INTERSTATE TECHNICAL GROUP ON ABANDONED UNDERGROUND MINES

5TH Biennial Workshop

Update of Abandoned Underground Mine Activities in Ohio

L. Rick Ruegsegger, P.E

Special Projects Coordinator

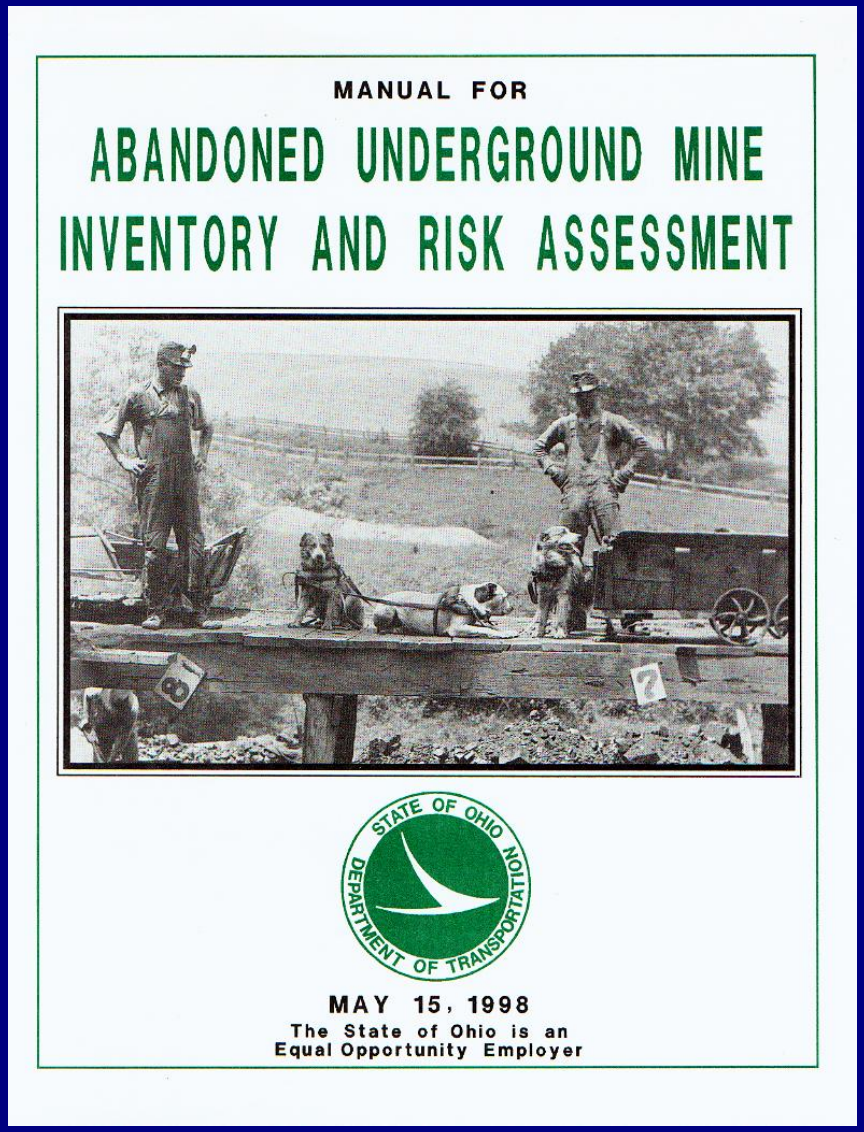
Office of Geotechnical Engineering

L. Rick Ruegsegger, P.E.

ODOT, Office of Geotechnical Engineering

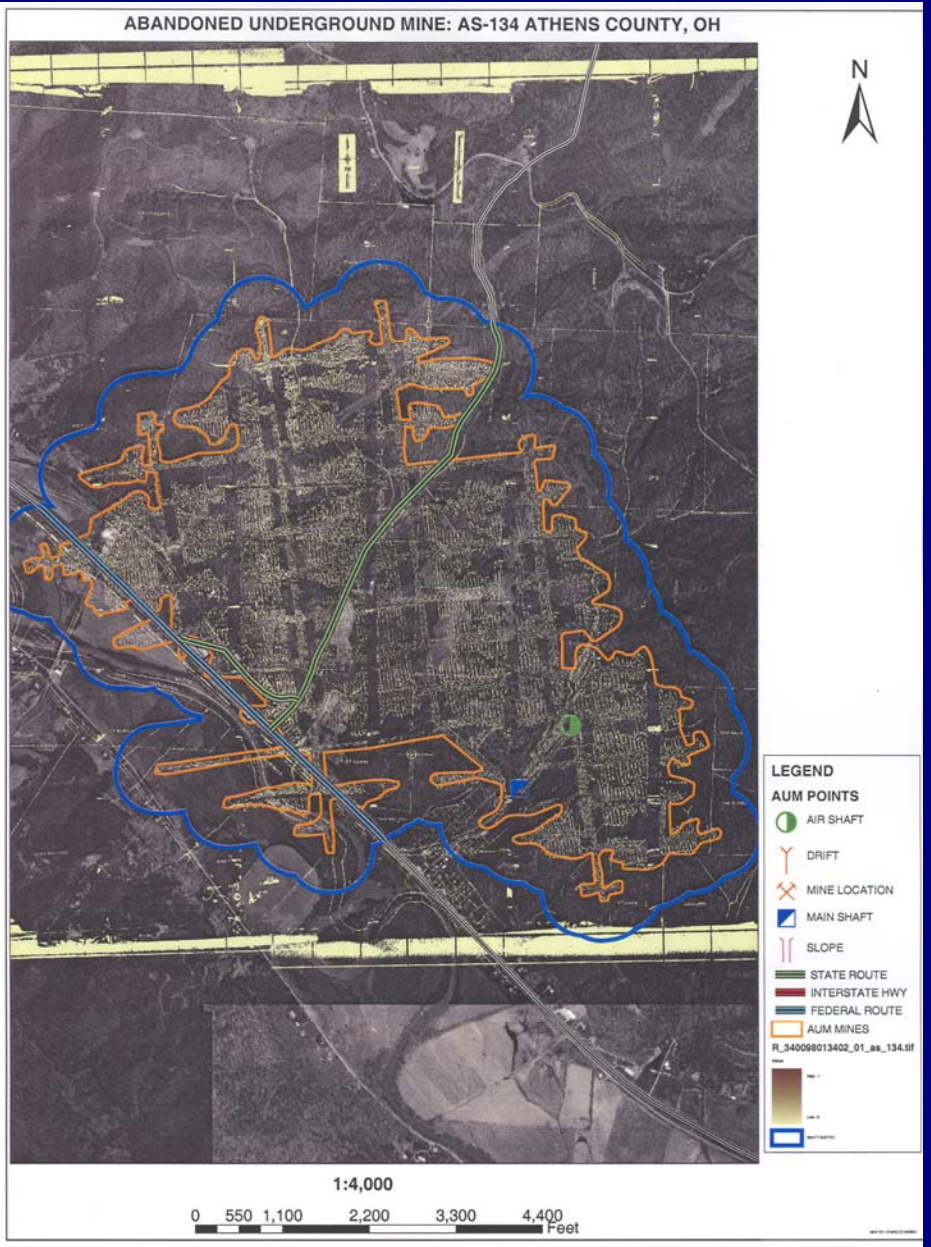
The Ohio Department of Transportation (ODOT) in the past two years has continued to work toward establishing the Abandoned Underground Mine Inventory and Risk Assessment (AUMIRA) statewide GIS database. ODOT estimates there will be approximately 1400 AUMIRA sites documented in this effort. District AUMIRA coordinators are to populate the database with information for all AUMIRA sites by July 22, 2005. The Ohio Department of Natural Resources, Division of Geological Survey is providing AUMIRA assistance to ODOT through the geo-referencing of mine map TIF file images provided by USDI, OSMRE. ODOT intends to perform FY2006 research to develop a sonar imaging capability to be used to investigate mine voids and other subsurface voids. Since 2002, ODOT has continued to be involved in site investigations, project development (corridor) studies, and construction projects associated with abandoned underground mines. These activities have been along a variety of roadways, including several interstate highway locations.

