

DIGITAL MAPPING TECHNIQUES 2024

The following was presented at DMT'24
May 13 - 16, 2024

The contents of this document are provisional

See Presentations and Proceedings
from the DMT Meetings (1997-2024)

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

An Update on Near-Surface Hazards in the Butte Mining District

By Anthony Roth (Montana Bureau of Mines and Geology)

This oral presentation will update the attending members of the 2024 Digital Mapping Techniques Seminar on the focus of Montana Bureau of Mines and Geology's (MBMG) Data Preservation department since the last oral presentation in 2021, what the MBMG is currently doing with this collection, and what future plans are possibly in store for the Stope Books.

The Stope Books were the responsibility of the Anaconda Mining Company (founded in 1881) and are a hand-drawn representation of the tens of thousands of miles of underground workings that make up what is known worldwide as the "Richest Hill on Earth." Each book shows all of the working levels and sills of the mines in 6.64' increments, from the shaft collar to the deepest workings, represented in each book's 40.04-acre "footprint." In addition to illustrating the stopes of the mines, the books also contain detailed records of survey points, shaft/raise/winze/drift/crosscut locations, bulkheads, fire doors, and timber sets as well as many other features associated with underground mining at a scale of 1:50.

Through the generosity of New Butte Mining, the Butte–Silver Bow Public Archives, and two grants from the U.S. Geological Survey's National Geological and Geophysical Data Preservation Program, 182 Stope Books have been digitally preserved. The remaining 171 books are owned by another entity. Due to exemplary working relationships, the MBMG has been granted access to scan the final portion of the collection (as time permits) to make the collection whole again in a digital format.

Every year, the MBMG receives correspondence from county workers or private parties inquiring if there are mine workings in areas that they are working in or underneath privately-owned properties. The phone calls and emails are due in part to the threat of subsidence, when historic mine workings collapse underneath the areas in question. The MBMG's Data Preservation Department primarily uses the Stope Books, along with other sources of information, to create a visual representation of the workings underneath the surfaces of Butte to a depth of 200 to 300 feet using Google Earth.

Currently, the metadata and images of the Stope Books that have been completed are available to view on the MBMG's website: <https://www.mbmng.mtech.edu/Information/Collections/Butte-Stope-Books/>

Eventually, all of the hazard information compiled on Google Earth from the Stope Books will be migrated into ArcPro for other users to study and add information. There has also been discussion about creating a working 3-D model of the entire Butte Hill using the information from the books.

An Update on Near Surface Hazards In the Butte Mining District

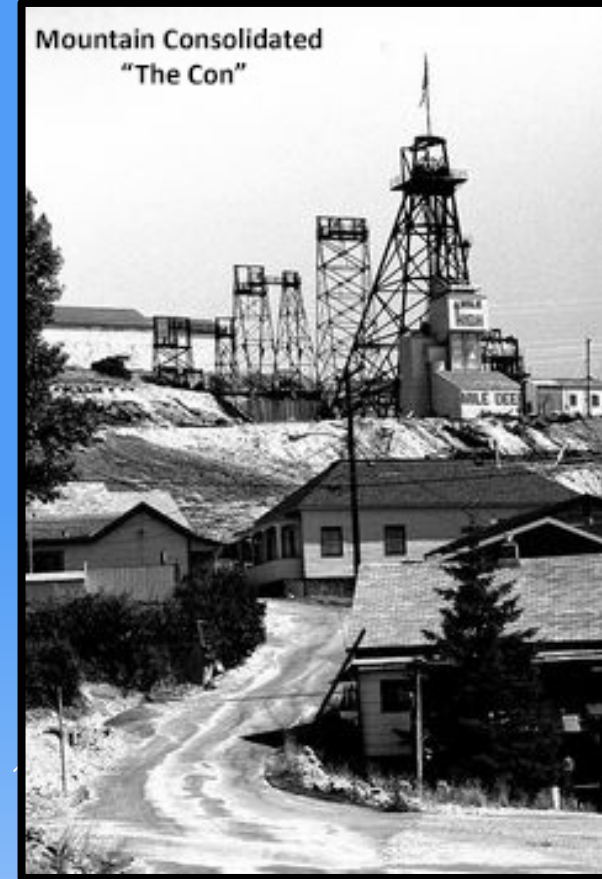
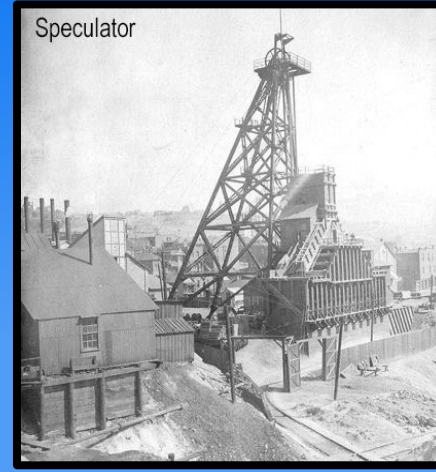
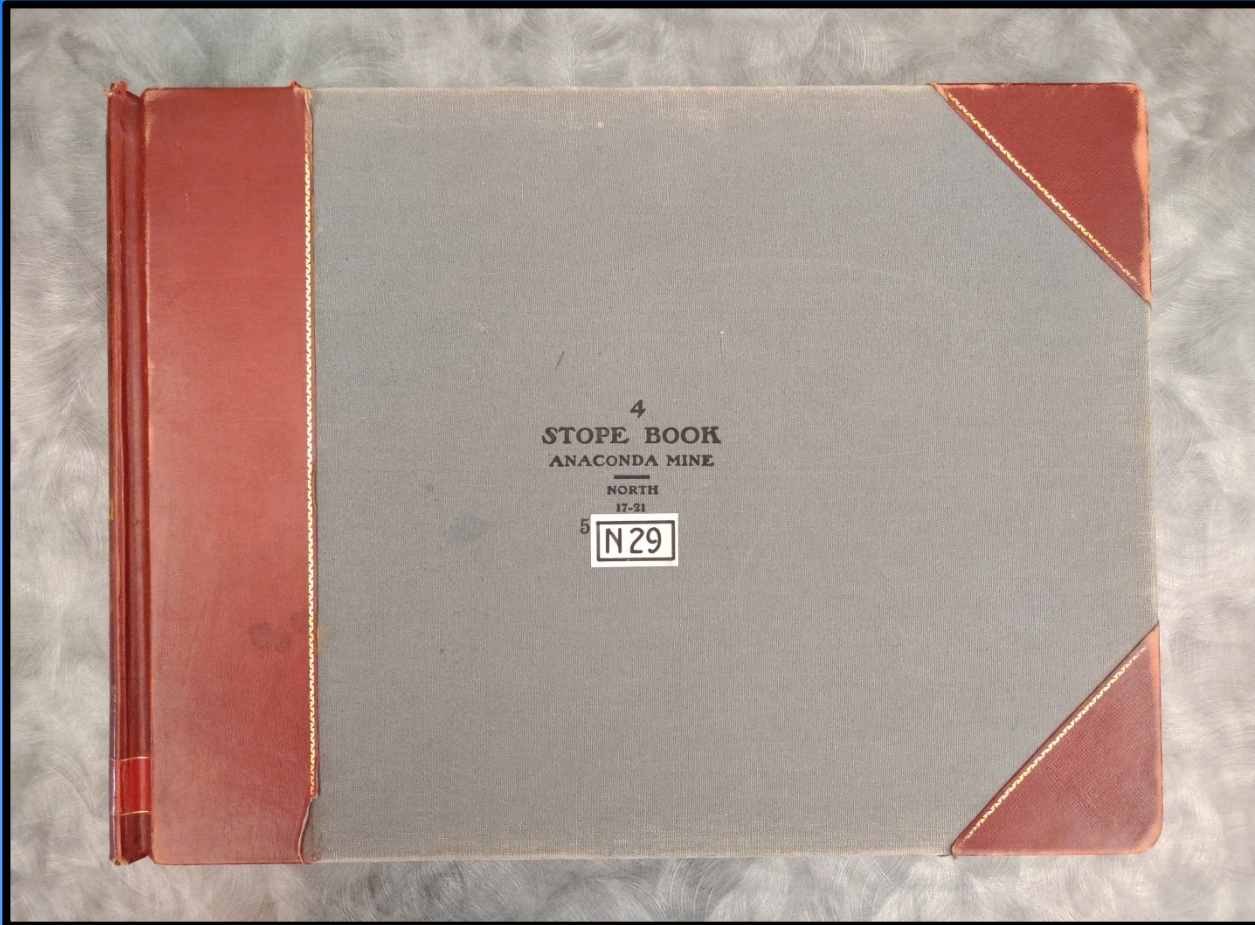


Outline

A brief description of what the Stope Books are

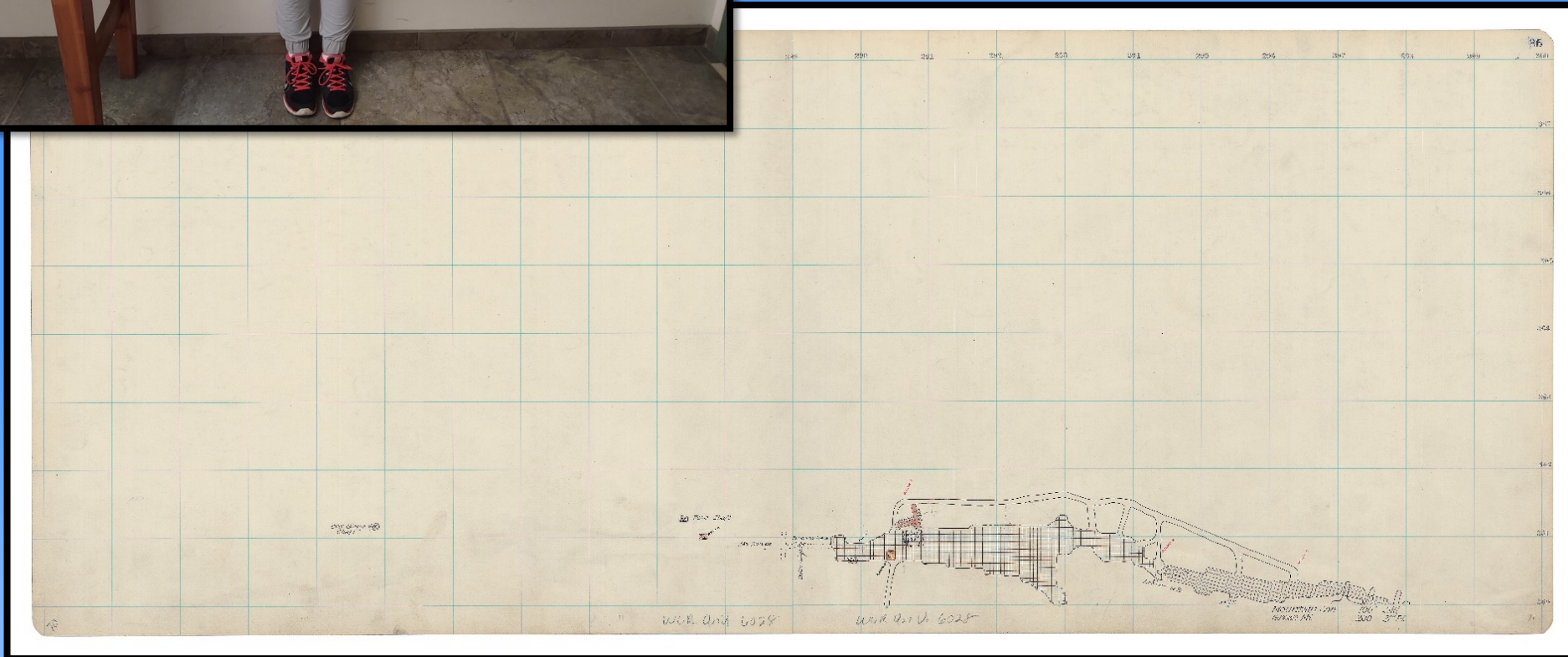
What the MBMG has accomplished to date

Current and Future work

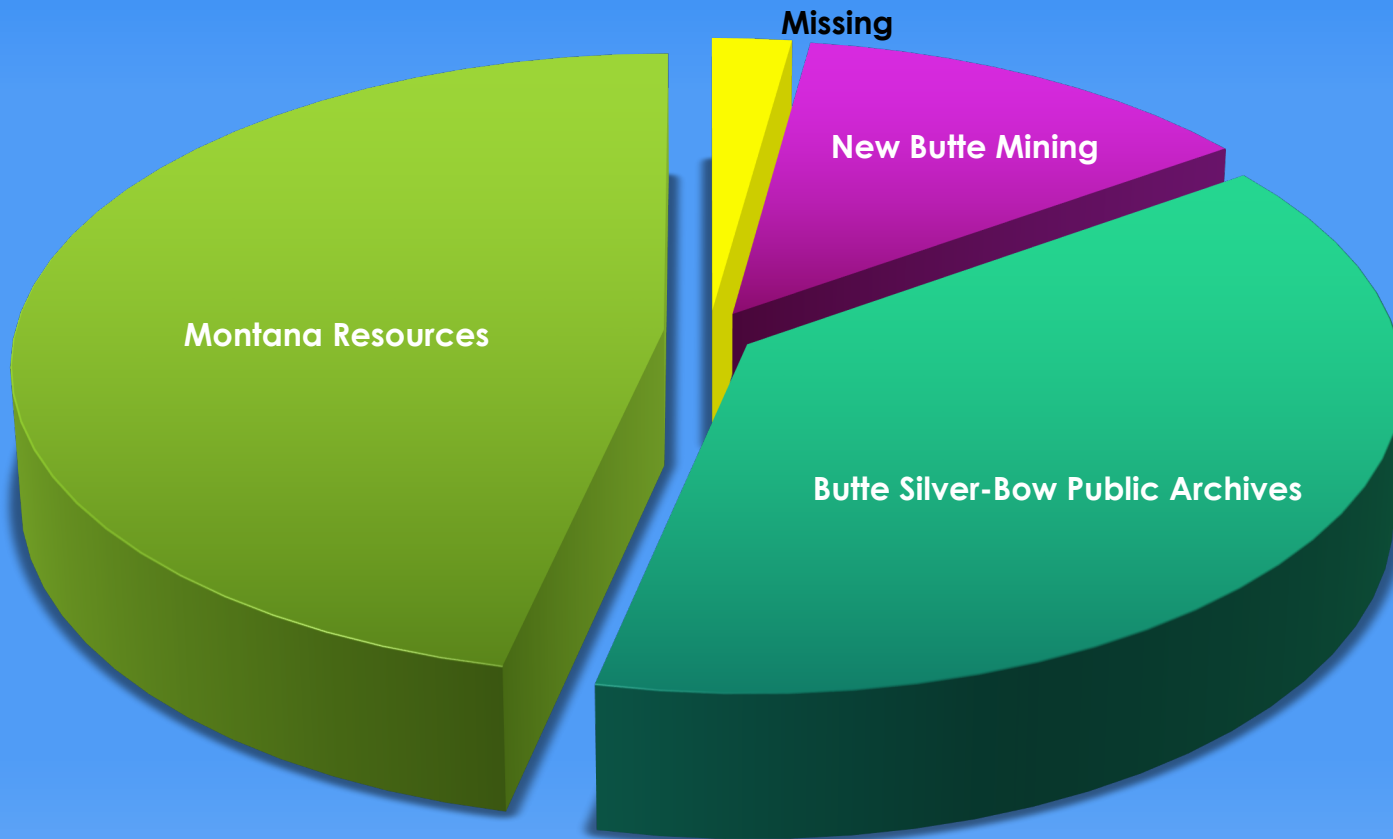


The Butte Stope Books

- Sponsored by the NGGDPP
- **Priority 2 Grant – New Butte Mining**
Delivered June 30, 2021
- **Priority 1 Grant – Butte Silver-Bow Public Archives**
Delivered June 30, 2023



Stope Book Ownership



Level 1 Grant

139 Stope Books – Butte Silver-Bow Public Archives

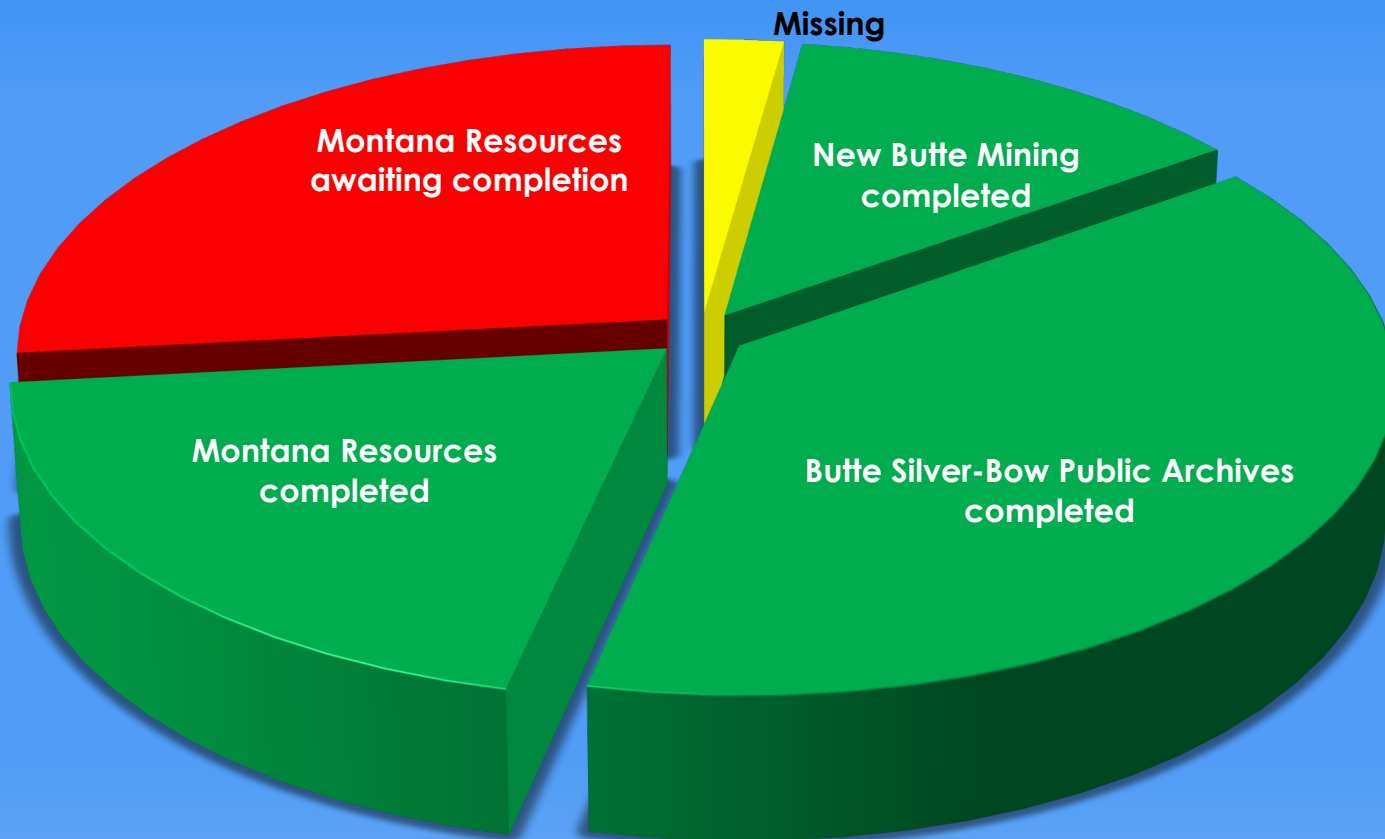
Level 2 Grant

47 Stope Books – New Butte Mining

Montana Resources

169 Stope books – Montana Resources

Stope Book Completion



Level 1 Grant

139 Stope Books – Butte Silver-Bow Public Archives

Level 2 Grant

47 Stope Books – New Butte Mining

Work completed as time permits

72 Stope books – Montana Resources scanned

97 Stope Books - Montana Resources left to scan

Current Totals

49,876 total pages scanned to date

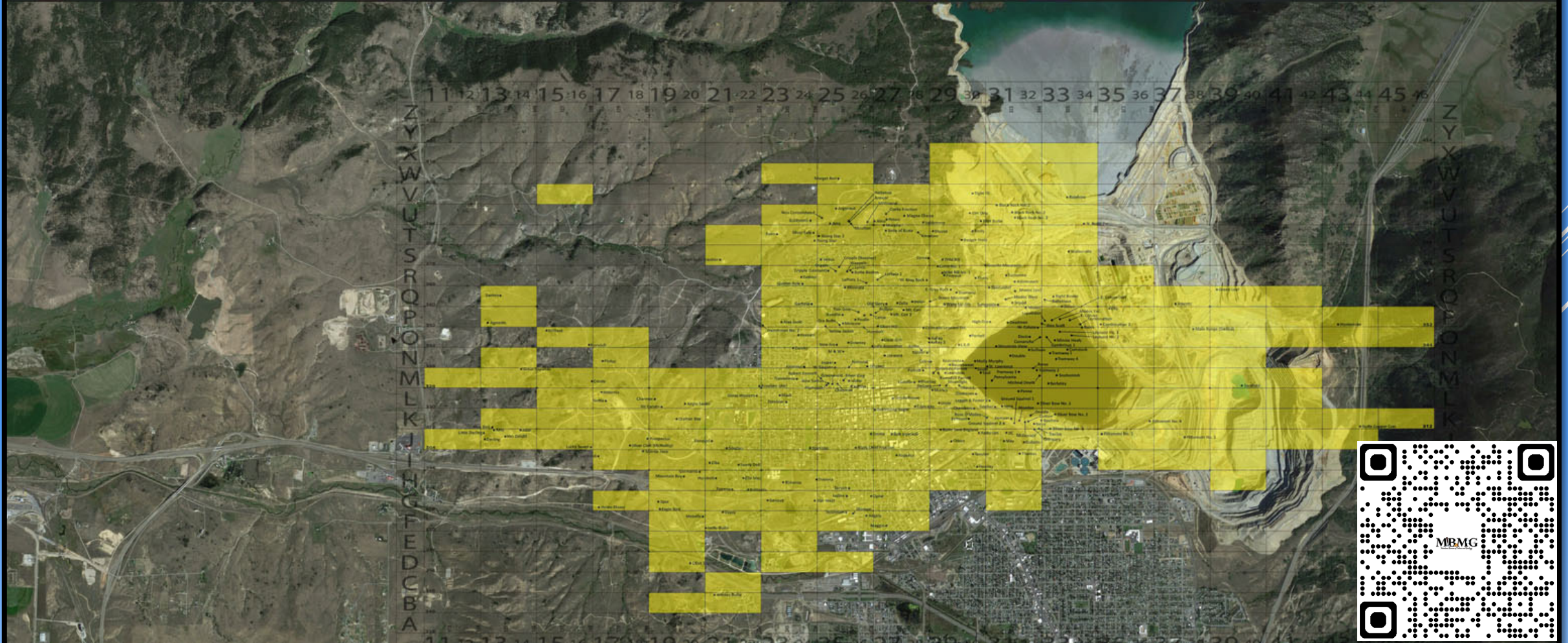
42 Terabytes of server space used

Butte Stope Books

Maps of the Underground Workings of the 'Richest Hill on Earth'



[Home](#) [Browse](#) [Mine](#) [Book Number](#) [Map](#) [Data](#) [About](#) ▾

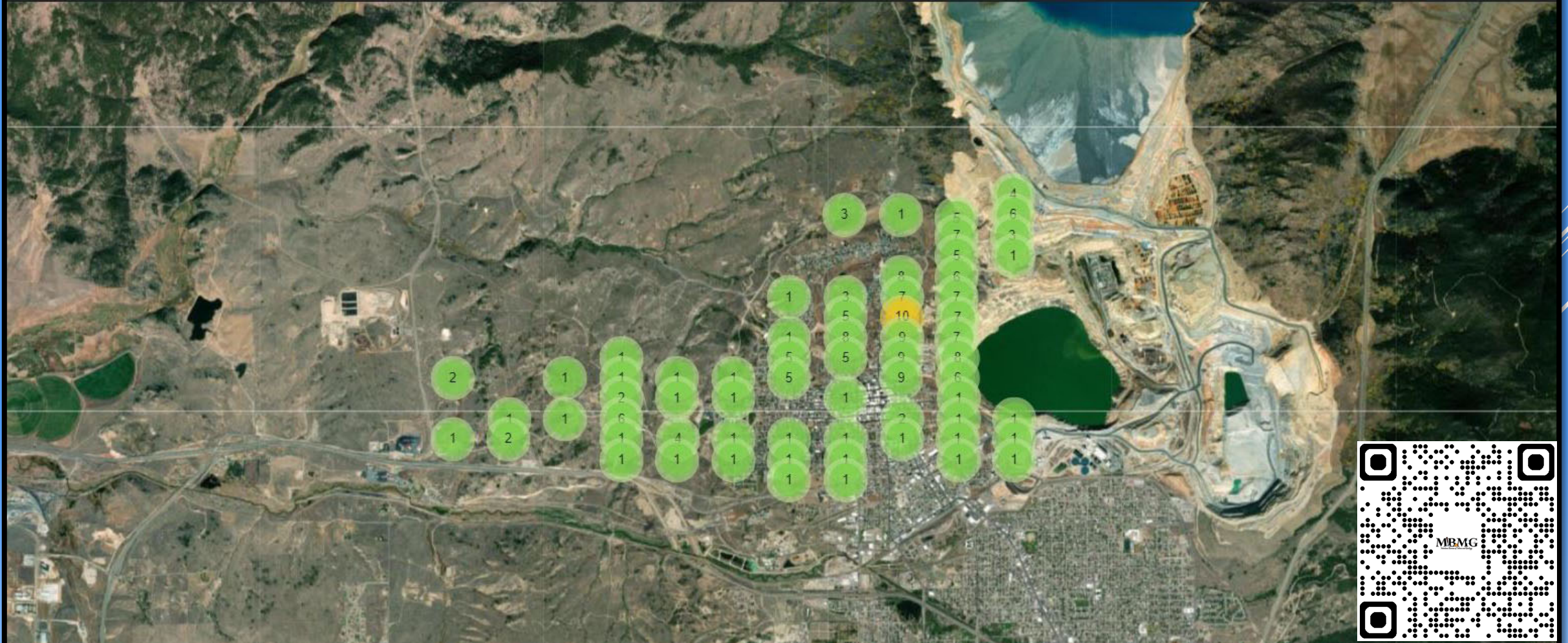
 

Butte Stope Books

Maps of the Underground Workings of the 'Richest Hill on Earth'



Home Browse Mine Book Number Map Data About ▾

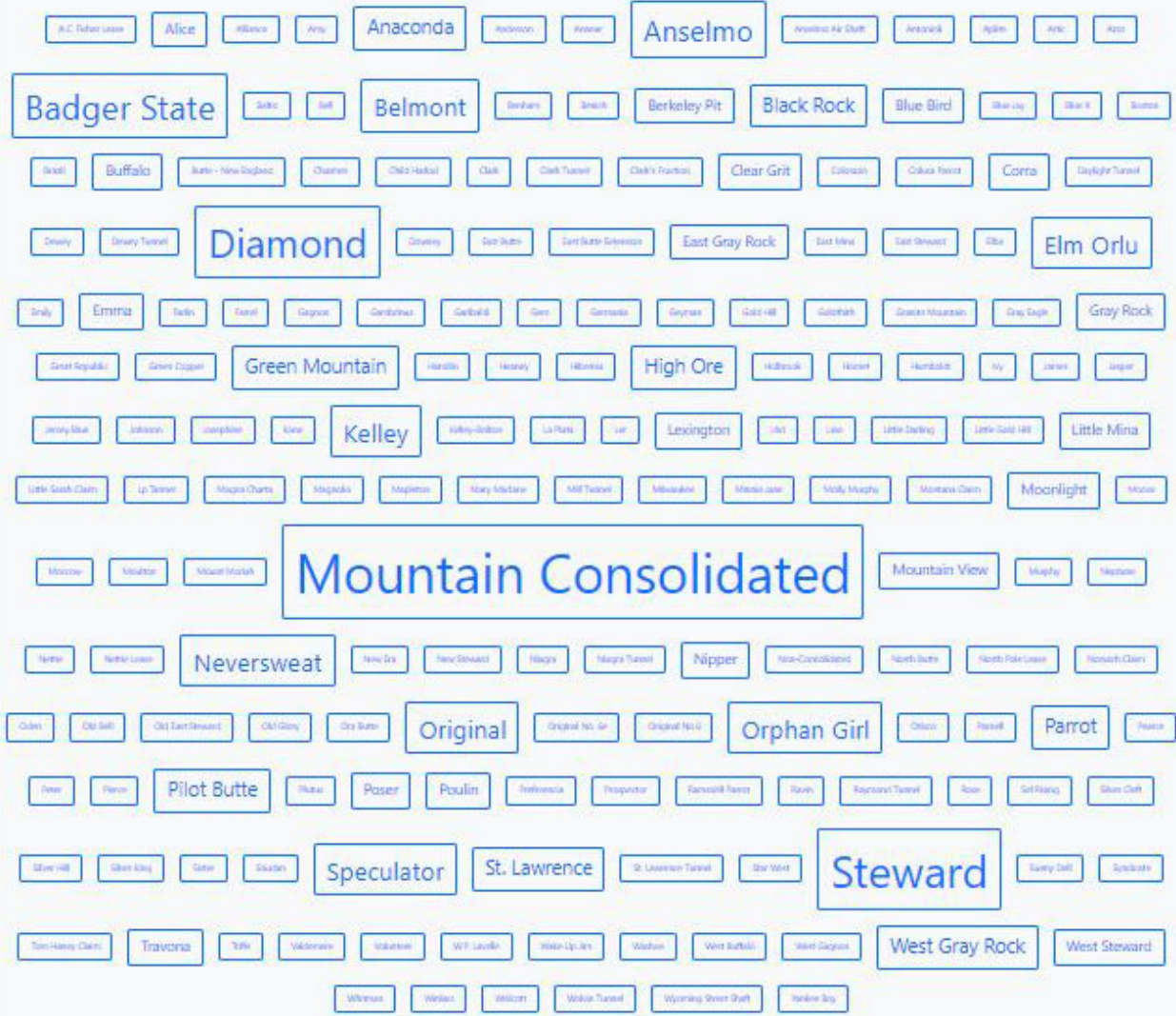
Browse Locations

Use this word cloud visualization to browse books. Word size is determined by frequency and all words link to a corresponding collection search.



Browse Subjects

Use this word cloud visualization to browse mines. Word size is determined by frequency and all words link to a corresponding collection search.



Browse Items

mountain consolidated

Search Reset

Sort by Random

75 of 278 items



N29 Misc. 3 Vol. 1

Mine(s): Steward Belmont

Mountain Consolidated High Ore Anaconda

Kelley

Book Number: N29

Sill Number: 100 - 5000

PDF

View Full Record



Q27 Vol. 8 Gray Rock South

Mine(s): Mountain Consolidated

Book Number: Q27

Sill Number: 4600 - 5200

PDF

View Full Record



P27 Vol. 3 Mountain Consolidated - North

Mine(s): Buffalo Mountain Consolidated

Green Mountain Lexington Diamond

Book Number: P27

Sill Number: 1100 - 1600

PDF

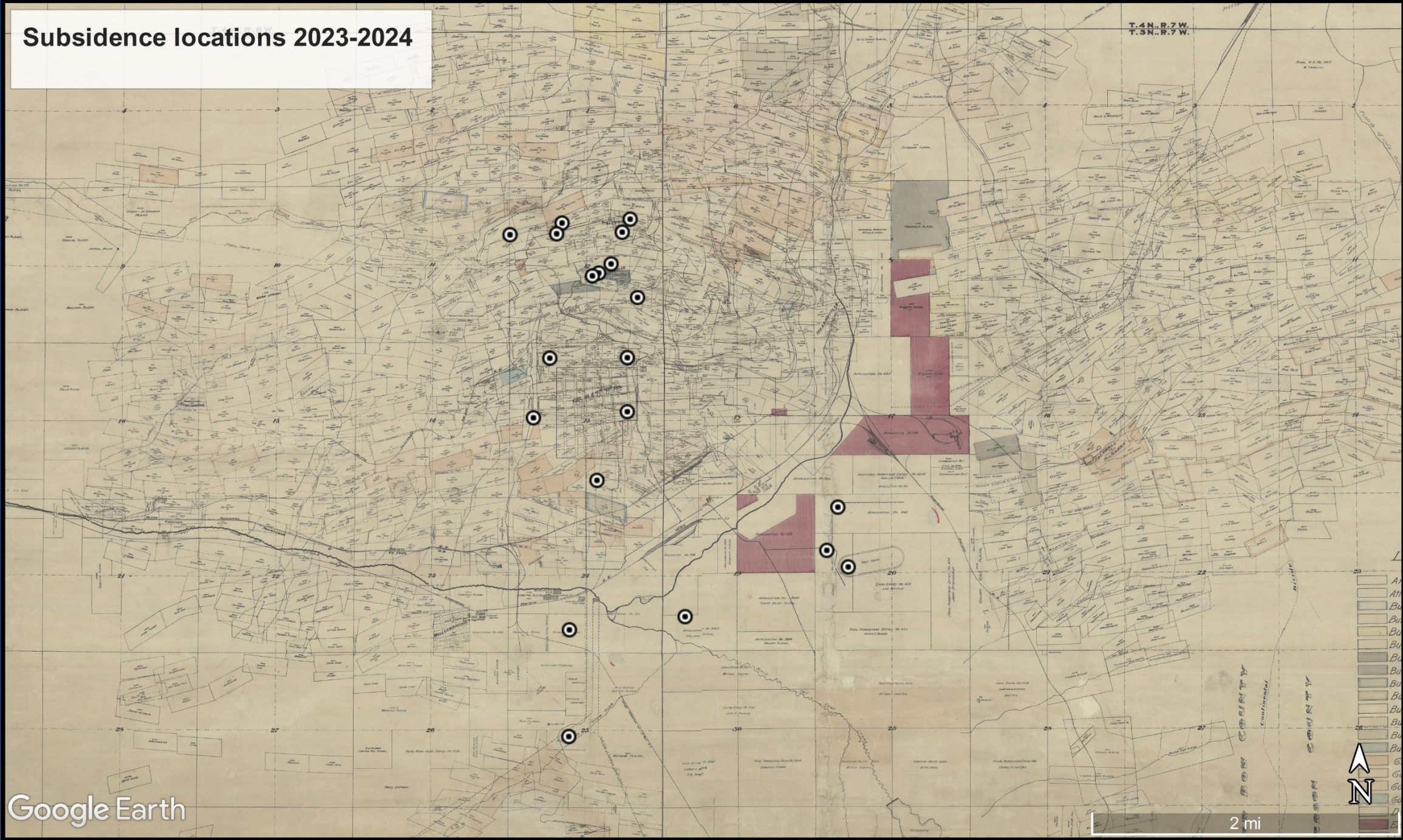
View Full Record

Subsidence locations 2023-2024



Subsidence locations 2023-2024

T.4N.R.7W.
T.3N.R.7W.

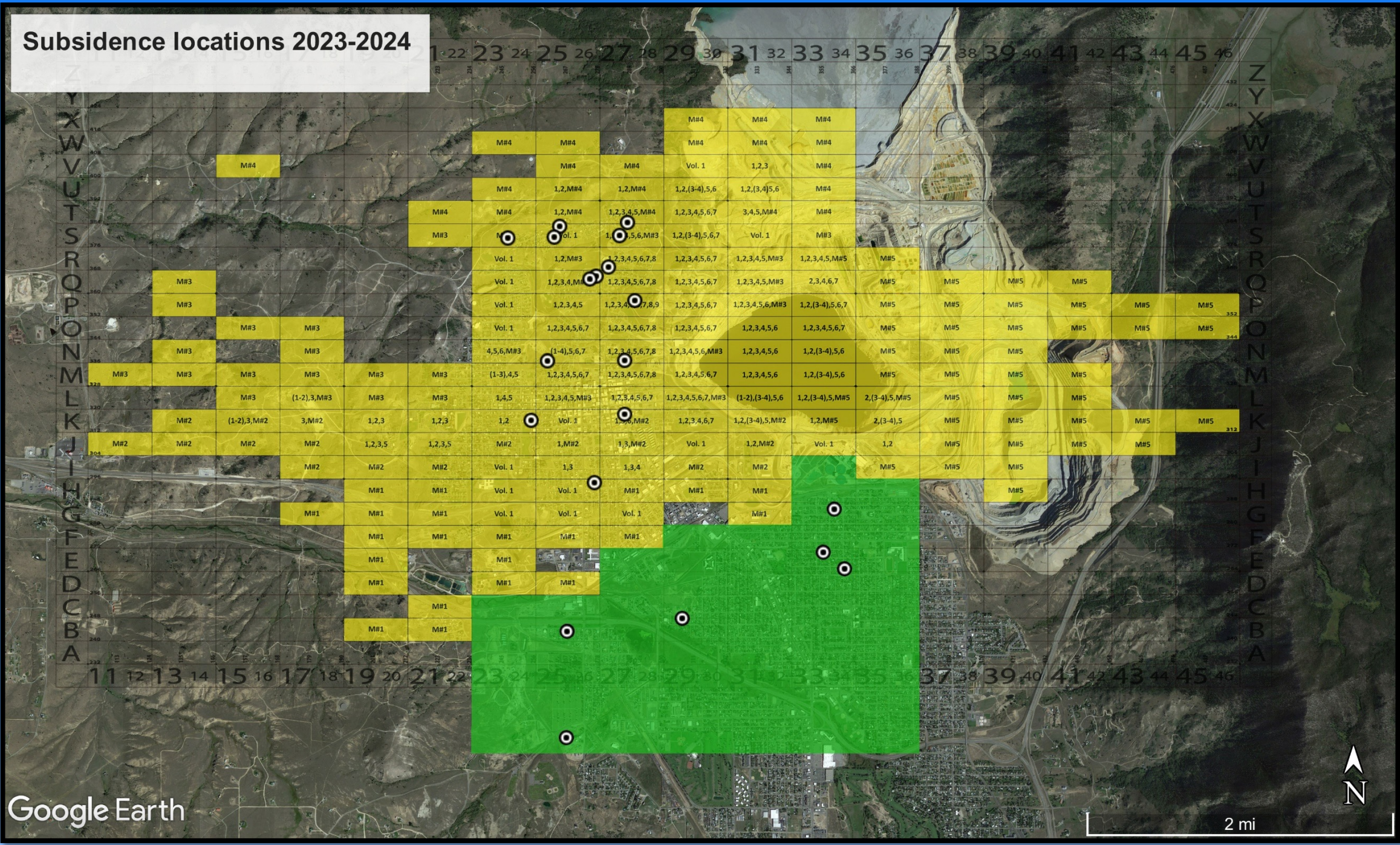


Google Earth

1 2 mi



Subsidence locations 2023-2024



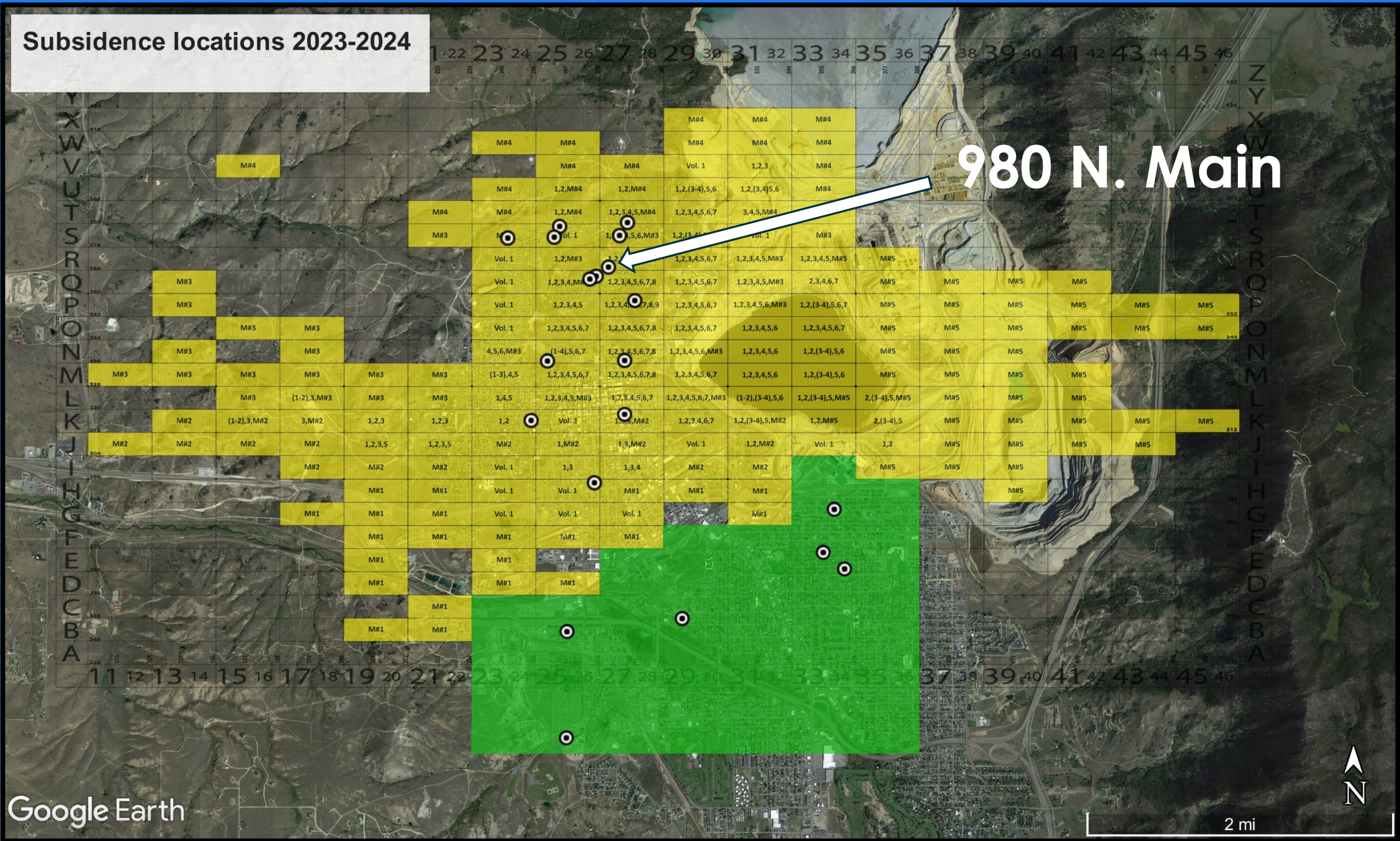
Google Earth

2 mi

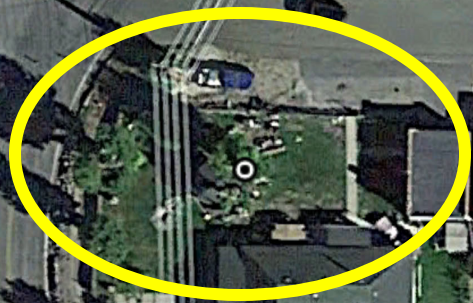


Subsidence locations 2023-2024

980 N. Main



Subsidence locations 2023-2024



Subsidence locations 2023-2024

La Plata

● Collar of Shaft

Old Shaft to Surface

La Plata 63 Level

OLD SH

Elev. Unknown

Winse from 63 ft. Level

Elev. Unknown

EL 5954

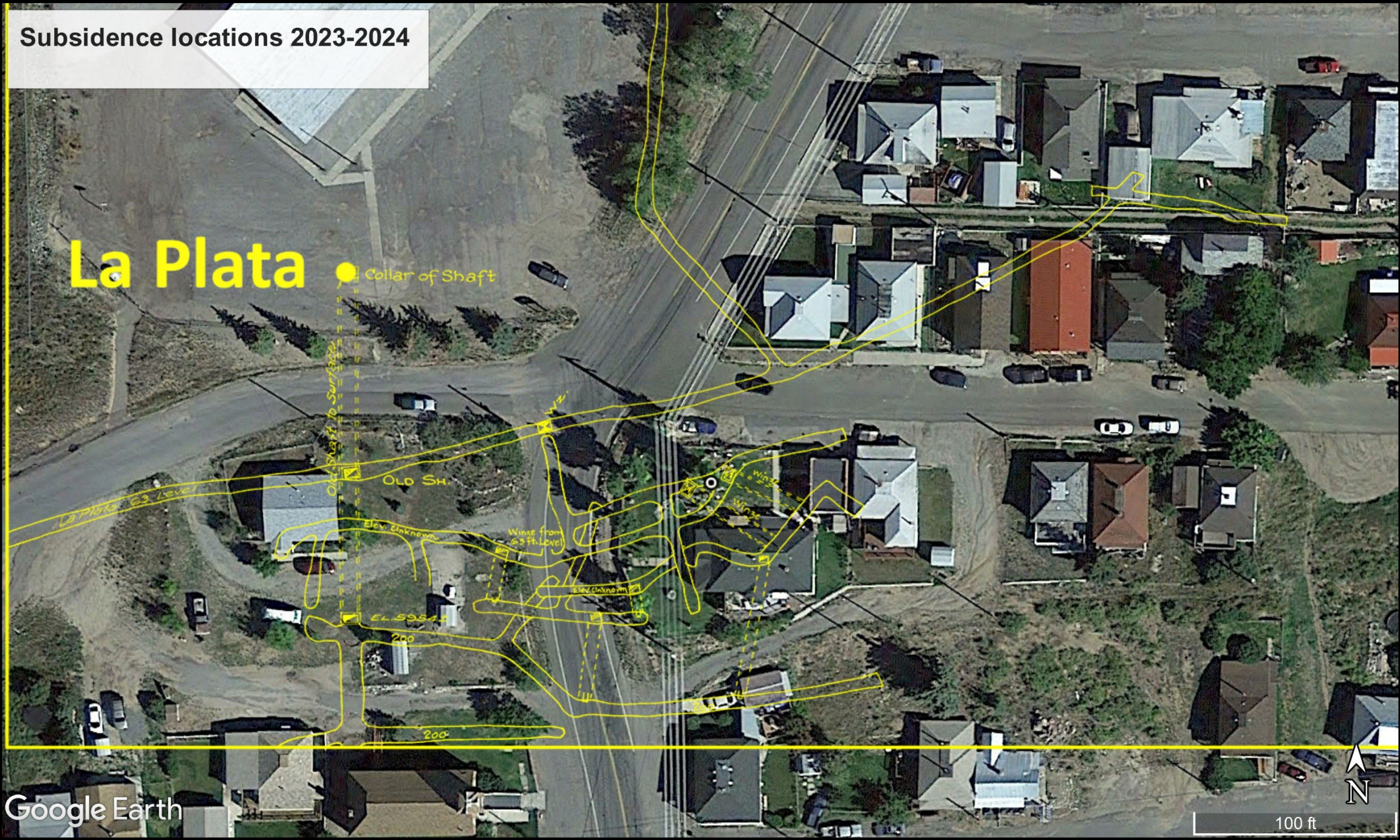
200

200

Google Earth

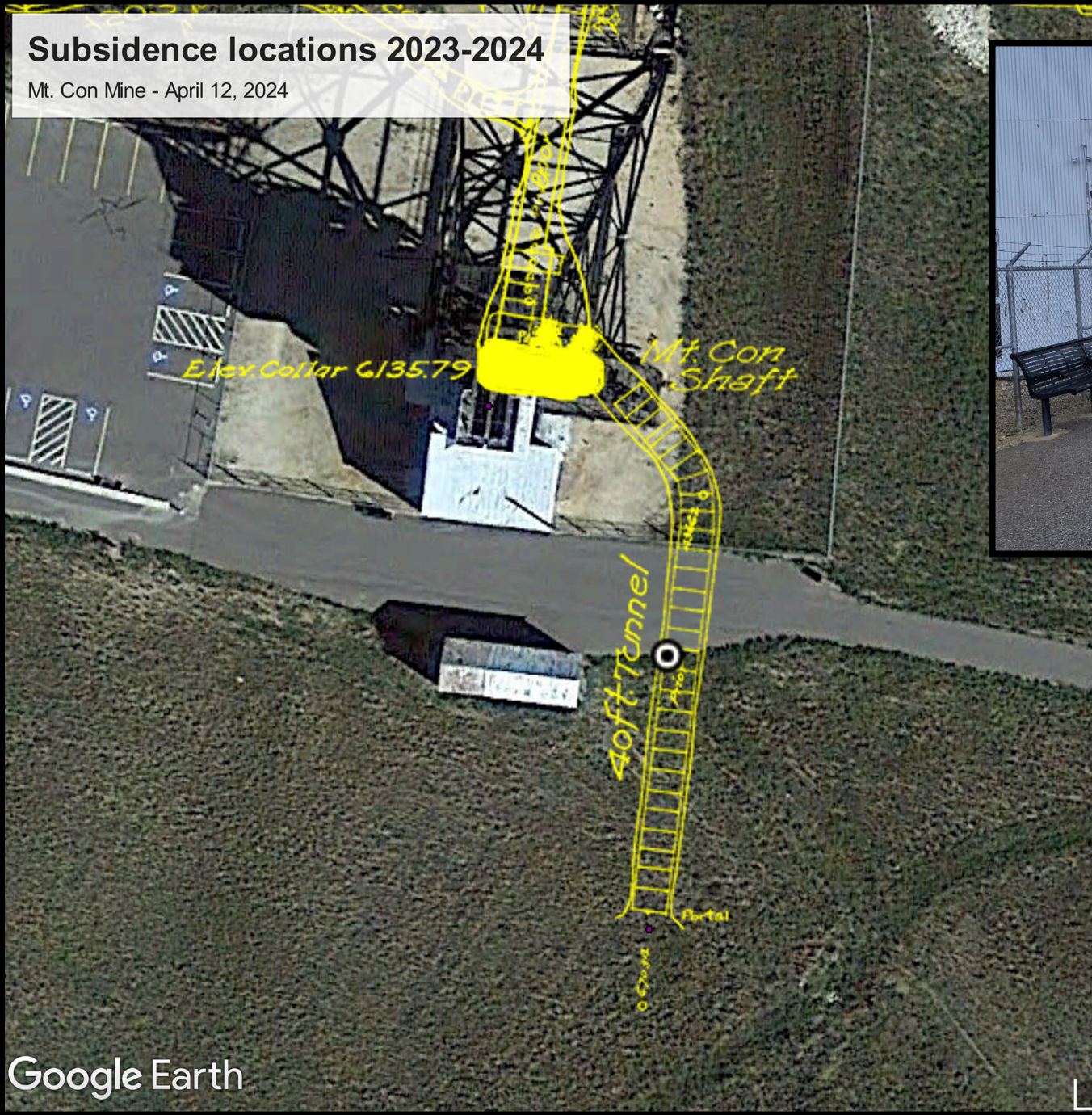


100 ft



Subsidence locations 2023-2024

Mt. Con Mine - April 12, 2024



Google Earth

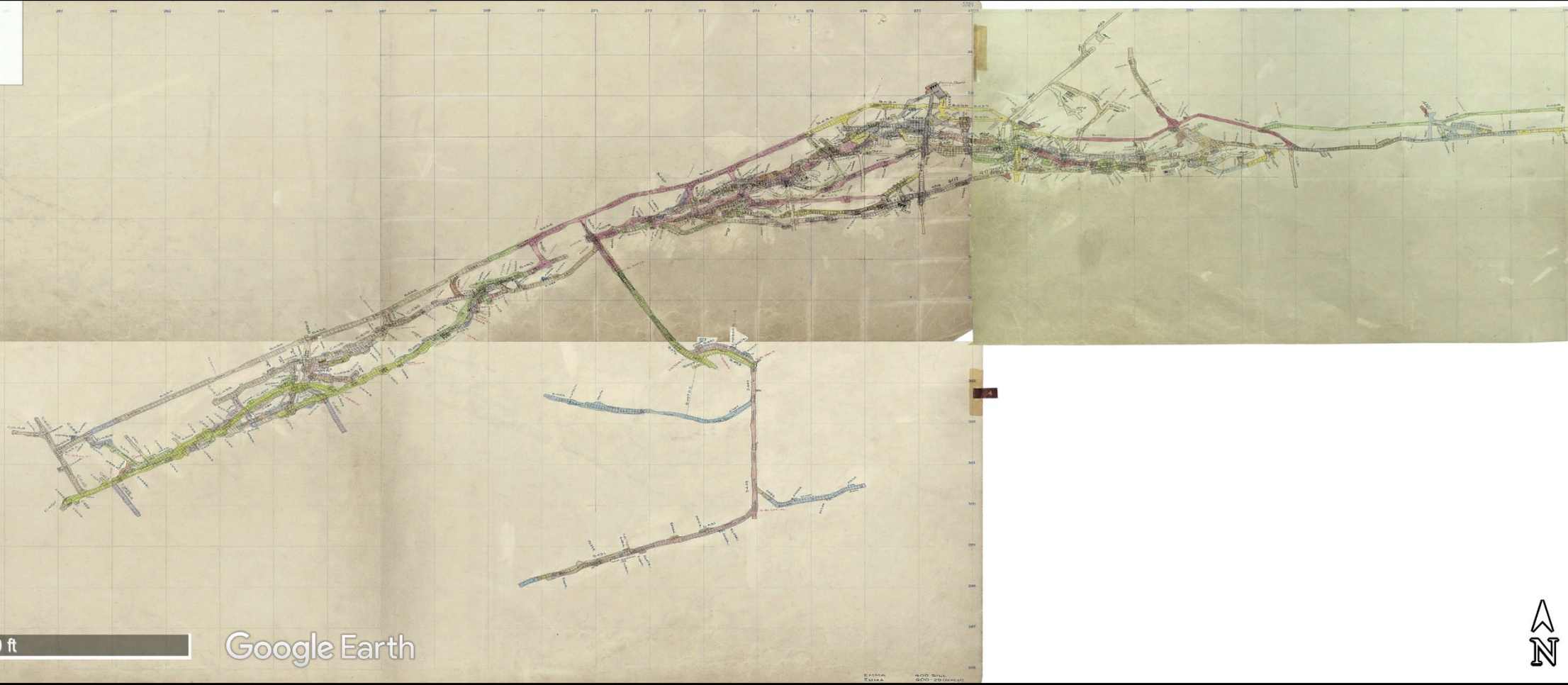


100 ft



Images dated 5/22/2012 are from an Esri presentation completed by Paul Thale and Chris Smith. Date unknown

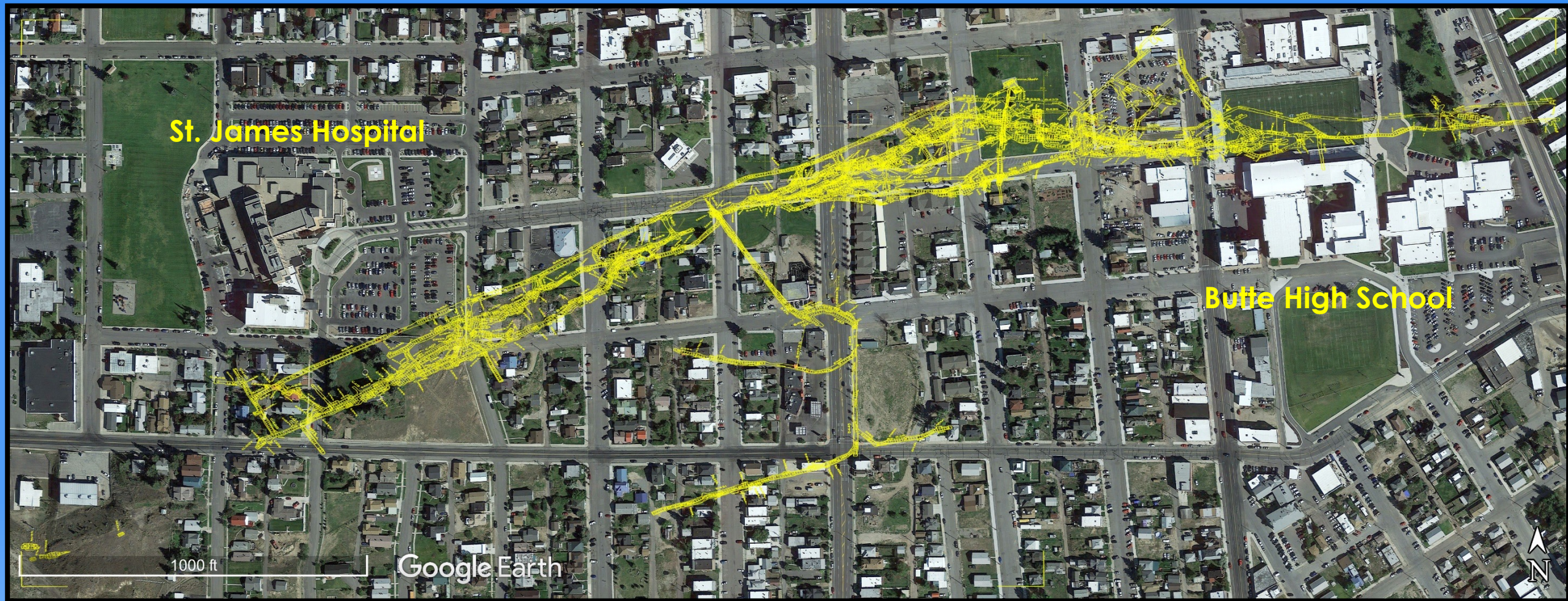
Emma - 400 Sill



1000 ft

Google Earth





St. James Hospital

Butte High School

1000 ft

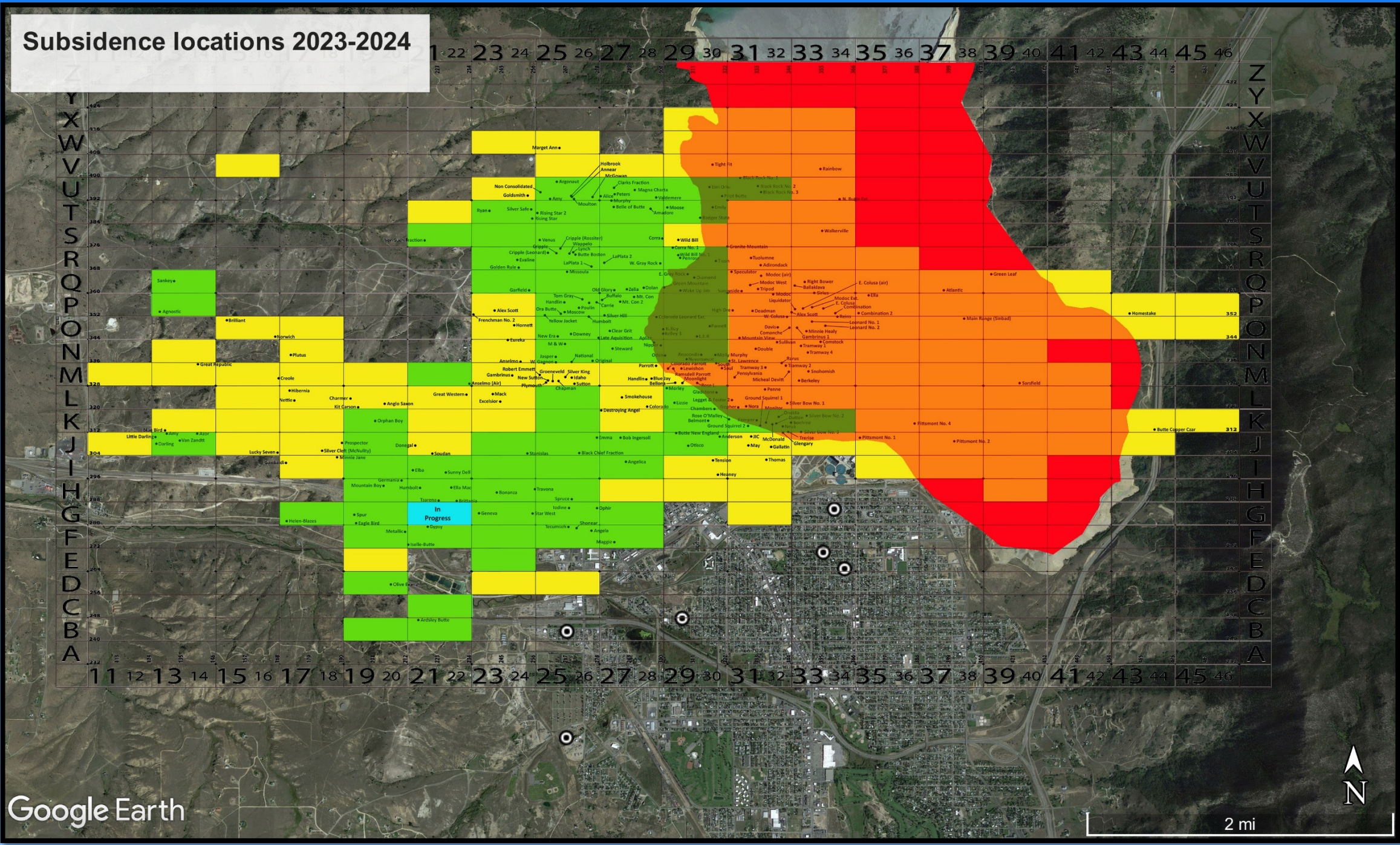
Google Earth



Emma Mine – 400 Sill



Subsidence locations 2023-2024



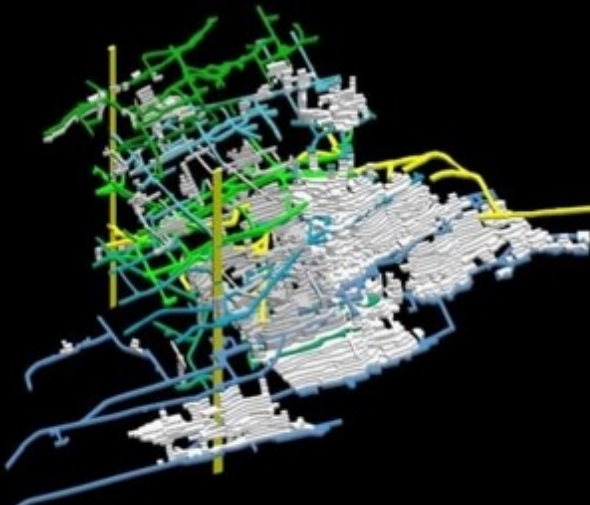
UNDERGROUND STOPES AND DEVELOPMENT



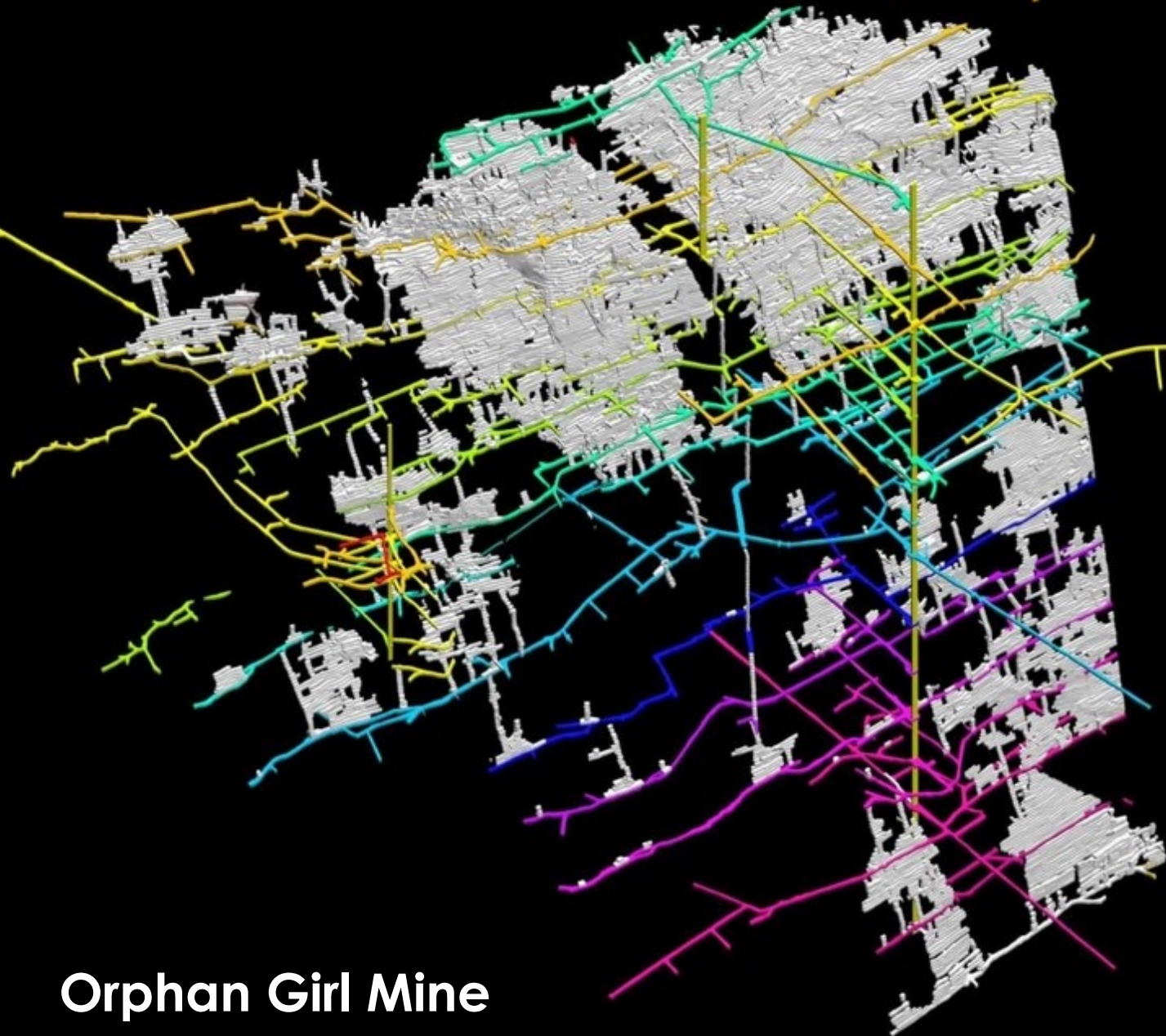
Pause (k)

BLACKJACK SILVER
CORPORATION

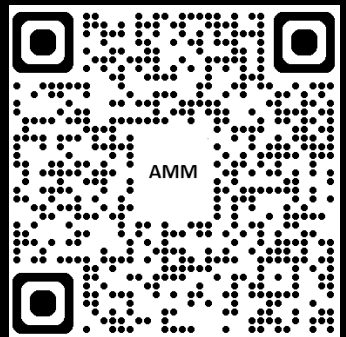


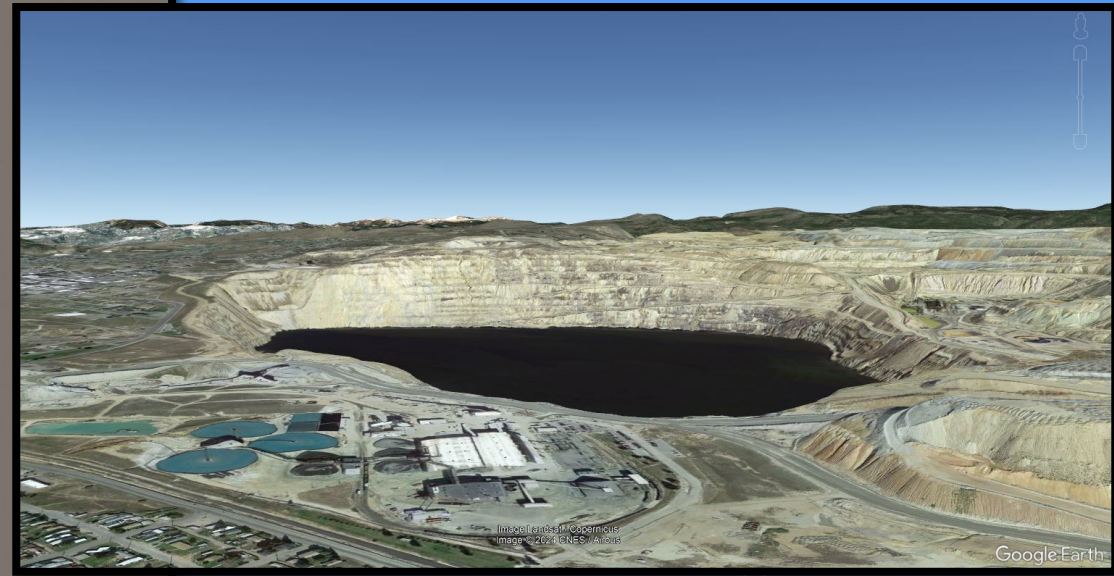
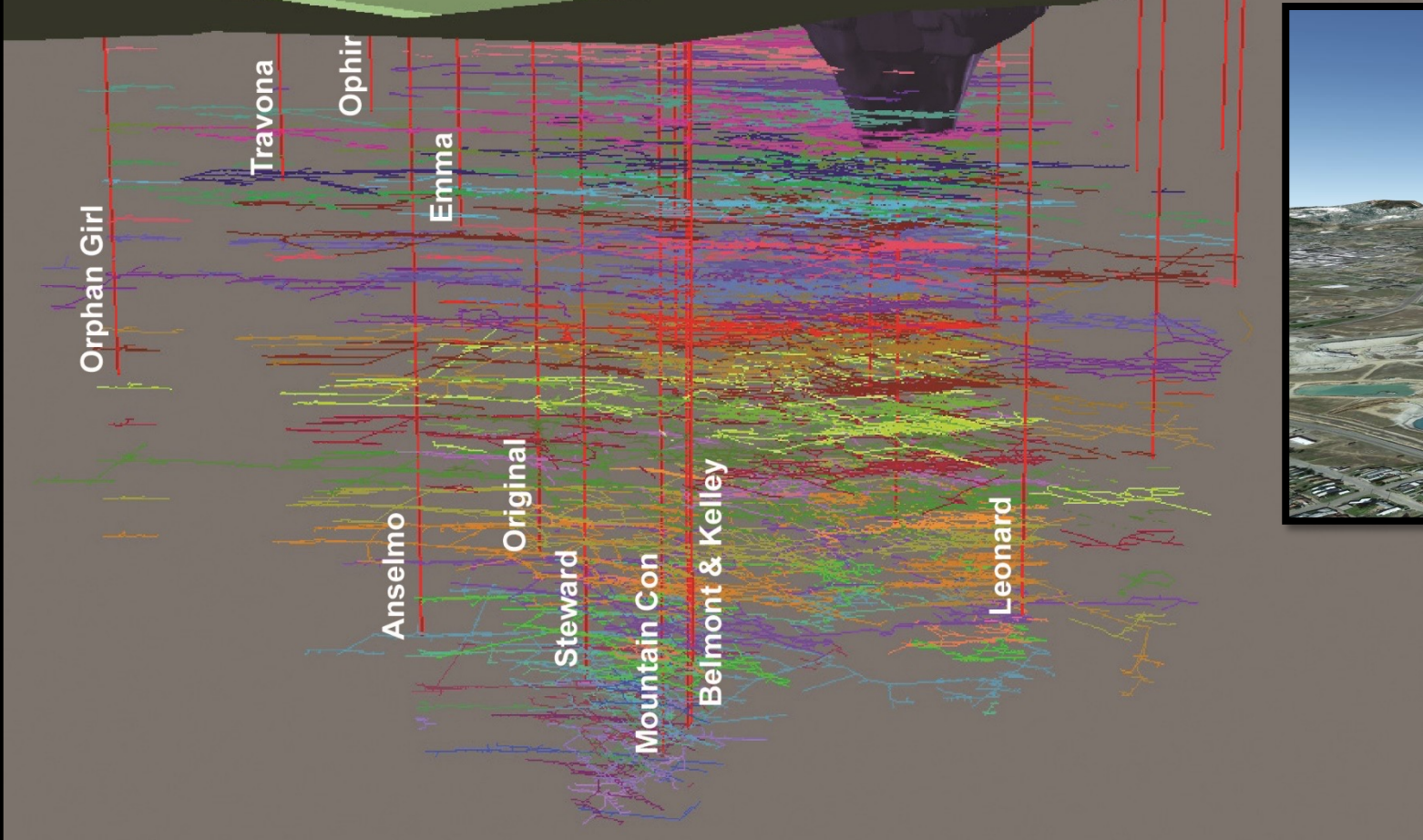
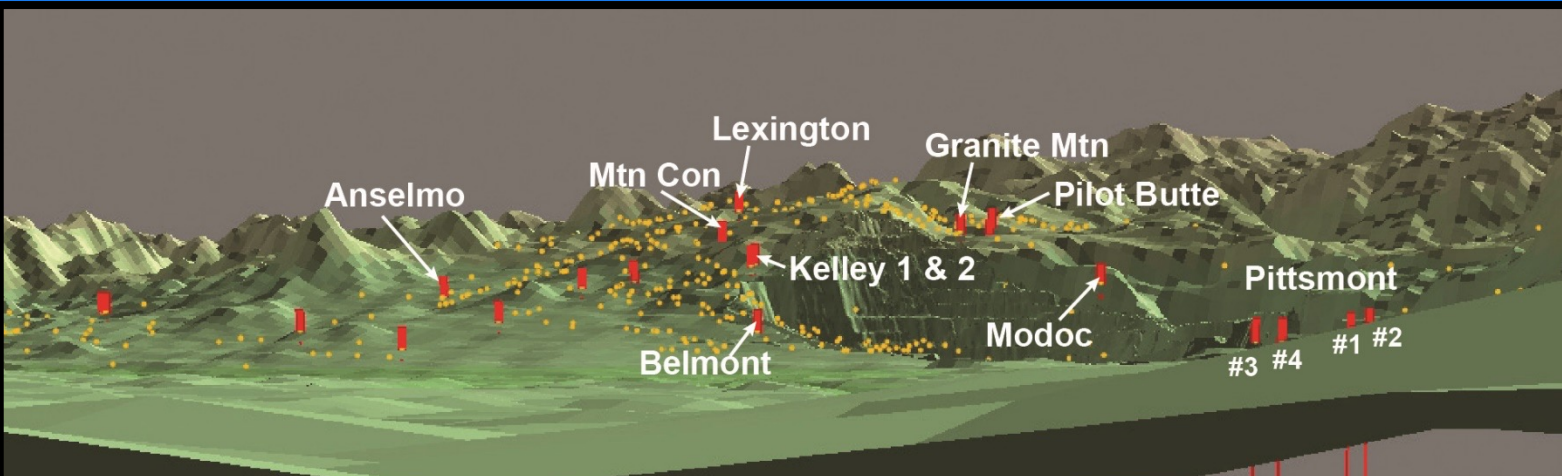


Nettie Mine



Orphan Girl Mine





Questions?



Anthony Roth
Map Technician
Data Preservation

Montana Bureau of Mines and Geology
Natural Resources Building
1300 West Park Street | