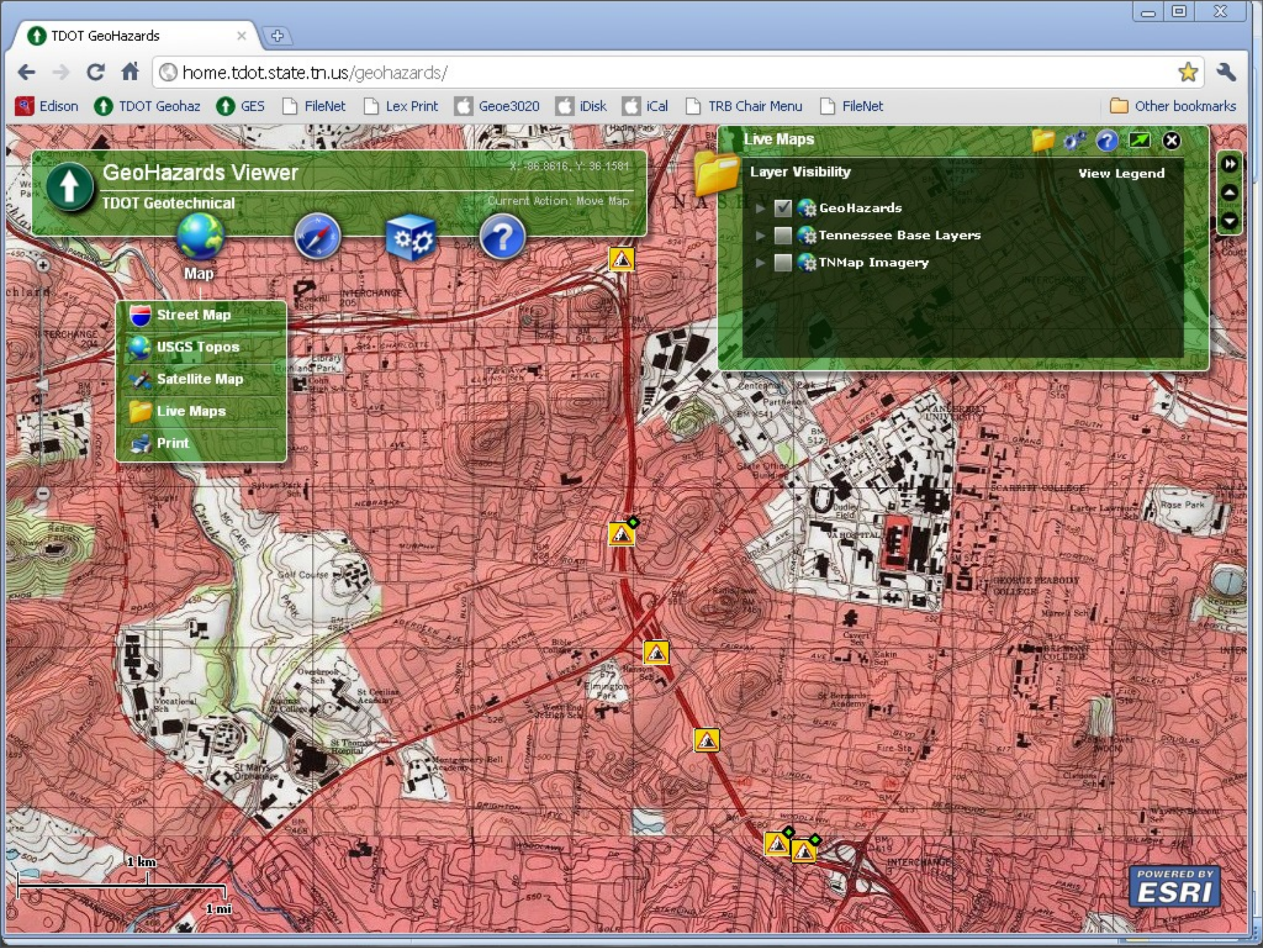

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GeoHazards Viewer

TDOT Geotechnical

X: -85.3734, Y: 36.1387

Current Action: Move Map

Live Maps

Layer Visibility

View Legend

- GeoHazards
- Tennessee Base Layers
- TNMap Imagery

Mount Pleasant Rd

Poplar Grove Rd

Isaacs Pass

Poplar Grove

Hyder Mountain

Jim Smith Rd

Rocky Point Rd

Rocky Point

Shady Ln

Cleghorn Creek

Blackberry Ln

Welch Rd

Sand Springs

40

1 km

1 mi

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GeoHazards Viewer

TDOT Geotechnical

X: -85.4038, Y: 36.1358

Current Action: Move Map

Live Maps

Layer Visibility

View Legend

- GeoHazards
- Tennessee Base Layers
- TNMap Imagery

Hollow

Macedonia Ch

Welch

Lee Cem

Whitaker Cem

Rocky Point Ridge

Rocky Point Sch

Bohannon Cem

Cleghorn Creek

Welch

Sand

1 km

1 mi

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Monday, July 25, 2011

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GeoHazards Viewer

TDOT Geotechnical

X: -85.3435, Y: 36.1297

Current Action: Identify

Live Maps

Layer Visibility — View Legend

- GeoHazards
- Tennessee Base Layers
- TNMap Imagery

Super Hazards by Type

BLM: 0
CT_ID: Bateman, Vanessa
LON: -85.35637
CL_REF: R
SPCL_CSE: 0
CNTY_NBR: 71
NBR_RTE: I0040
RPL_DATE: 7/15/2004
LAT: 36.13021
COMNTS: Site 7 - Pin No. 112402.00
DST_NBR: 24
HR_SCR: 544
RATE_DATE: 7/15/2004
Preliminary Score: A
Mitigation Status: Completed Partial
CNTY_SEQ: 1
GEOMETRY: Point
FILE_NBR: 71I0040001295.900RSRF