Abandoned Underground Mine Inventory and Risk Assessment (AUMIRA)



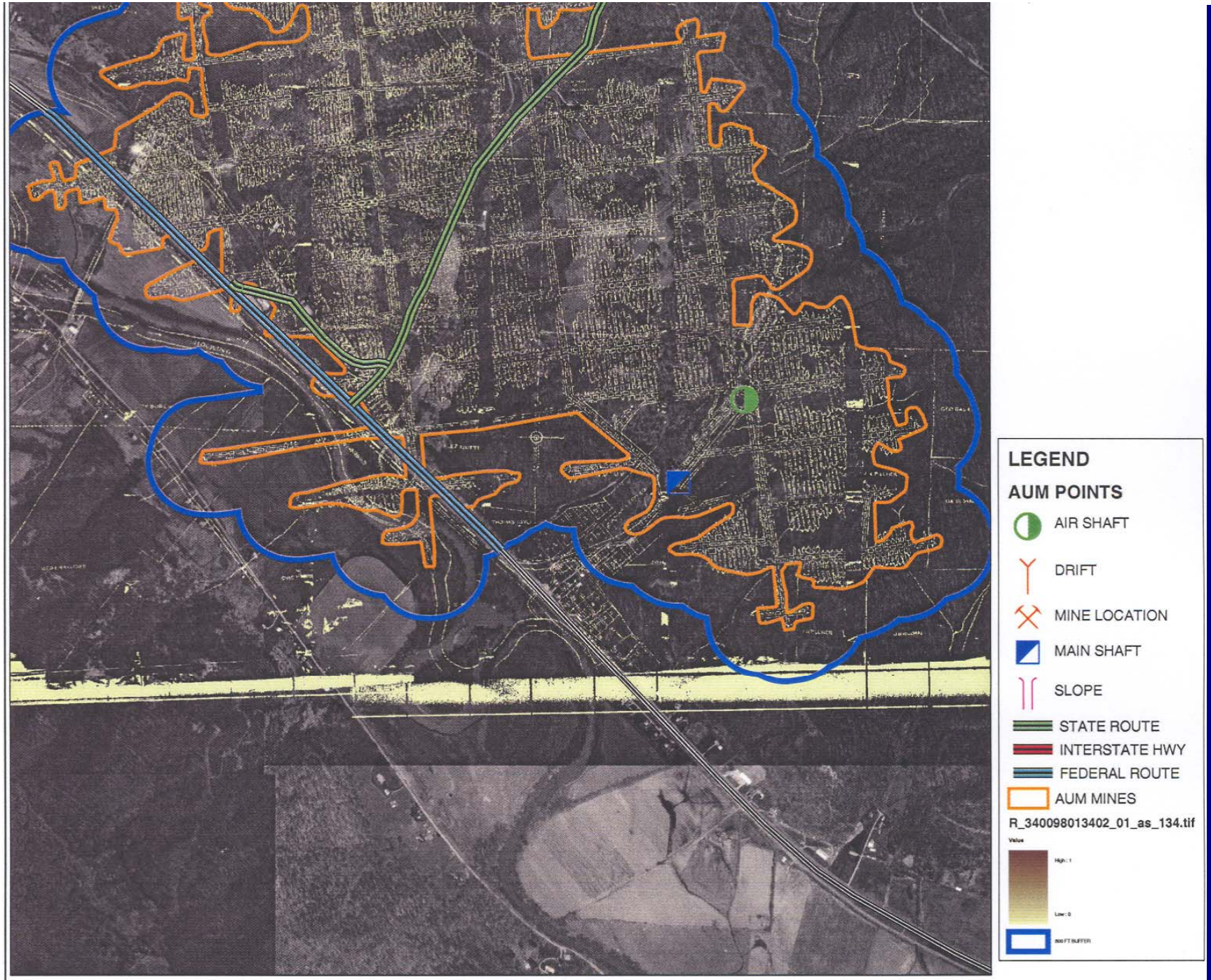
Progress to Date

- ODOT estimates that there are approximately 1400 AUMIRA sites along the state's roadways.
- The AUMIRA statewide GIS database has been populated with data for approximately 600 sites (data for some sites is still under development).
- One of ODOT's 12 districts contains an estimated 700 AUMIRA sites, which represents about 50% 0f the statewide total of AUMIRA sites
- Per the current ODOT AUMIRA policy, the statewide database is to be populated with all required site information by July 22, 2005.
- ODOT is using a Quality Assurance Review (QAR) process to monitor progress of the Districts working to document AUMIRA sites by the July 22, 2005 deadline.
- The AUMIRA work is competing with higher priority work, such as major new projects and maintenance projects, for the limited amount of staff time available for all operations.



