

Capturing 'other' Mine Information in a Database

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Office of Mines and Minerals
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- Data that facilitates mineral exploitation
(covered by Nick Fedorko)

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- **Data that facilitates safety and abandoned mine use.**

Capturing “other” Mine Information in a Database

So Why Bother Collecting Mine
Information ?

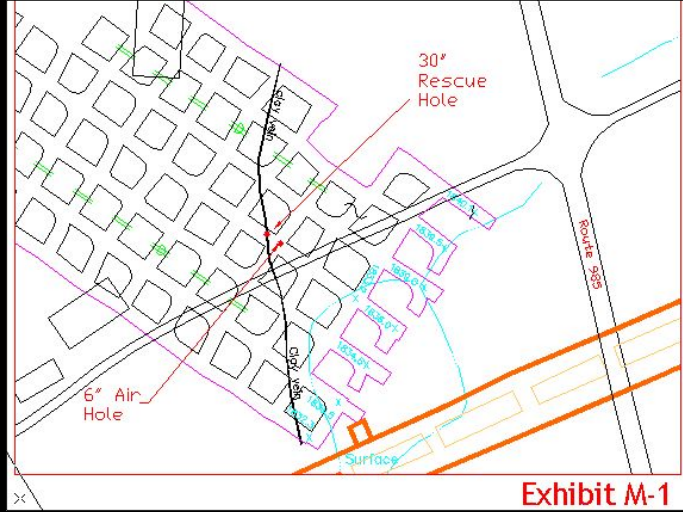
Capturing “other” Mine Information in a Database

So Why Bother Collecting Mine
Information ?

Mine Safety

QueCreek

From: US Department of Labor – QueCreek Mine Rescue



And To Avoid Mine Related Land-Use Problems



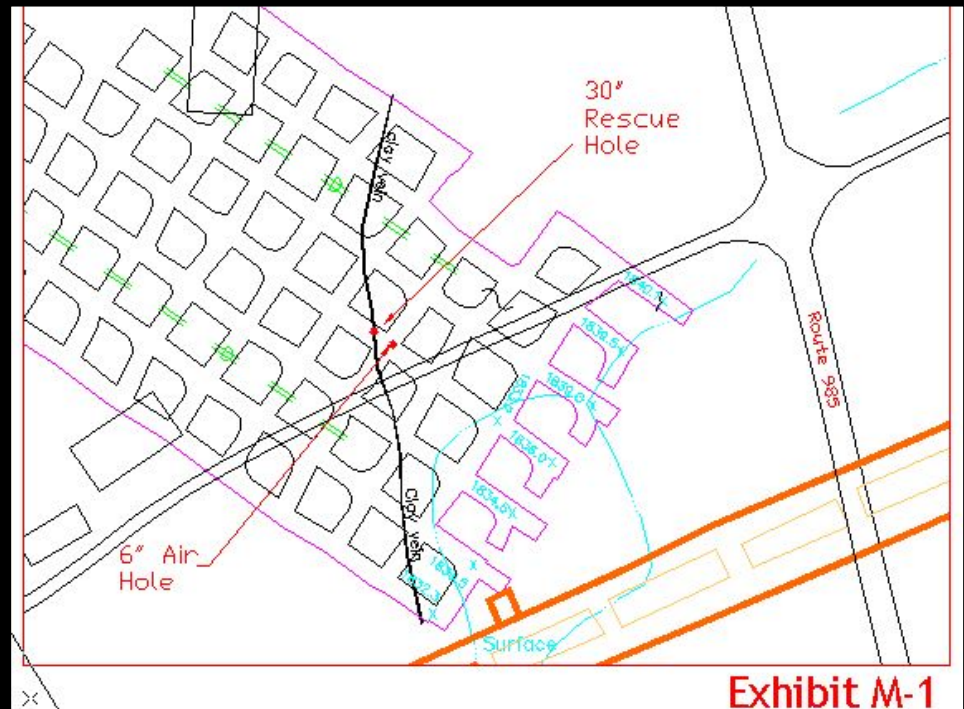
Mine Safety and Land-Use Problems Share Common Needs and Concerns



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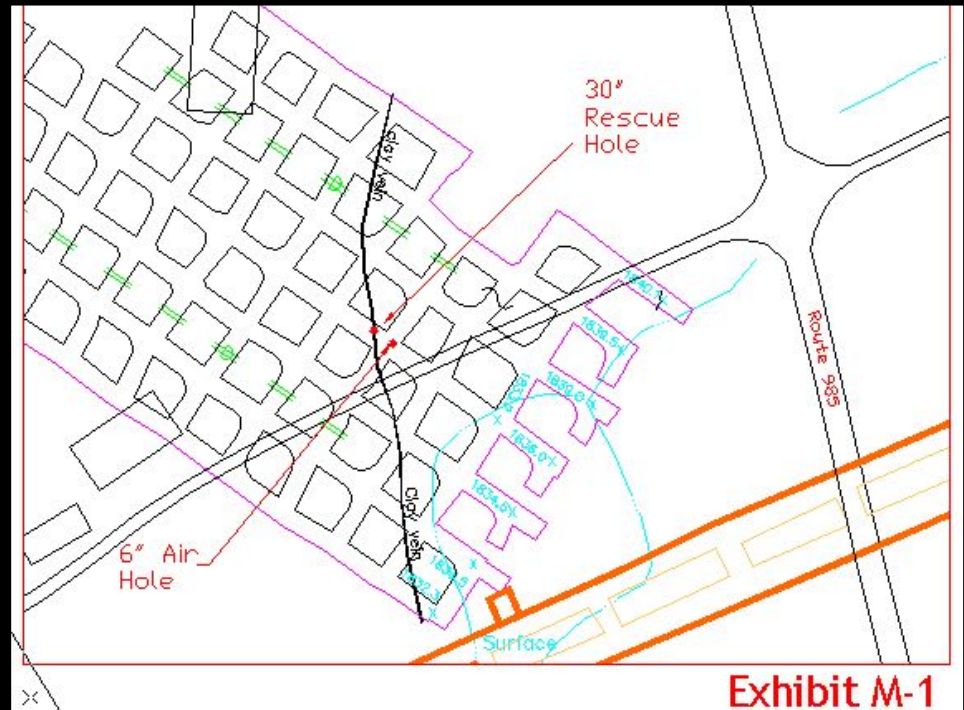
- **Precisely knowing the XYZ Coordinates of past mining.**



Mine Safety and Land-Use Problems Share Common Needs and Concerns



- Precisely knowing the XYZ Coordinates of past mining.
- **Storing mine maps in a known and accessible location.**



Mine Safety and Land-Use Problems Share Common Needs and Concerns



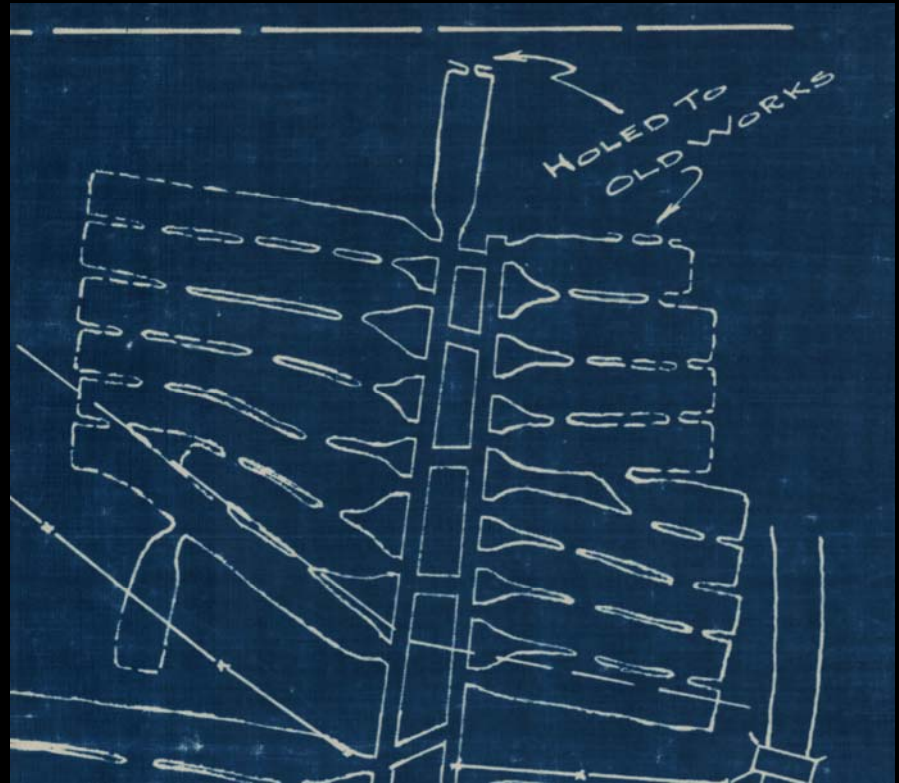
- **Knowing type, quantity and content of fluids contained in past mines.**



Mine Safety and Land-Use Problems Share Common Needs and Concerns



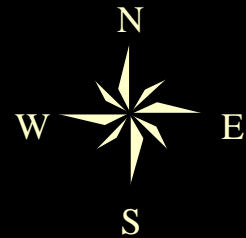
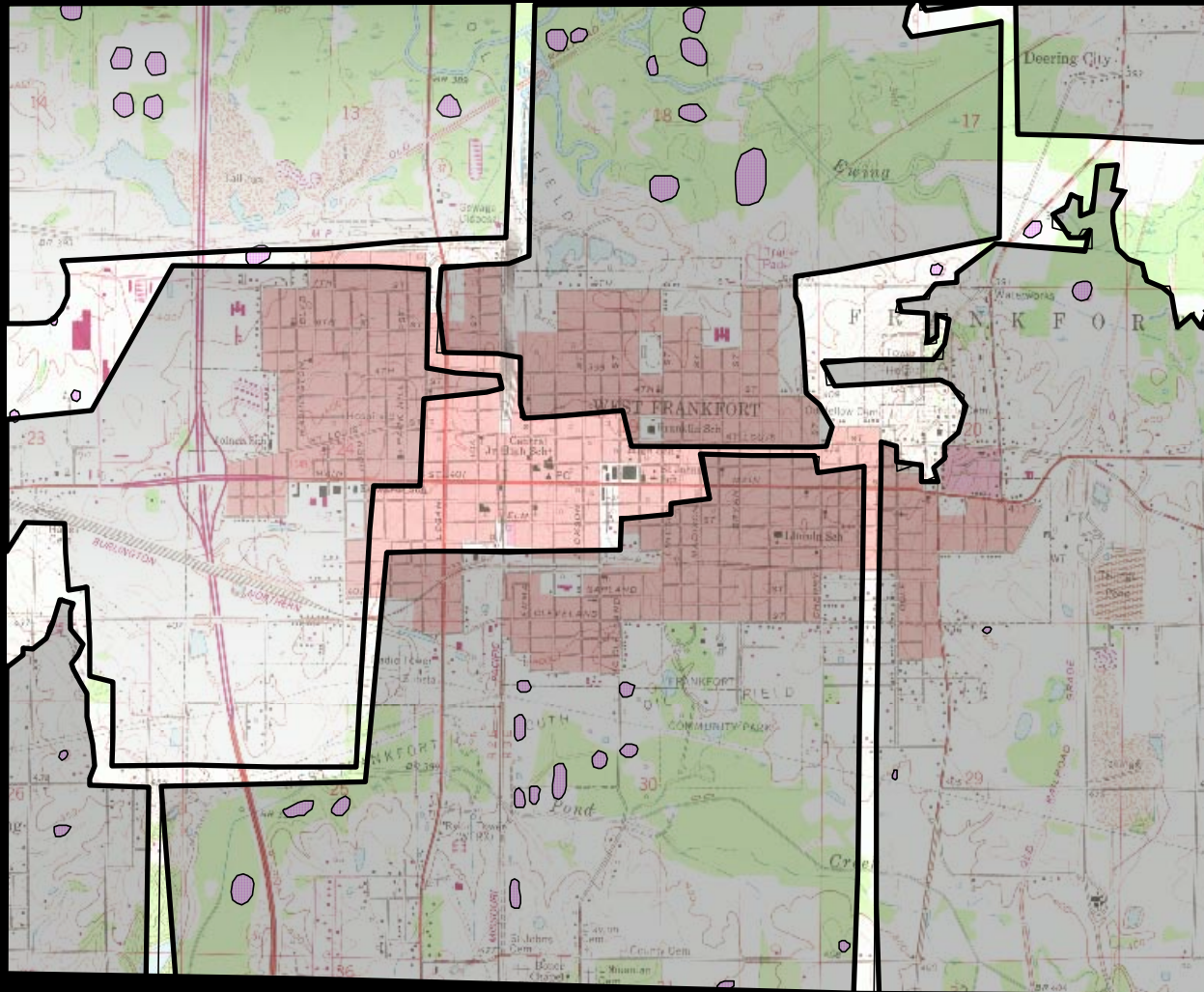
- Knowing type, quantity and content of fluids contained in past mines.
- **Connectivity Between Mines**