Hazard Type: Rockfall
CNTY_NME: Putnam
RATE_ID: Bateman, Vanessa
CL_OFFSET: 0

Identify

Super Hazards by Type

BLM: 0
CT_ID: Bateman, Vanessa
LON: -85.35637
CL_REF: R
SPCL_CSE: 0
CNTY_NBR: 71
NBR_RTE: I0040
RPL_DATE: 7/15/2004
LAT: 36.13021

Welch Rd

Sand Springs

Roberson Rd

Stant McCloud Rd

0.5 km

0.5 mi

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GeoHazards Viewer

TDOT Geotechnical

X: -85.6982, Y: 35.2376

Current Action: Identify

Documents for 31I0024001132.700RSRF

Name	Abstract	Date	Contact
Preliminary Geotechnical Report	Preliminary Geotechnical report for section of the cut adjoining the section mitigated in 2003/2004.	08/01/2005	Bateman, Vanessa
Geotechnical	Geotechnical report for	06/22/1999	Bateman, Vanessa

Live Maps

Layer Visibility

View Legend

- GeoHazards
- Tennessee Base Layers
- TNMap Imagery

Identify

HR_SCR: 693
BLM: 0
LON: -85.87165
COMNTS:
LAT: 35.23724
NBR_RTE: I0024
SPCL_CSE: 0
CL_REF: R
GEOMETRY: Point
CT_ID: Bateman, Vanessa

Super Ha...
Preliminar...
Hazard Ty...
CNTY_NM...
DST_NBR...
HR_SCR: ...
BLM: 0
LON: -85.87165
COMNTS:
LAT: 35.23724
NBR_RTE: I0024
SPCL_CSE: 0
CL_REF: R
GEOMETRY: Point
CT_ID: Bateman, Vanessa
RPL_DATE: 7/28/2004
CNTY_NBR: 31
RATE_DATE: 7/28/2004
RATE_ID: Bateman, Vanessa
CL_OFFSET: 0
CNTY_SEQ: 1
FILE_NBR: 31I0024001132.700RSRF

Claiborn View Rd
Barrel House Rd
Deepwoods Rd
Trussell Creek
Trussell Pond
Gilliam Rd
Dogwood Dr
0.5 km
0.5 mi
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TDOT GeoHazards

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GeoHazards Viewer

TDOT Geotechnical

X: -85.8639, Y: 35.2351

Current Action: Identify

Documents for 31I0024001132.700RSRF

Name	Abstract	Date	Contact
Preliminary Geotechnical Report	Preliminary Geotechnical report for section of the cut adjoining the section mitigated in 2003/2004.	08/01/2005	Bateman, Vanessa
Geotechnical	Geotechnical report for	06/22/1999	Bateman, Vanessa

Live Maps

Layer Visibility

View Legend

- GeoHazards
- Tennessee Base Layers
- TNMap Imagery

Identify

HR_SCR: 693
BLM: 0
LON: -85.87165
COMNTS:
LAT: 35.23724
NBR_RTE: I0024
SPCL_CSE: 0
CL_REF: R
GEOMETRY: Point
CT_ID: Bateman, Vanessa

Send Email

Super Ha

Preliminary

Hazard Ty

CNTY_NM

DST_NBR:

HR_SCR:

BLM: 0

LON: -85.87165

COMNTS:

LAT: 35.23724

NBR_RTE: I0024

SPCL_CSE: 0

CL_REF: R

GEOMETRY: Point

CT_ID: Bateman, Vanessa

RPL_DATE: 7/28/2004

CNTY_NBR: 31

RATE_DATE: 7/28/2004

RATE_ID: Bateman, Vanessa

CL_OFFSET: 0

CNTY_SEQ: 1

FILE_NBR: 31I0024001132.700RSRF

Claiborn View Rd

Barrel House Rd

Deepwoods Rd

Trussell Creek

Gilliam Rd

Trussell Pond

Dogwood Dr

0.5 km

0.5 mi

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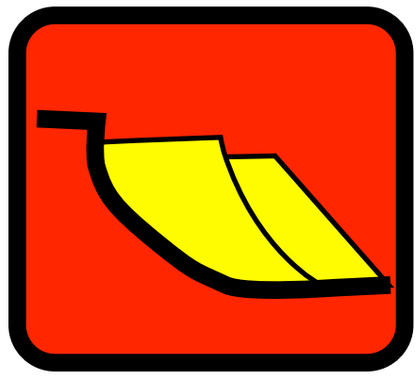
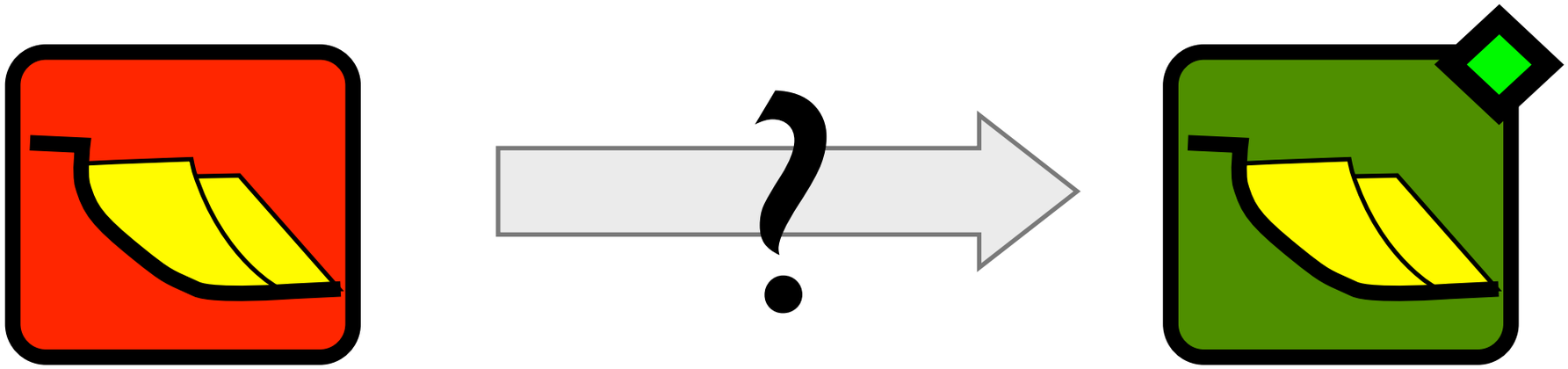
Historical Records are Important

Debris Flow



You don’t want to miss something...



We’re not there, yet

But it’s getting closer...