Geo-Referenced Mine Maps

Ohio Department of Natural Resources, Geological Survey is providing AUMIRA assistance to ODOT through the geo-referencing of mine map TIF image files which were previously made available by the USDI, Office of Surface Mining National Mine Map Repository in Pittsburgh, PA.


LEGEND
AUM POINTS
AIR SHAFT
DRIFT
MINE LOCATION
MAIN SHAFT
SLOPE
STATE ROUTE
INTERSTATE HWY
FEDERAL ROUTE
AUM MINES
R_340098013402_01_as_134.tif
Value
High : 1
Low : 0
500 FT BUFFER

1:4,000

ODOT Research for FY2006

Sonar Imaging of Flooded Subsurface Voids

PROBLEM STATEMENT

• Many of Ohio's roadways are subject to subsidence or settlement due to the presence of subsurface voids.

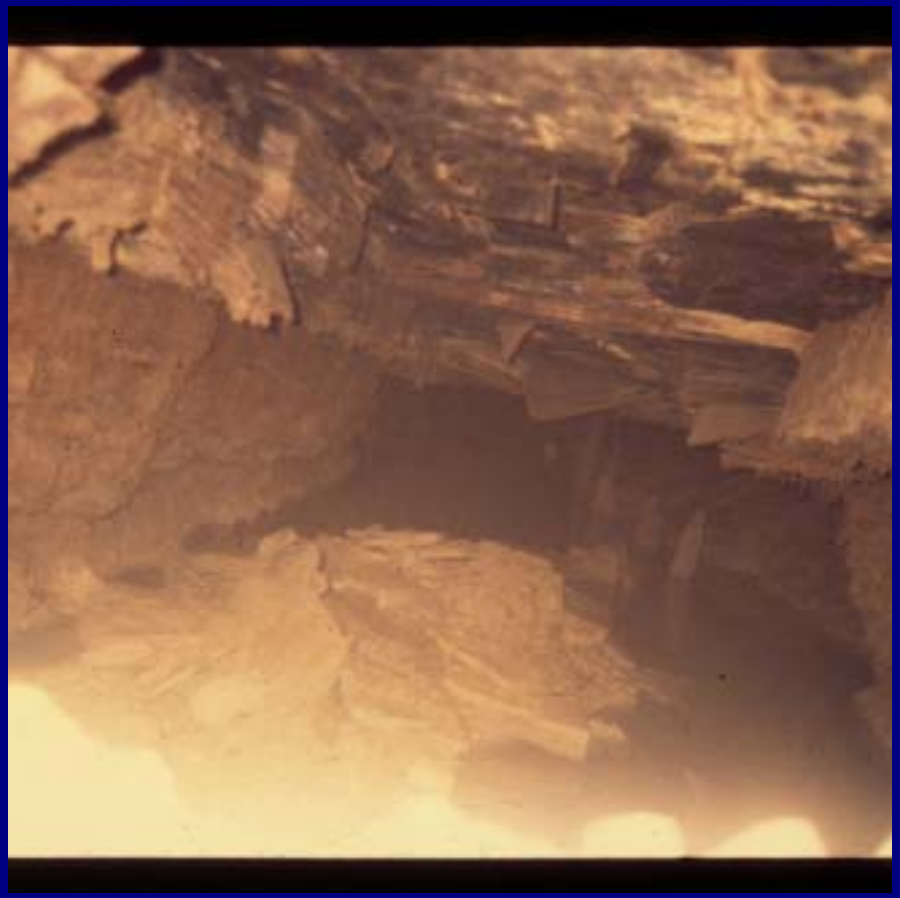
•Voids may be associated with past underground mining activities for coal, clay, limestone, and gypsum.

• Voids may also have been created through natural dissolution of bedrock as with karst formations.

•Voids are frequently flooded.

• Borehole camera viewing of voids is greatly inhibited by turbid waters created through the drilling process. The borehole camera's lights are reflected reducing viewing distance to near zero.

• This research project will explore the use of sonar to develop 2D and 3D images of the flooded subsurface voids.



Some mine voids are flooded or partially flooded.

PROPOSED ODOT RESEARCH:

- Develop and test a practical, borehole viewing system that will provide real-time video and sonar data of flooded subsurface voids.

- Consider various design alternatives including:

  - A new sonar system attached to ODOT's borehole camera

  - A new sonar system to be used independently but in conjunction with the ODOT borehole camera

  - A new OGE borehole camera which includes an integrated sonar system.

SYSTEM CHARACTERISTICS

- Capable of reaching and operating at depths of 300 feet with full inundation.

- Capable of real time monitoring with the capacity to record all pertinent information (e.g., depth, orientation, distance) and images.

- Sensitive enough to identify timbers, pillars, roof falls, etc. When possible, the system's components shall be off-the-shelf.

Corridor Studies, Designs, Investigations and Construction Projects

Corridor Study

U.S. Route 30

- Stark and Columbiana Counties
- 2 Corridors totaling 70 miles
- Numerous Abandoned Underground Mines and Abandoned Surface Mines

Major New Design on New Alignment

U.S. Route 33 (Nelsonville, Ohio By-Pass)

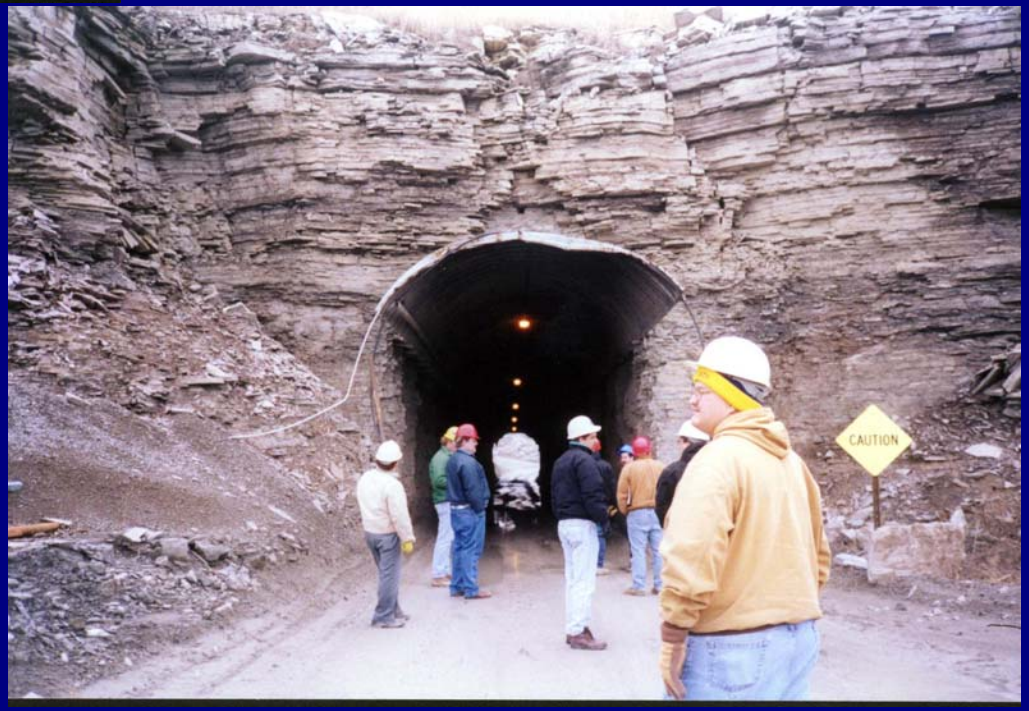
- Hocking and Athens Counties
- 9 mile new alignment
- Numerous Abandoned Underground Mines and Abandoned Surface Mines
- Estimated cost of Construction = $122 Million, including an estimated $32 Million for abandoned mine remediation

Renovation Design Investigation

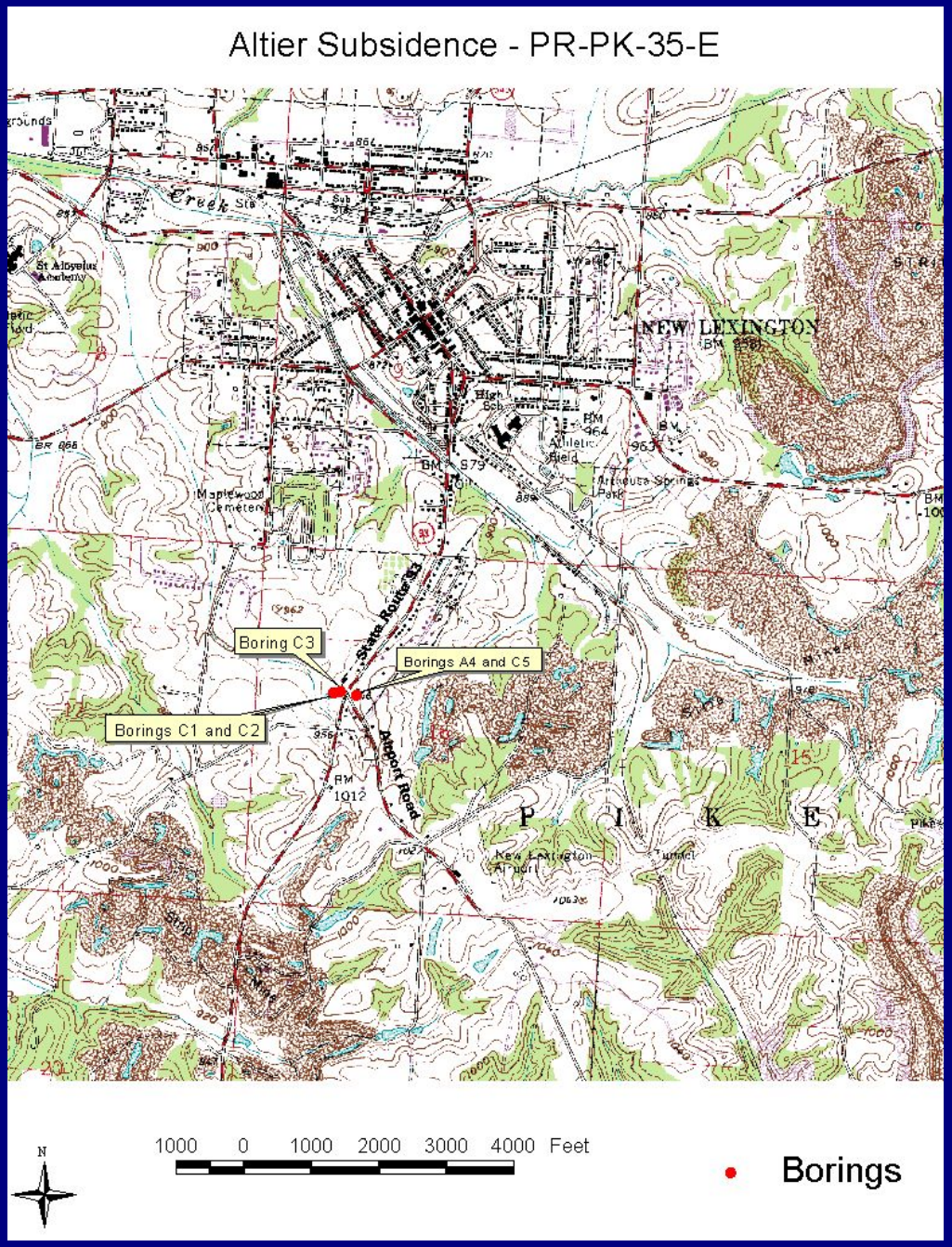
Interstate 75

Allen County

Active Quarry Tunnel



Investigation, State Route 13, Perry County, Unmapped Mine



Investigation

State Route 93

Perry County

Unmapped Mine Investigation

Construction

Interstate 77

Stark County

Mine Remediation

Project

Construction

State Route 711

Mahoning and Trumbell Counties

Roadway Project

Unmapped mine workings encountered during storm sewer construction on new alignment.

Separately contracted mine remediation work is scheduled to begin in 2004.

INTERSTATE TECHNICAL GROUP ON ABANDONED UNDERGROUND MINES

5TH Biennial Workshop

Update of Abandoned Underground Mine Activities in Ohio

L. Rick Ruegsegger, P.E

Special Projects Coordinator

Office of Geotechnical Engineering