Knowing X,Y,Z Coordinates of Past Mining

- Generalized Maps and Their Use

Mined Areas Superimposed On A Topographic Map



Mined Out Area



Subsidence Events

0

1

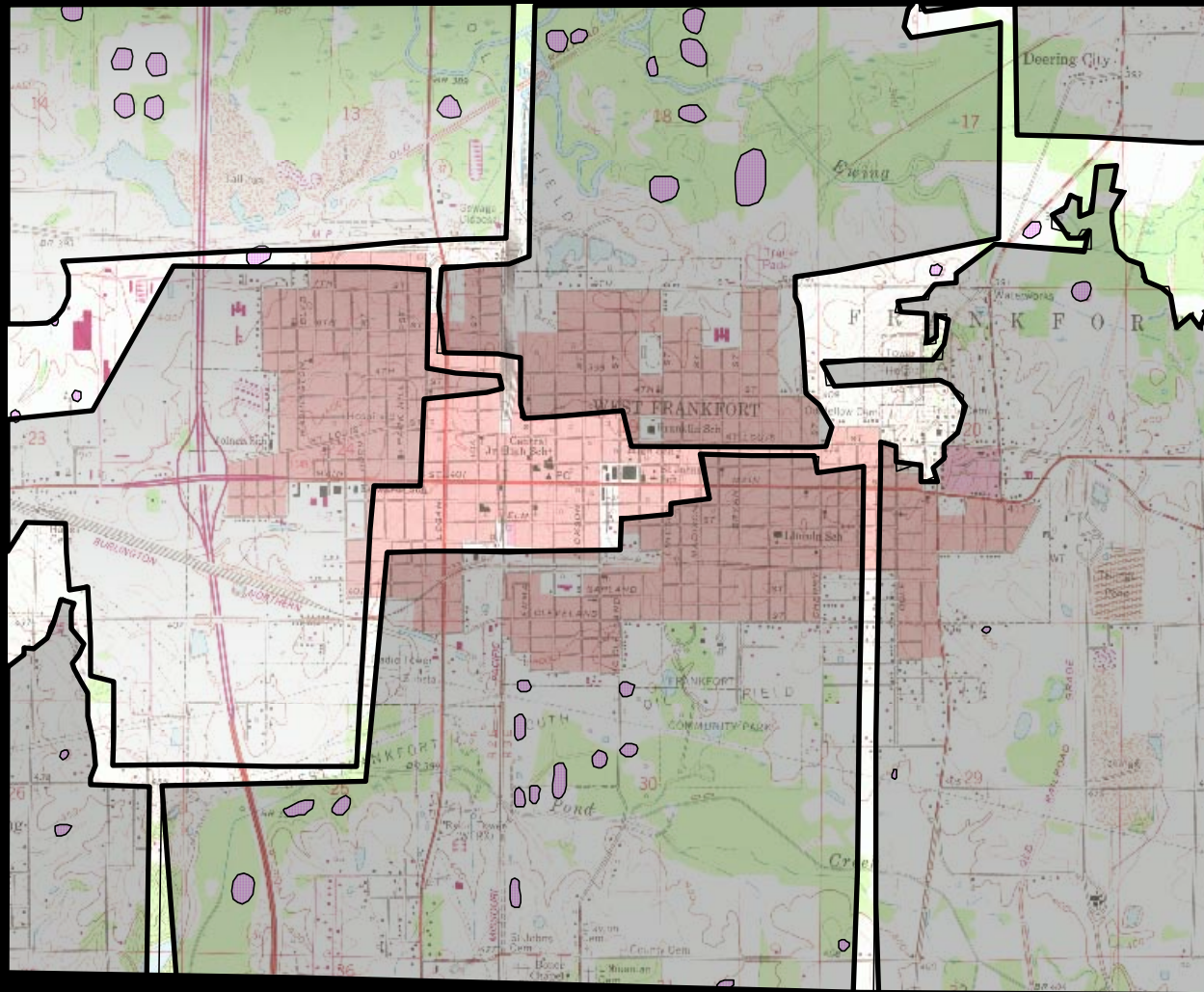
2

3

4

Miles

General Map Use Examples



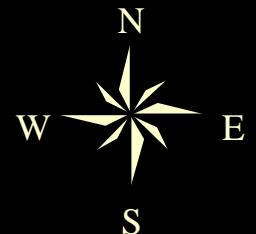
- City planning



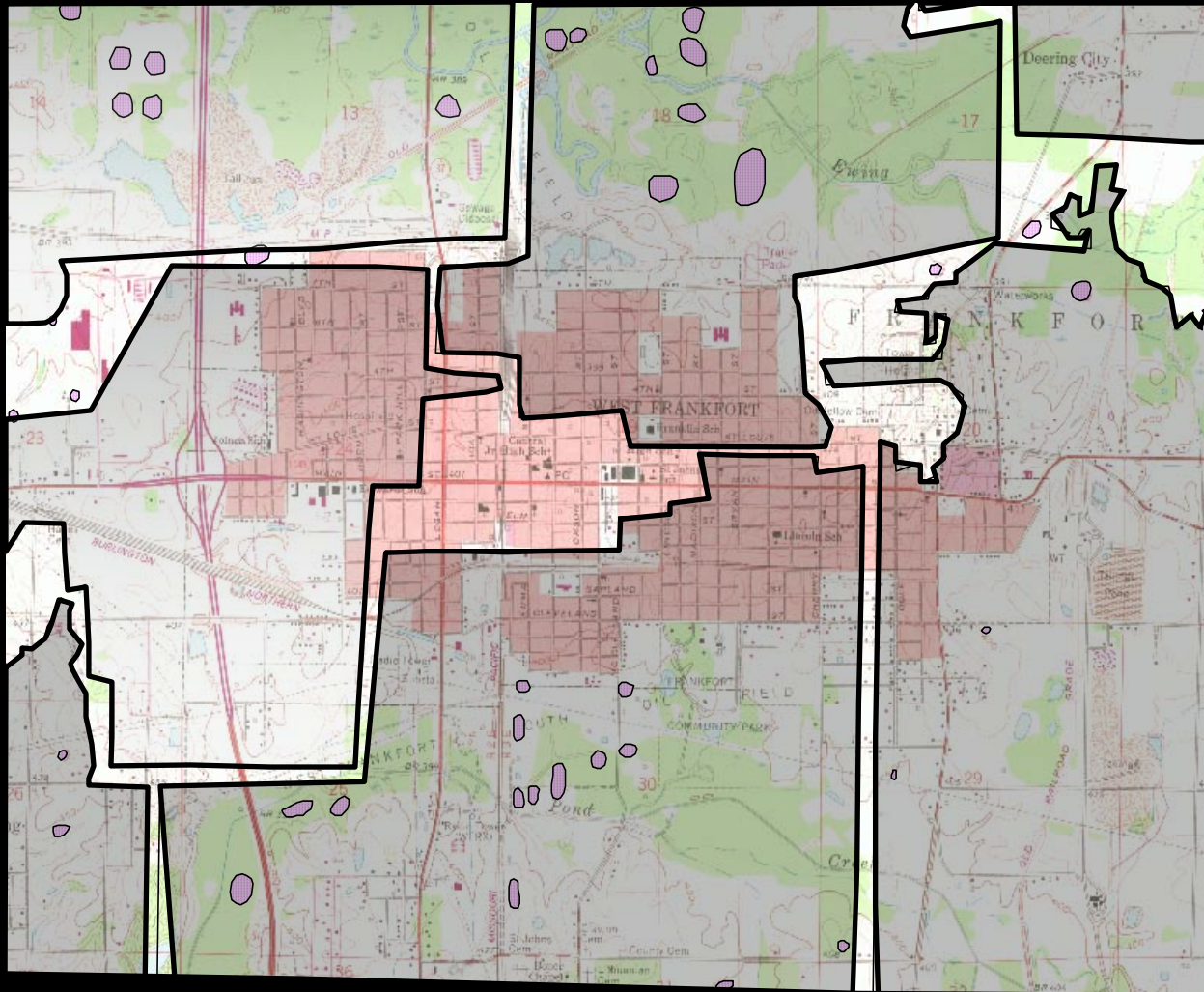
Mined Out Area



Subsidence Events



General Map Use Examples



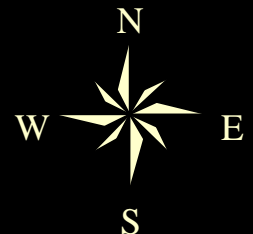
- City planning
- Mineral depletion and speculation
- Transportation



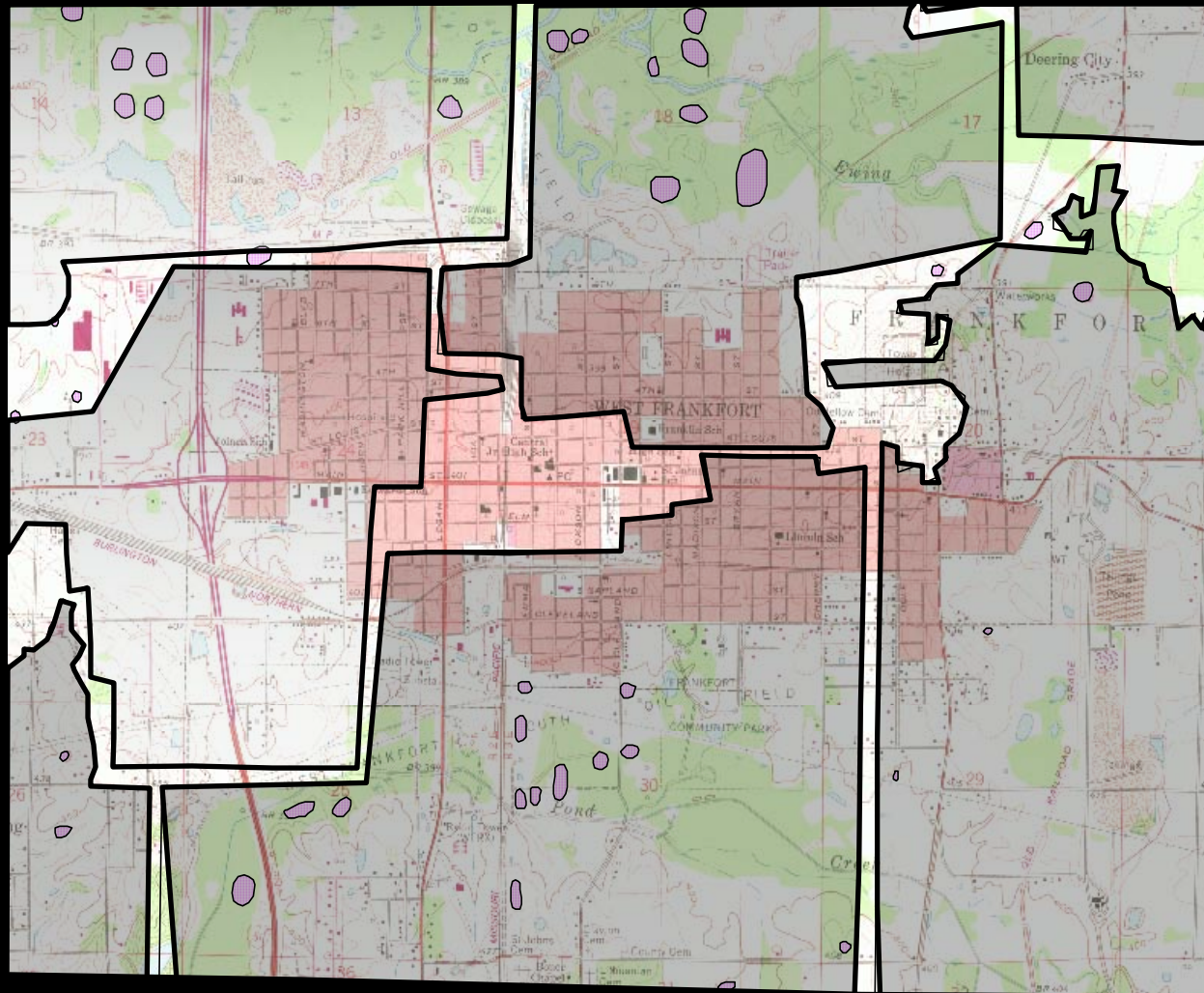
Mined Out Area



Subsidence Events



General Map Use Examples



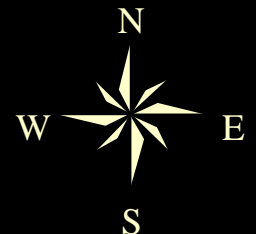
- City planning
- Mineral depletion and speculation
- Transportation
- Emergency planning



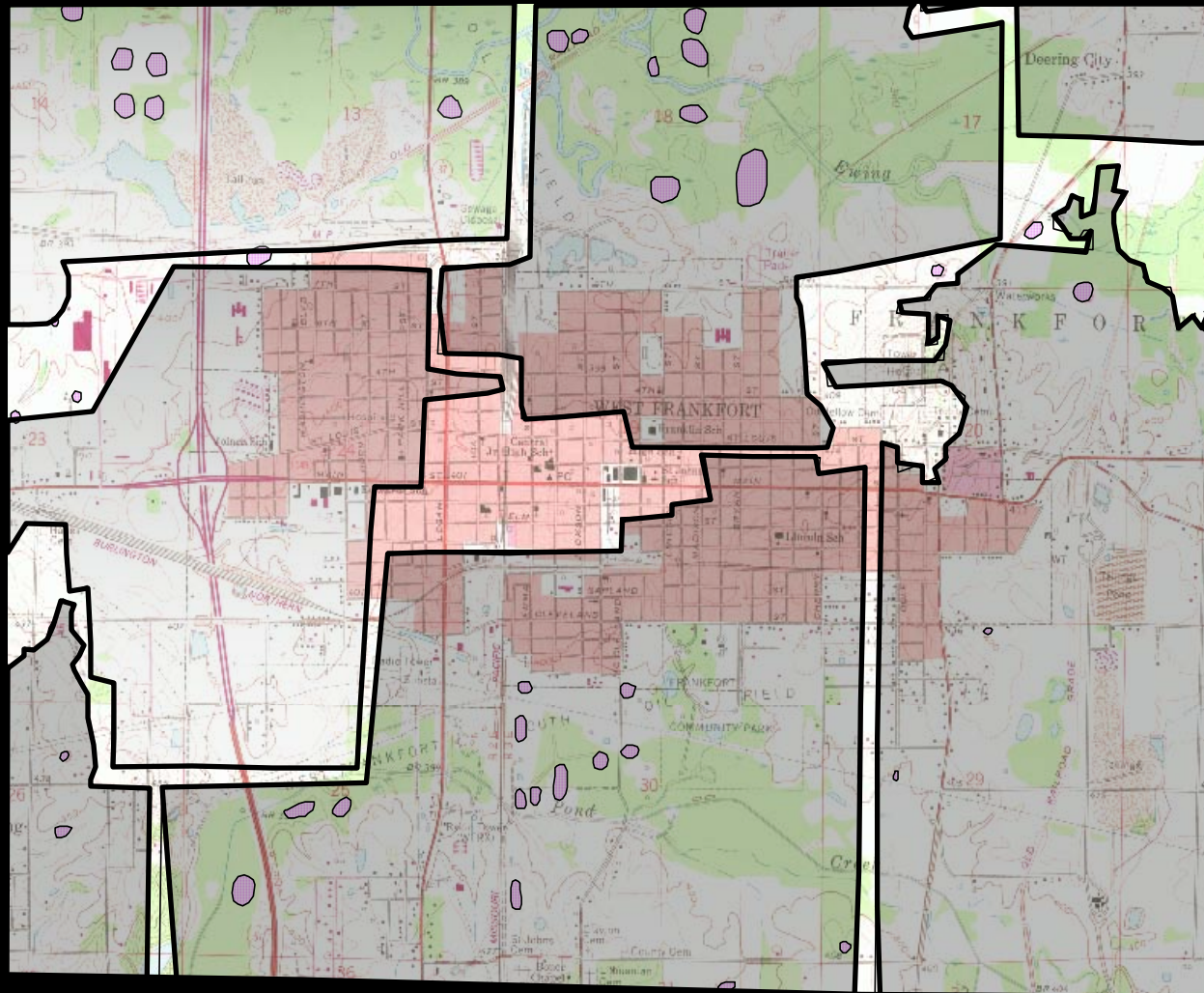
Mined Out Area



Subsidence Events



General Map Use Examples



- City planning
- Mineral depletion and speculation
- Transportation
- Emergency planning
- Waste disposal

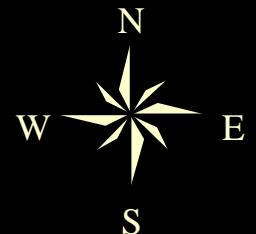


Mined Out Area



Subsidence Events

0 1 2 3 4 Miles



Knowing X,Y,Z Coordinates of Past Mining

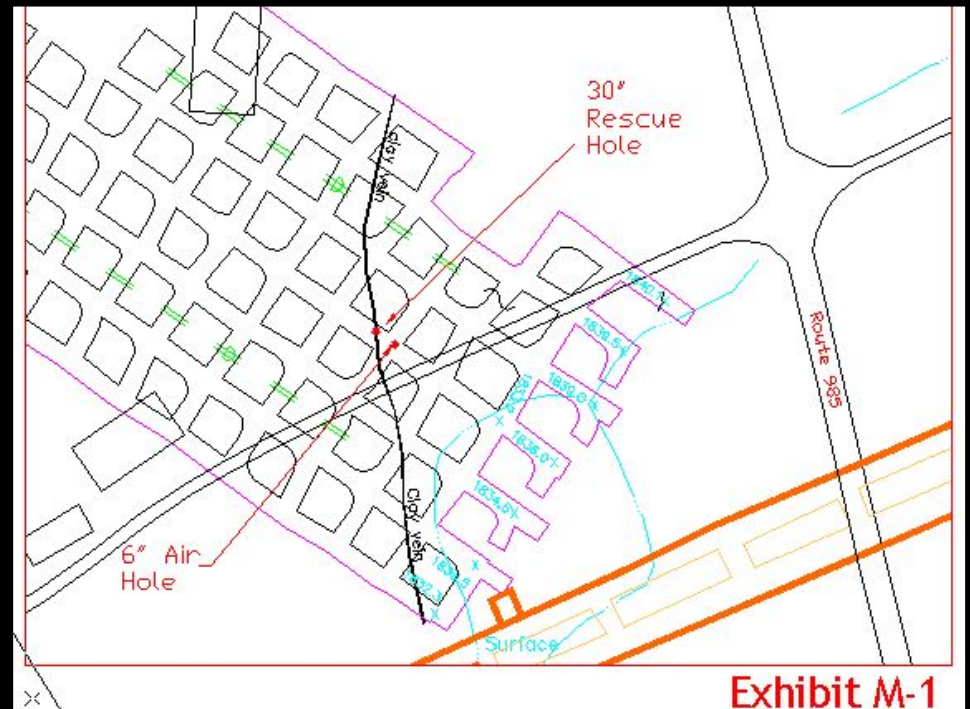
- Generalized Maps and Their Use
- Detailed Maps and Their Use.

Knowing X,Y,Z Coordinates of Past Mining

- **Modern Mine Considerations**

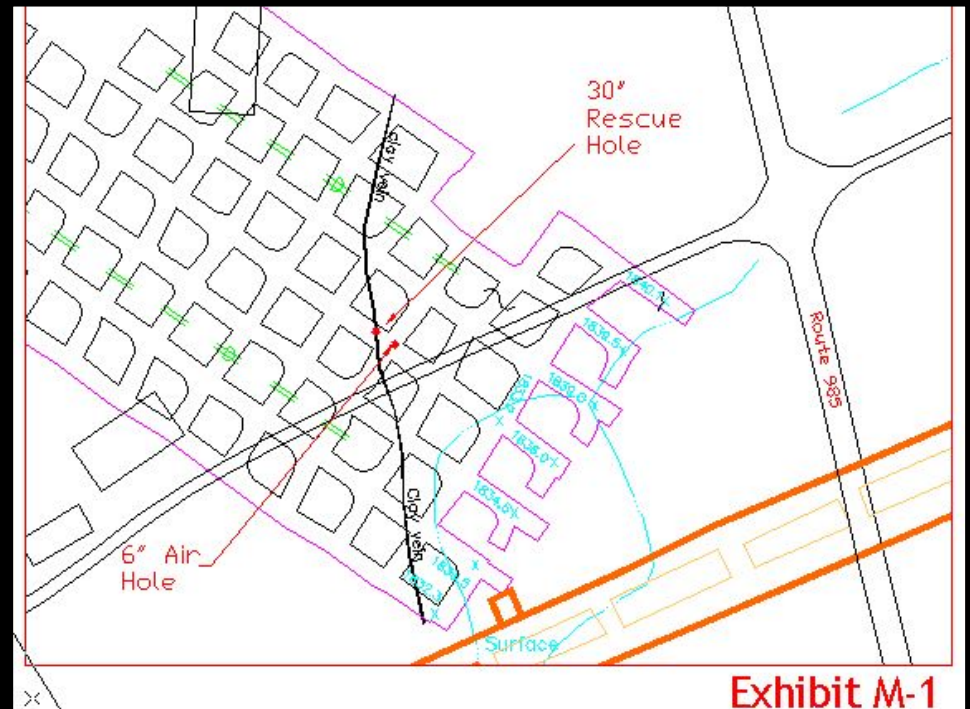
Advantages For Modern Mines

- To avoid past mining operations.



Advantages For Modern Mines

- So that past mining can be avoided
- Or to safely use old mines for ventilation, haulage or emergency escapement purposes.



Knowing X,Y,Z Coordinates of Past Mining

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- Land-Use Development Considerations

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Knowing X,Y,Z Coordinates of Past Mining

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 - Detailed information on local geology and mining conditions.
 - Detailed mine and land histories.

“Other” Information List

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- **Site Information**
 - Known subsidence
 - Shaft locations
 - Boreholes
 - Oil wells

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- Geological Information
 - Seam thickness
 - Coal elevations
 - Gaseous conditions
 - Floor and roof details
 - Hydrology

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- **Historic and Mining Information**
 - Unusual mining practice and/or construction
 - Shaft construction details and closure detail
 - Mine fires
 - Past subsidence
 - Mine connectivity
 - Noting and naming of adjacent mine workings.
 - Oil well location
 - Other known problems

Mining and Potential Land-Use Conflicts

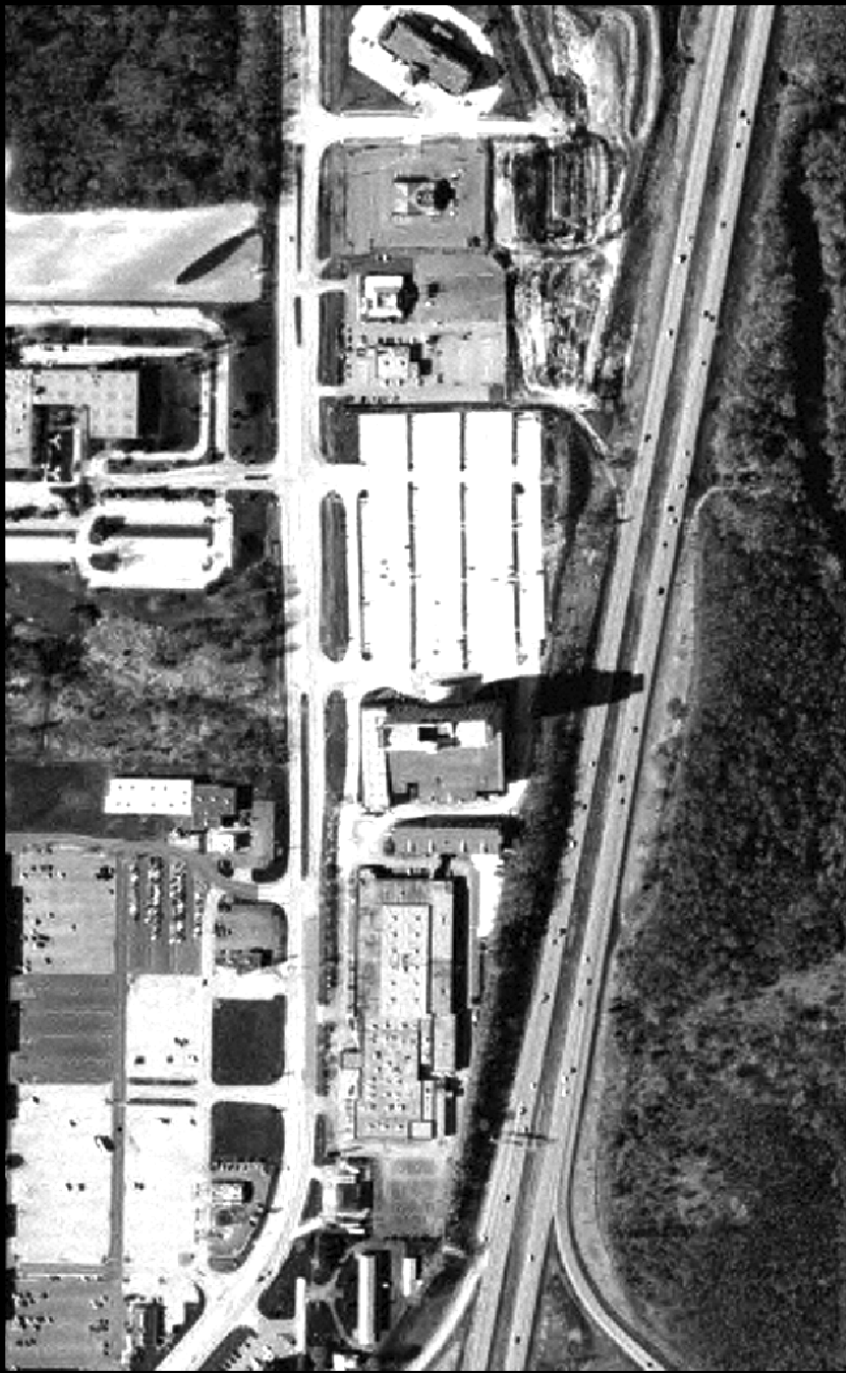
Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

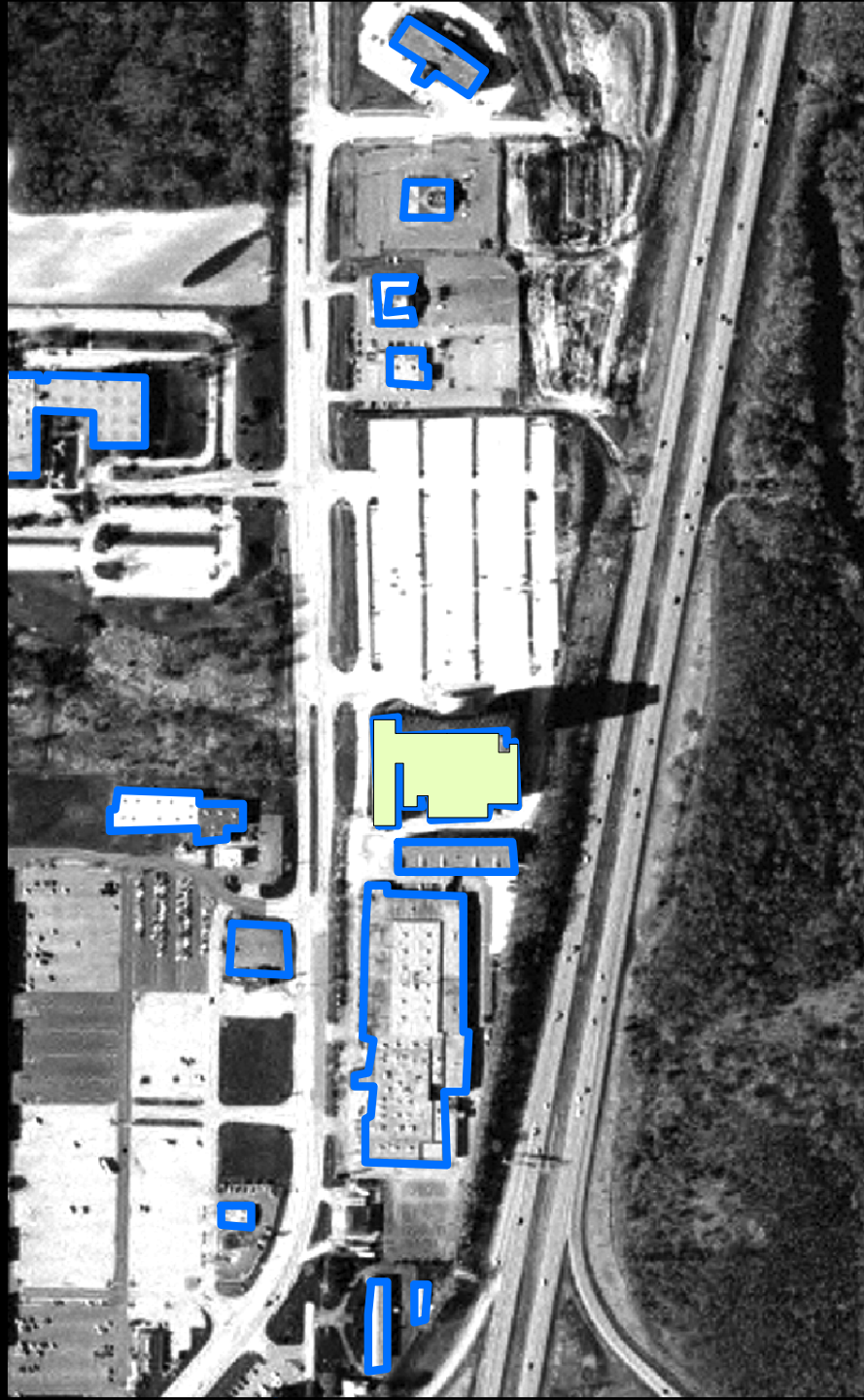
Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

- Investigation of a large hotel complex.



- Is this area



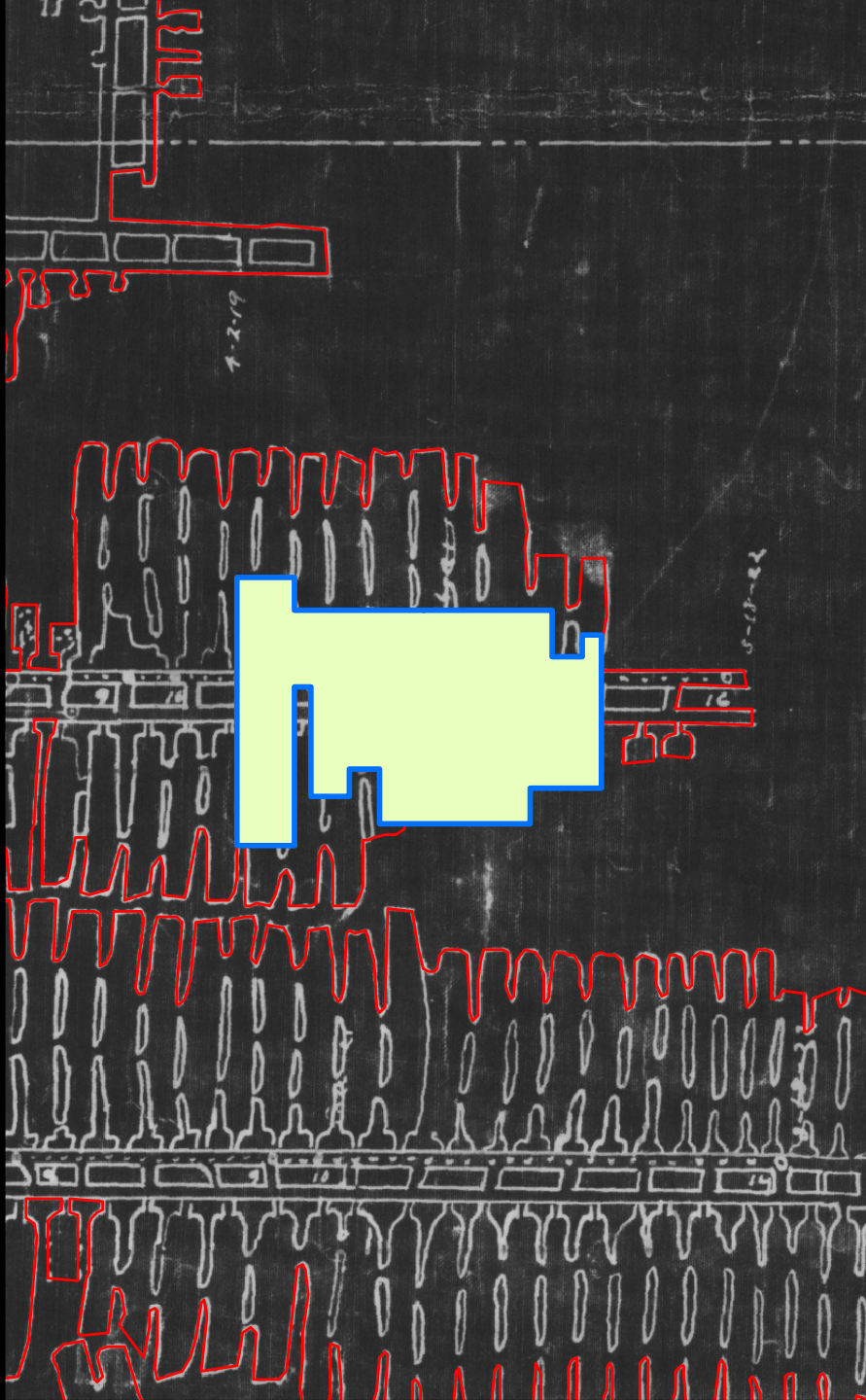
- Or particular building





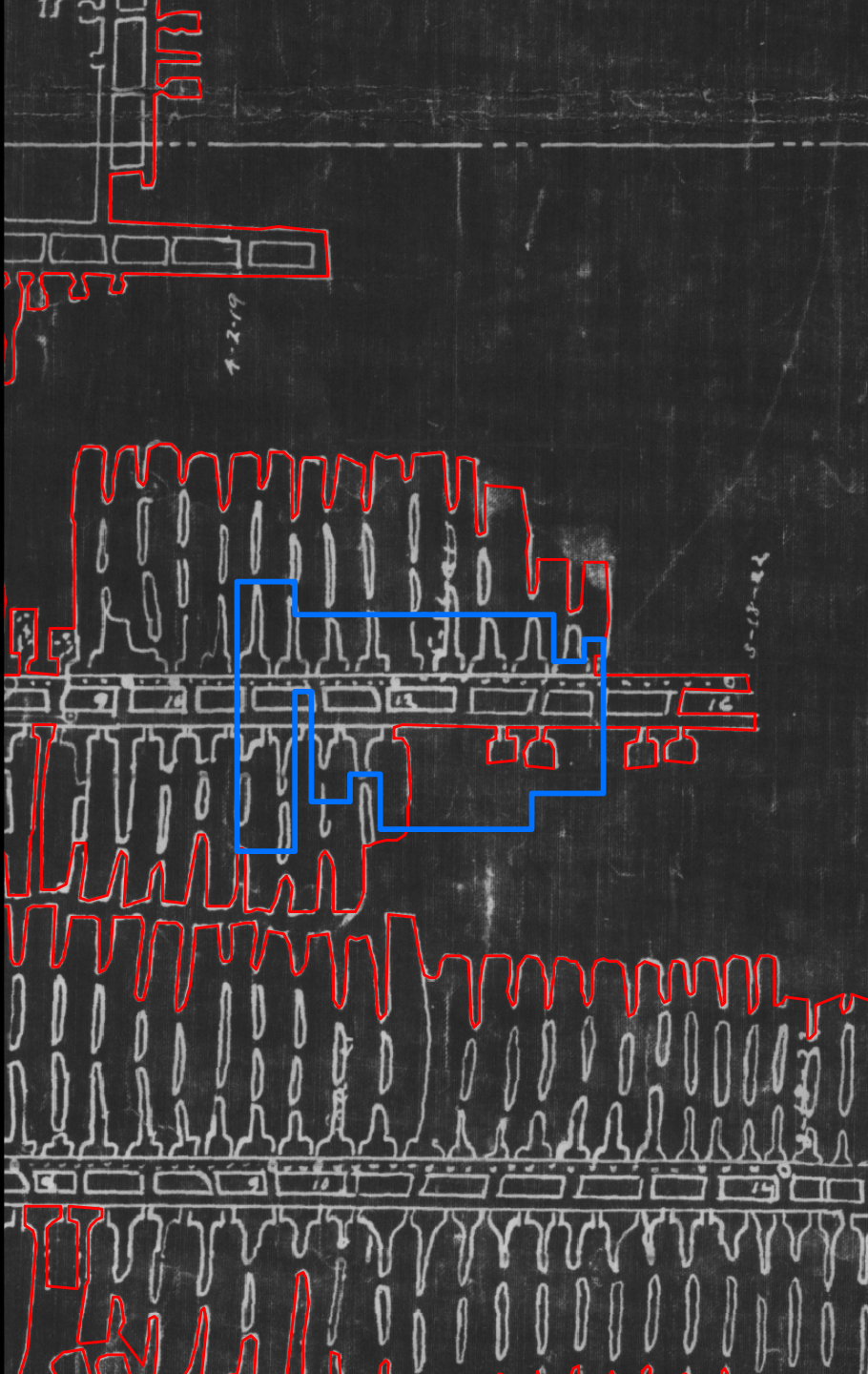
Undermined?

- IF undermined. Precisely locating surface features with respect to a detailed mine workings map



will help in identifying risks.

- What are the risks?

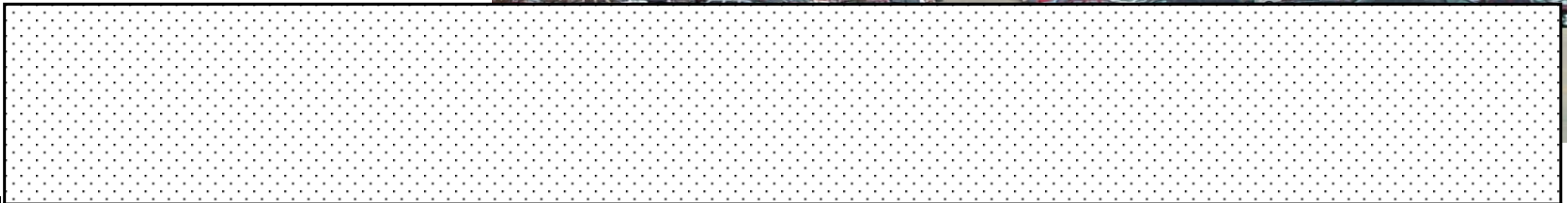


Site Information

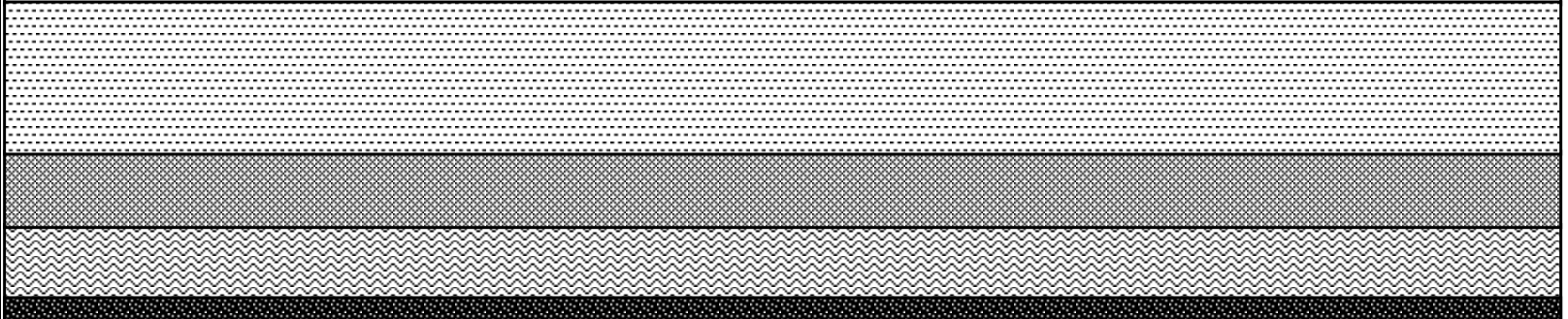
- Evidence of previous subsidence at site ?
- Nearby subsidence ?
- Known attempts at mine stabilization?



Soil 30 ft



Rock 190 ft



Coal 6 ft

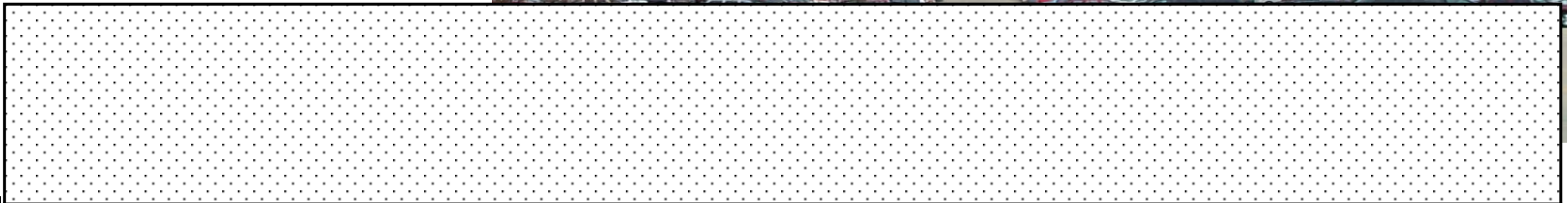


Information Desired

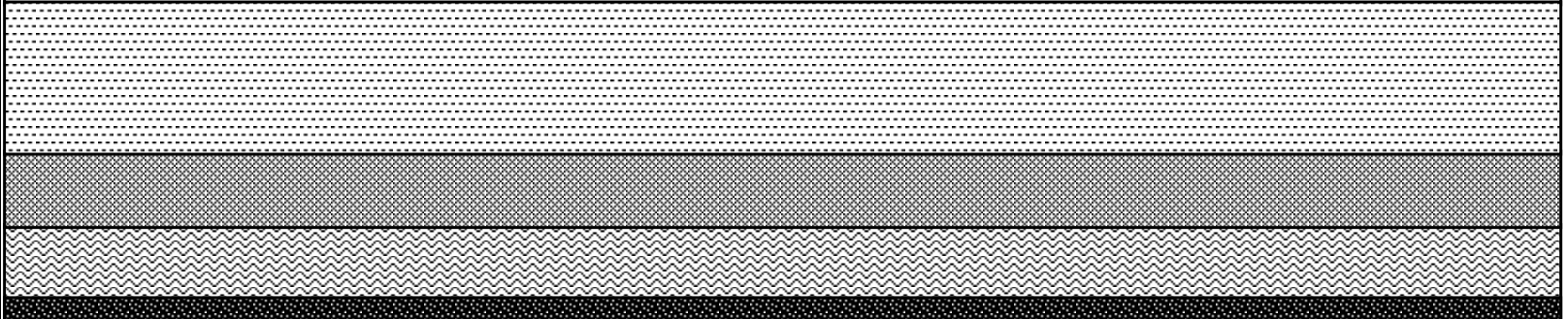
- Floor thickness & lithology.
- Coal seam thickness.
- Mine hydrology
- Mine gas
- Historical mine problems



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Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

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- Investigation for site re-development.

Land Being Considered for Commercial Re- Development



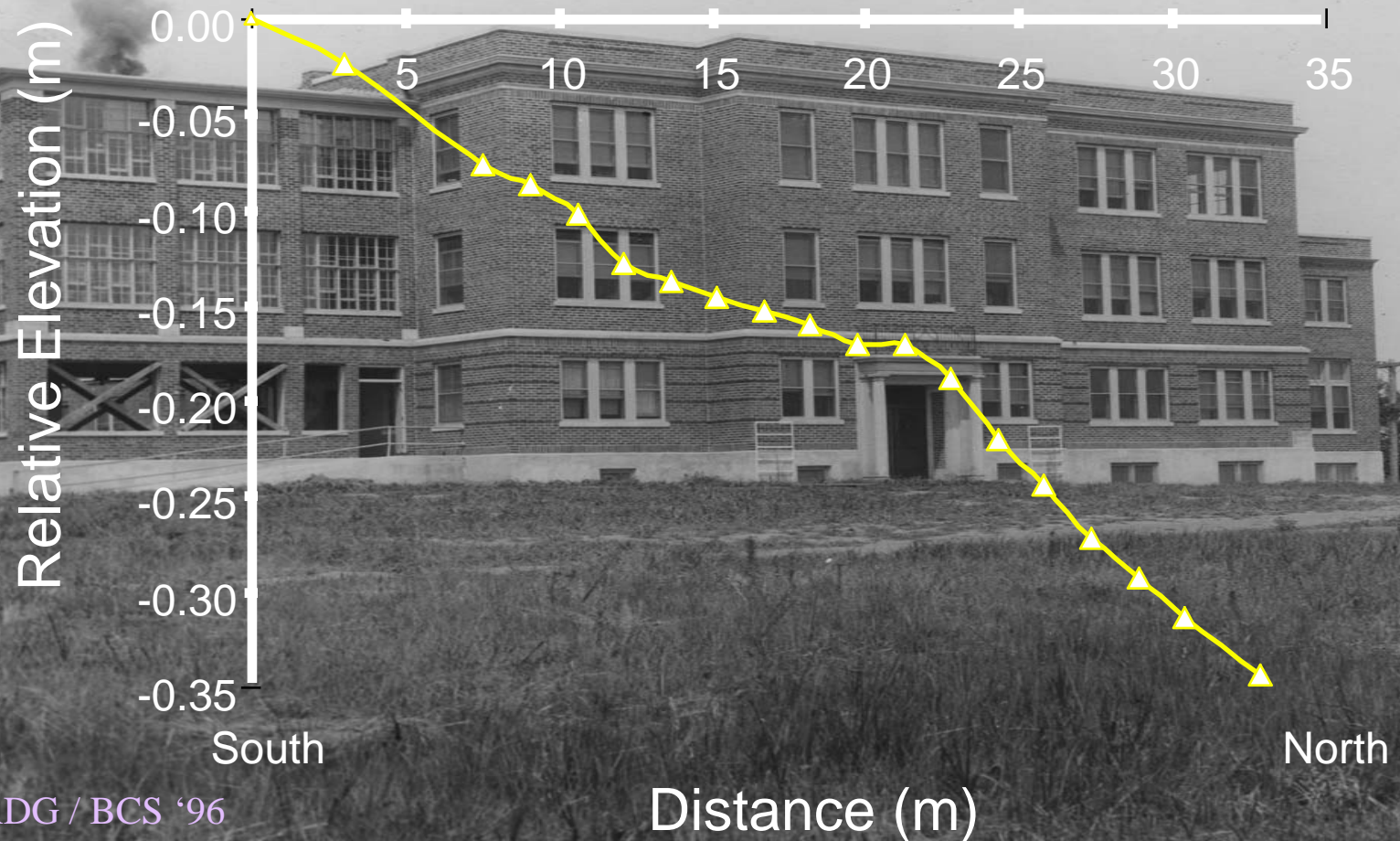
Historical Subsidence Event



Site Information

- Subsidence has occurred and history is known.

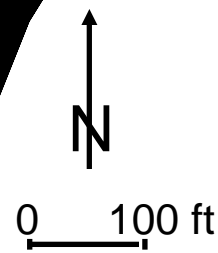
TB Sanitarium Subsided in 1926



Donk Bros. Mine No. 4



TB Sanitarium located
relative to mine workings



C 5'-10''

80 Years Later – no evidence of continuing subsidence.



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- Limited data suggests that once ground movements are complete, sag events do not reactivate.
- It should be noted that adjacent mined areas may collapse and overlap boundaries of an earlier sag event.

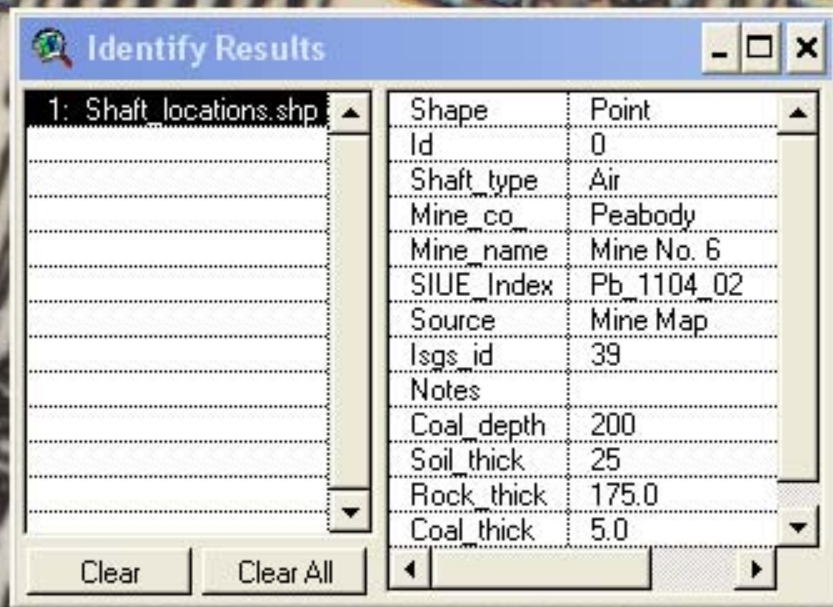
Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

- Investigation of a large hotel complex.
- Investigation for site re-development.
- Investigation of structure for mine gas leaks.

Explosive Accumulation of Methane Gas Measured In Home.



A software dialog box titled "Identify Results" is overlaid on a grayscale aerial photograph of a city street grid. The dialog box has a blue title bar with a globe icon on the left and standard window controls (minimize, maximize, close) on the right. Below the title bar is a list box containing "1: Shaft locations.shp". To the right of the list box is a table with two columns: "Shape" and "Point". The table contains several rows of data, with the last row highlighted. Below the table are two buttons: "Clear" and "Clear All".

| Shape | Point |
|------------|------------|
| Id | 0 |
| Shaft_type | Air |
| Mine_co | Peabody |
| Mine_name | Mine No. 6 |
| SIUE_Index | Pb_1104_02 |
| Source | Mine Map |
| Isgs_id | 39 |
| Notes | |
| Coal_depth | 200 |
| Soil_thick | 25 |
| Rock_thick | 175.0 |
| Coal_thick | 5.0 |

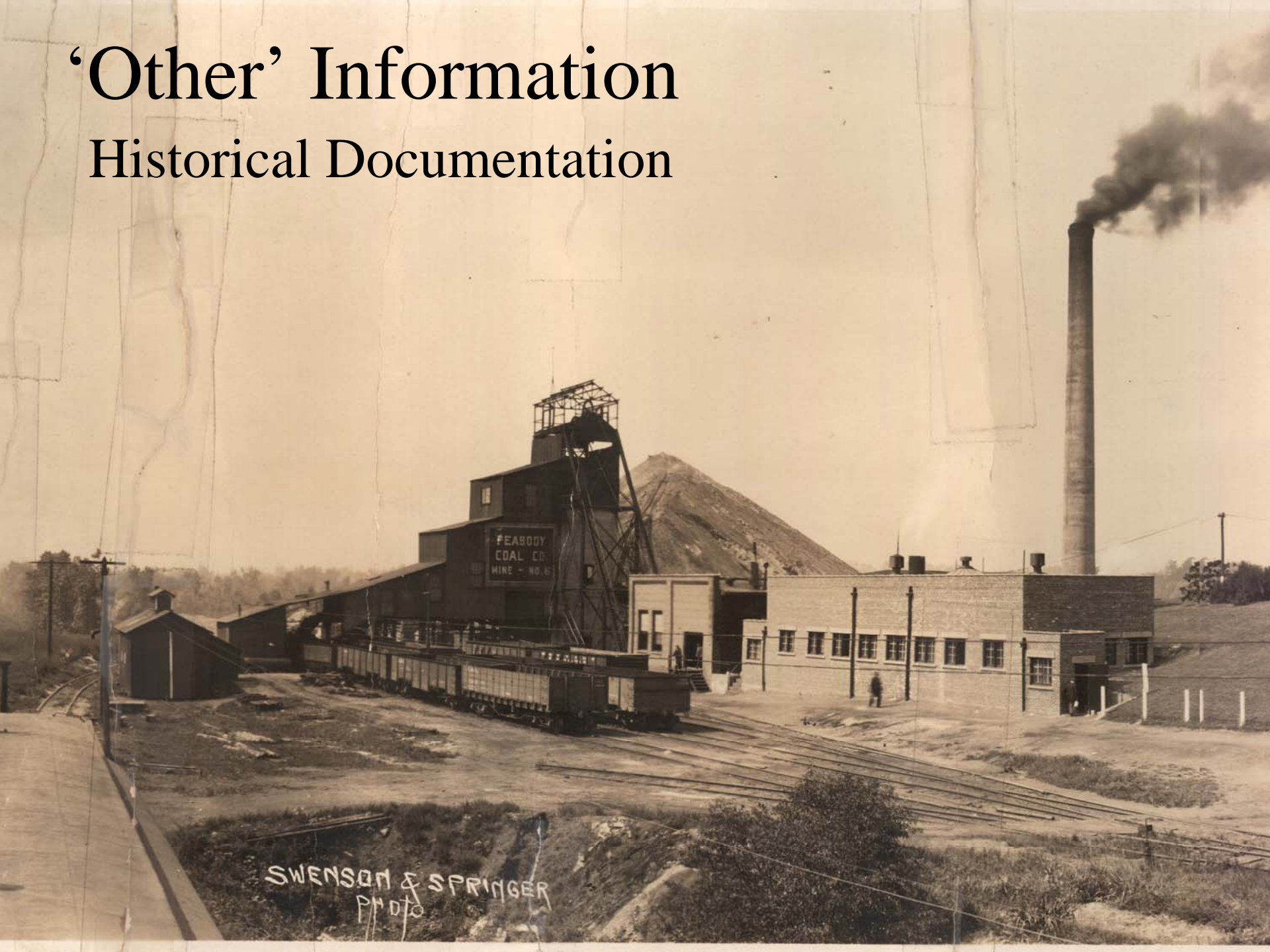


Landscaping Conceals Location of Mine Structures



'Other' Information

Historical Documentation



SWENSON & SPRINGER
PHOTO

Mine Gas Problem Summary

- Require a conduit between mine and surface

Mine Gas Risks

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Mine Gas Risks

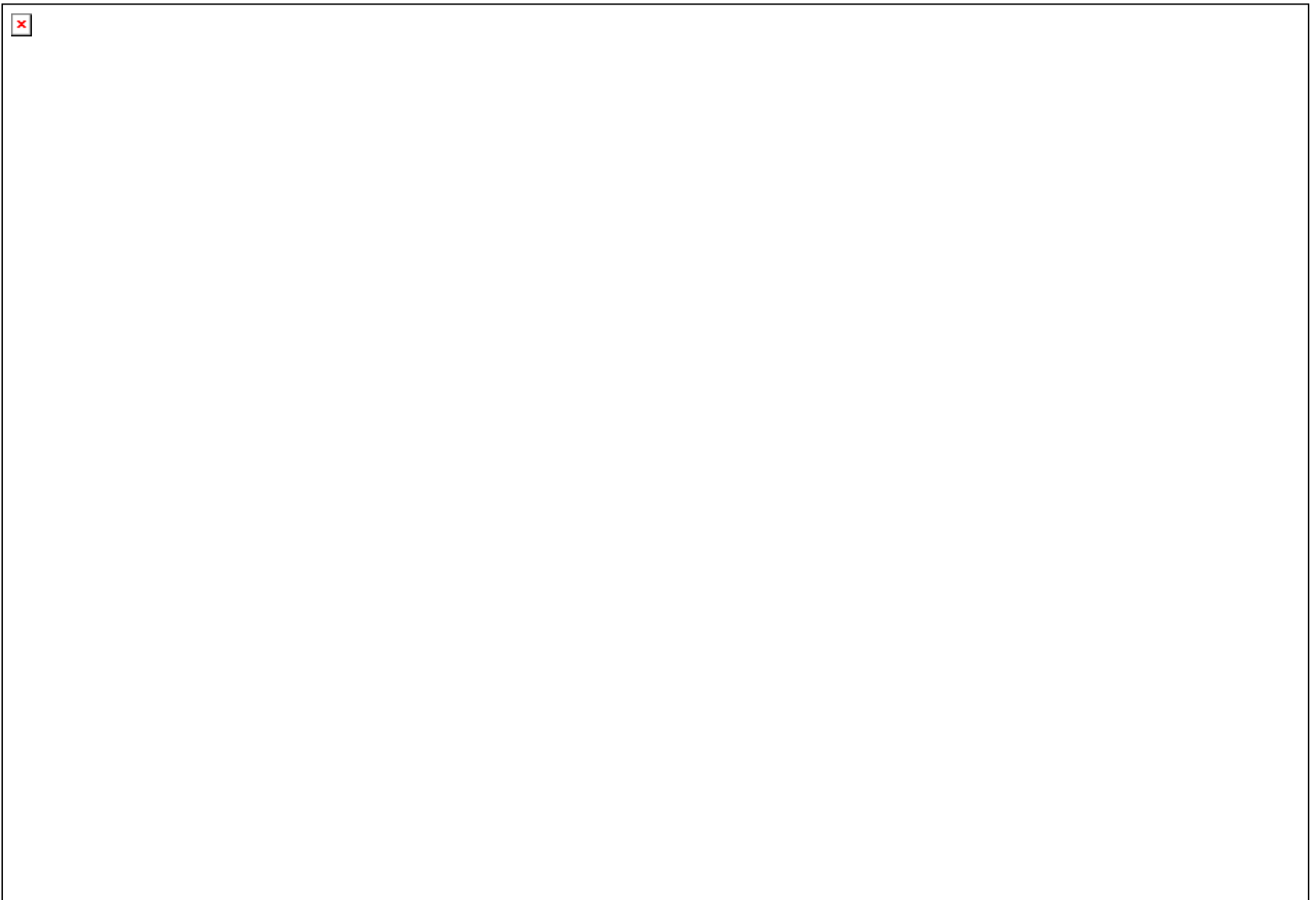
- Require a conduit between mine and surface
- Typical conduits include shafts and boreholes
- Shafts filled with porous media do not protect surface from escaping mine gases.
- Oil wells and/or interconnecting mines may significantly exacerbate mine gas pressures and volumes.

Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

- Investigation of a large hotel complex.
- Investigation for site re-development.
- Investigation of structure for mine gas leaks.
- **Unusual mining practice and/or construction**

Underground Bunker Details

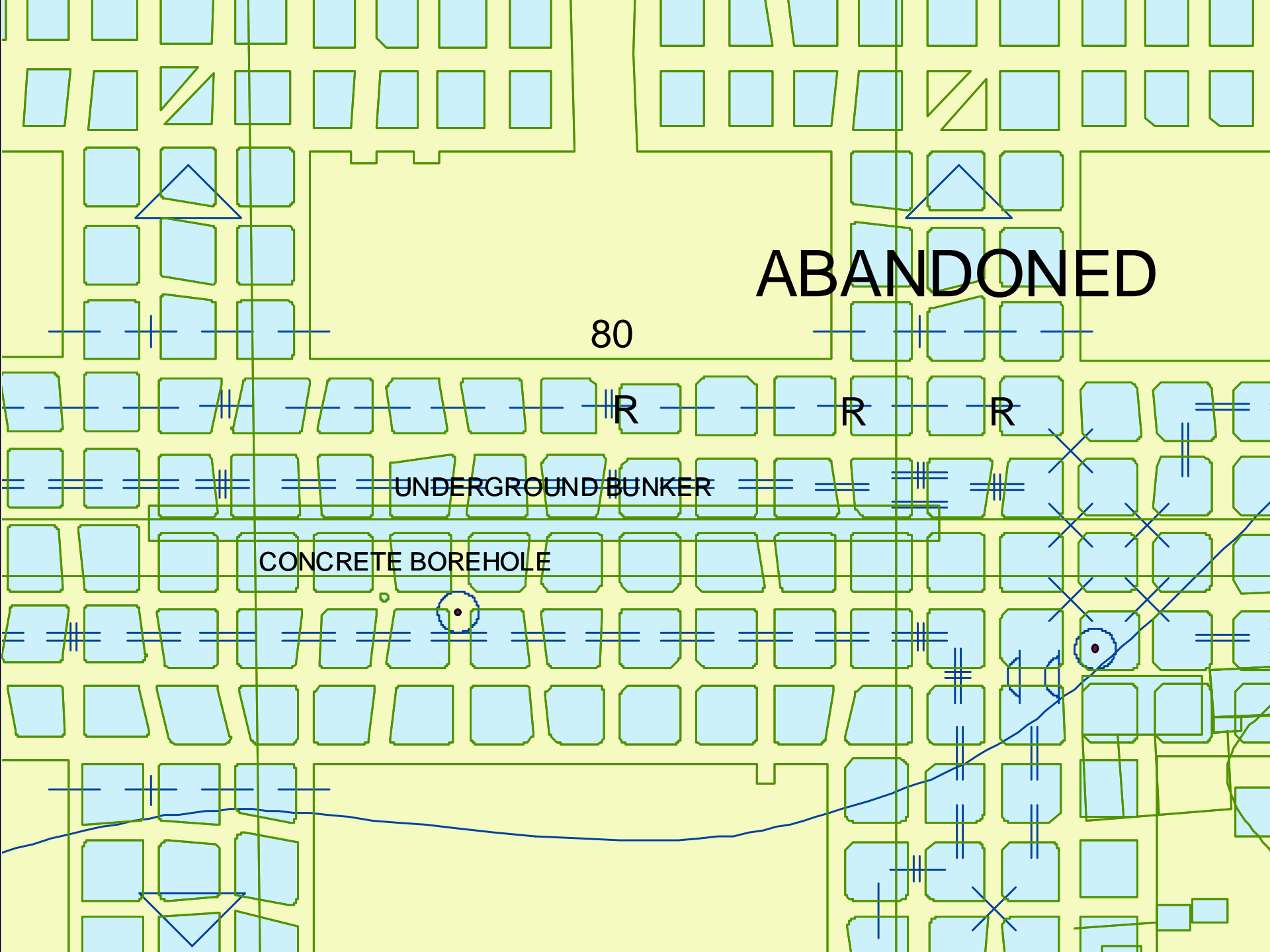


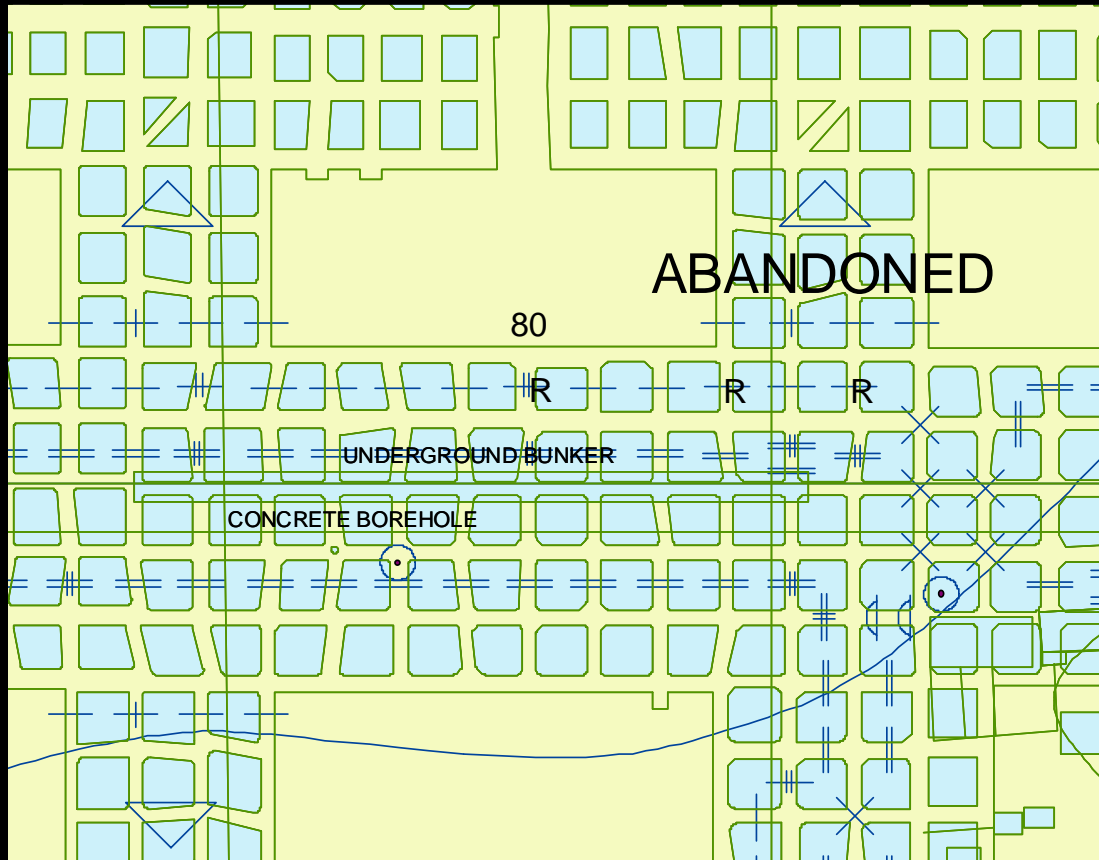
ABANDONED

80

UNDERGROUND BUNKER

CONCRETE BOREHOLE

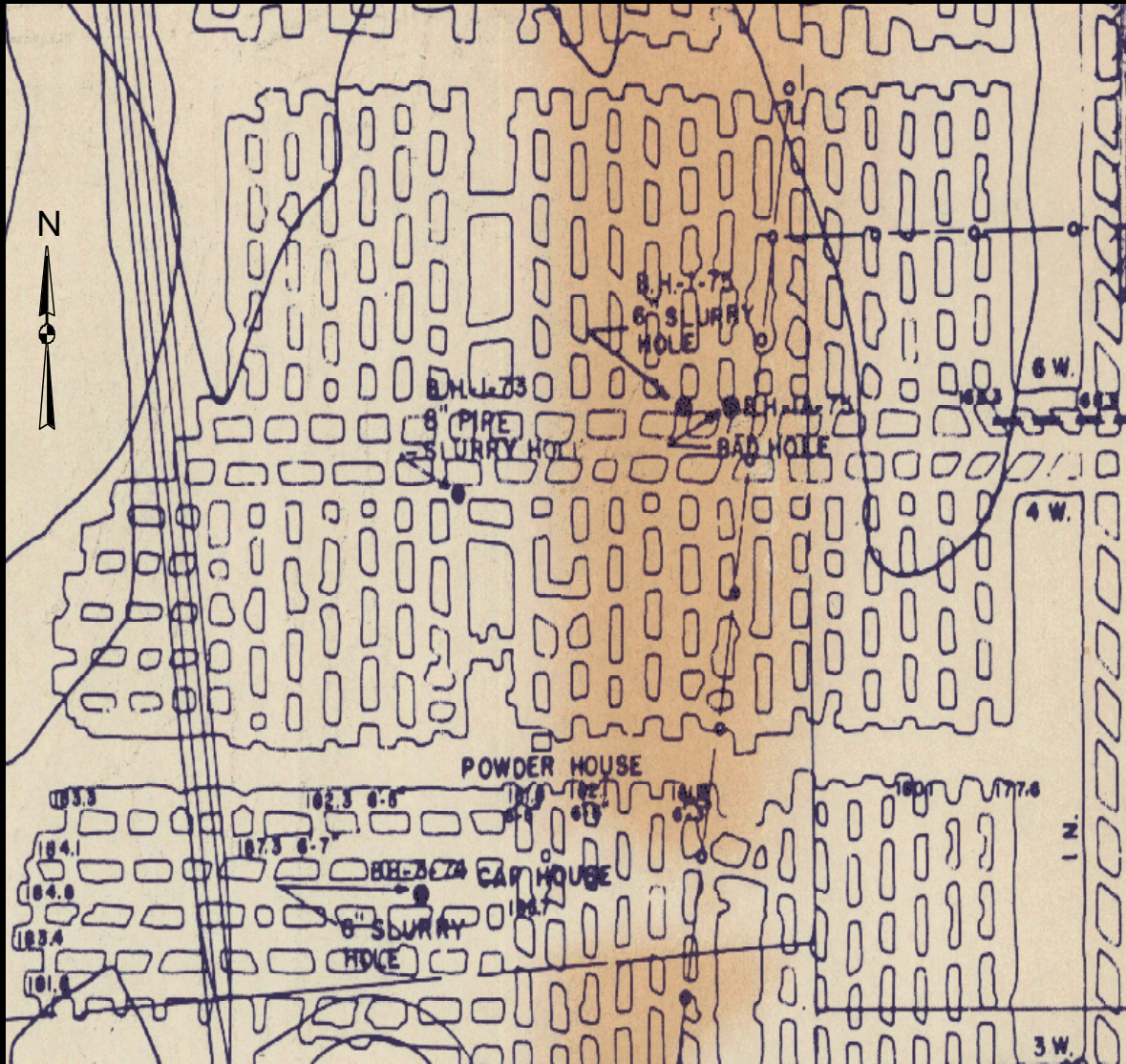




Questions

- Bunker height.
- Bunker construction details
- Was bunker filled?
- Filled material Used?
- Volume of void
- Volume of fill take

Slurry Injection



Questions

- Intent of slurry
 - disposal ?
 - surface protection ?
- Cementitious ?
- Panel filled?

Mining and Potential Land-Use Conflicts

Typical situations and mine information needs.

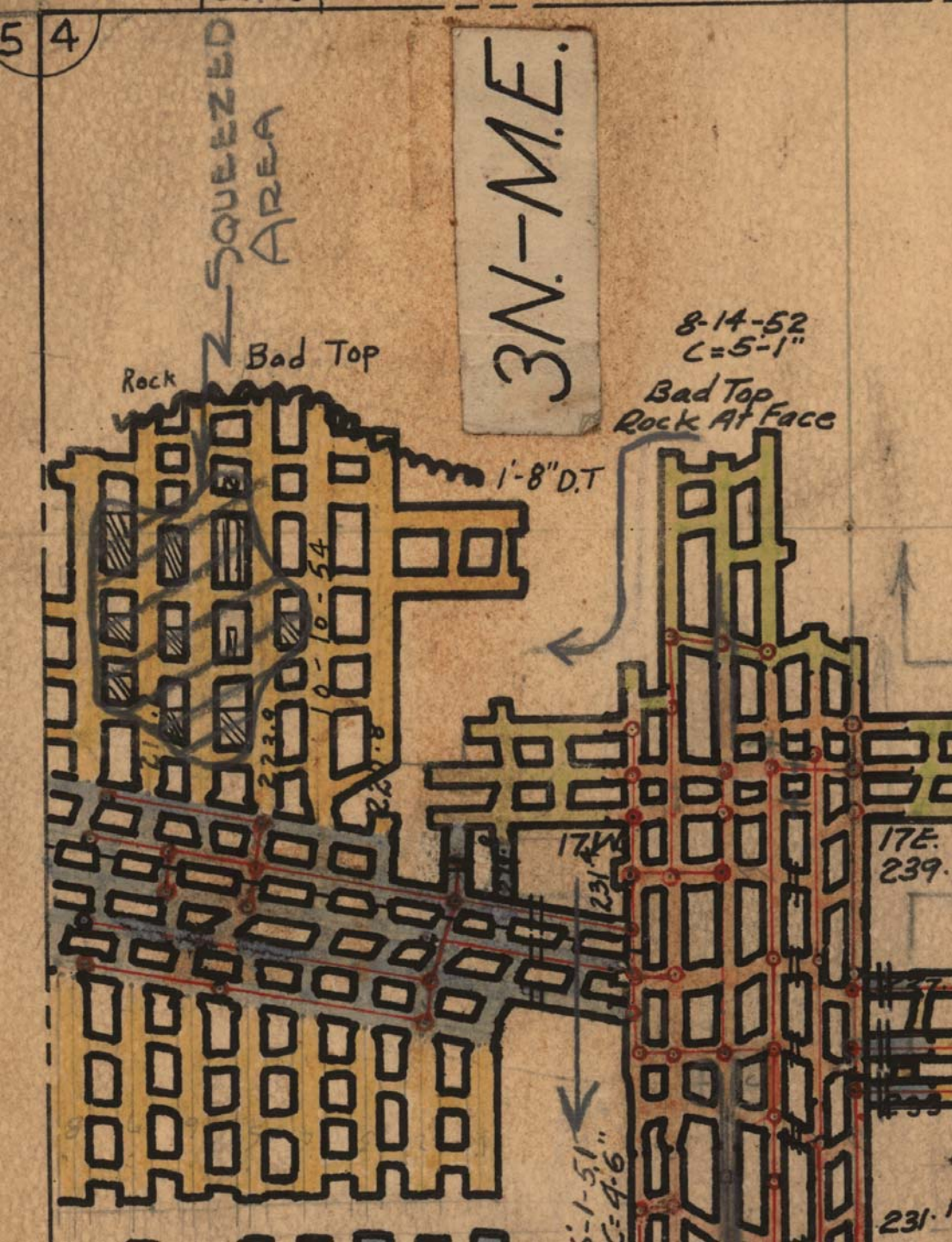
- Investigation of a large hotel complex.
- Investigation for site re-development.
- Investigation of structure for mine gas leaks.
- Unusual mining practice and/or construction
- **Making and Using mine maps as a database**

Examples Of Mine Maps Containing 'Other' Information

- Mine maps may be the only data reliably carried forward into the future.

Examples Of Mine Maps Containing 'Other' Information

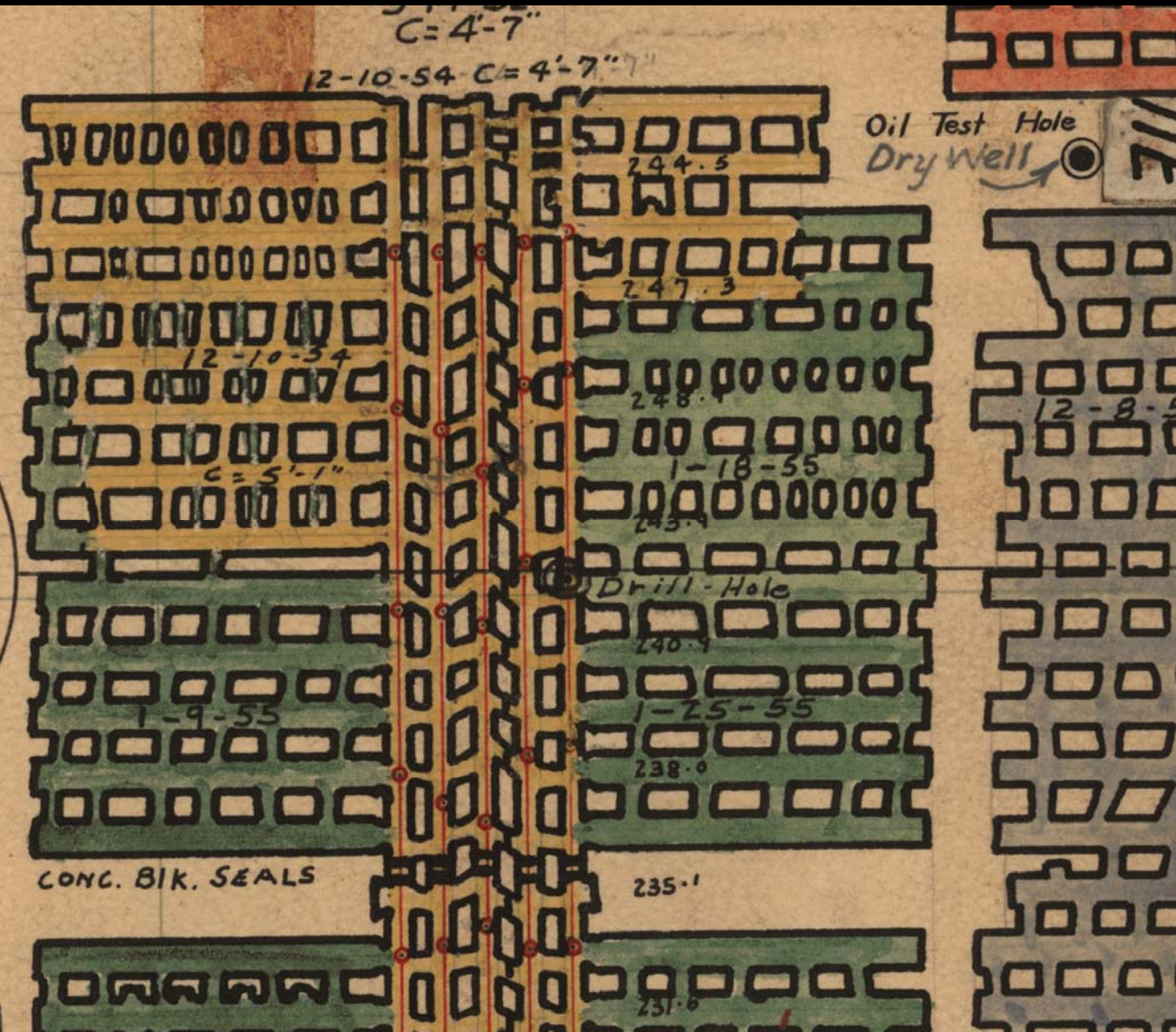
- Mine maps may be the only data reliably carried forward into the future.
- More information can be included on modern mine maps at little or no extra effort or costs. Presumably this information is commonly collected but not included on map submittal.



Questions

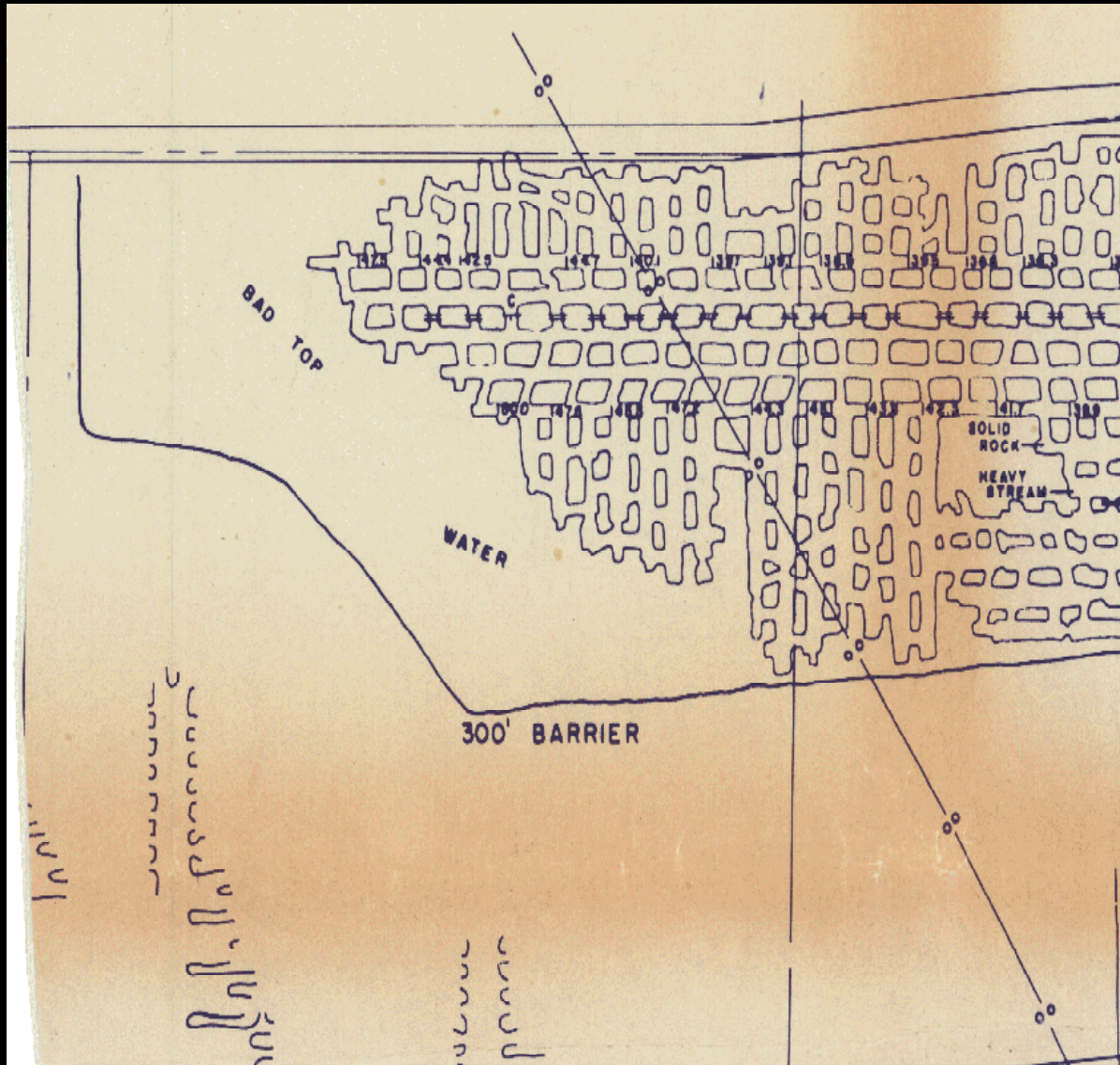
- Squeeze date?
- Complete floor/roof closure?
- Floor characteristics

Mine Gas Information



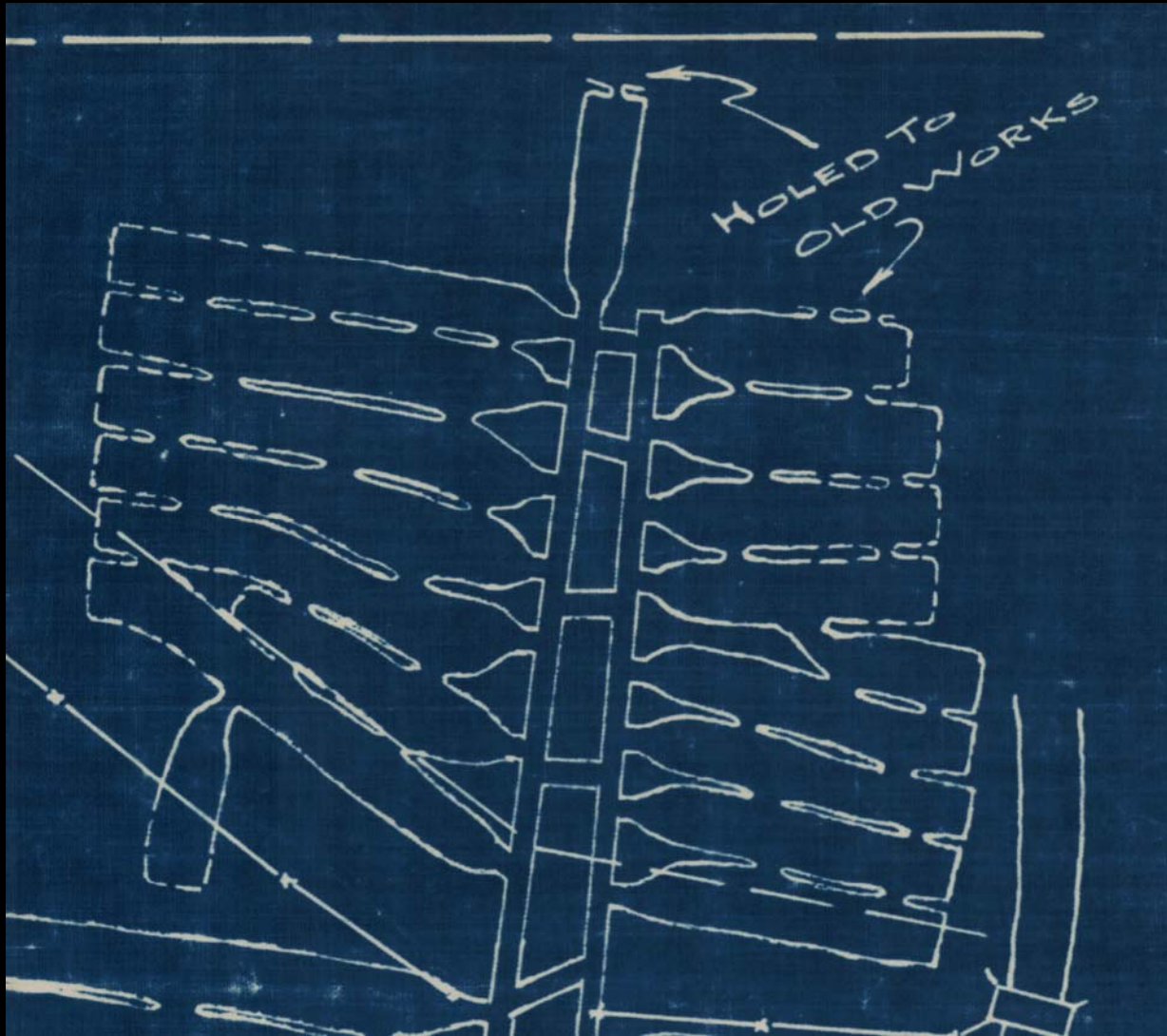
Questions

- Oil well and drill hole plugged?
- Intent of seals gas/ water ?



Questions

- Adjacent mine active? name ?
- Concerned about water in adjacent mine ?



Questions

- Accidental?
- Was hole sealed?
- Adjacent mine name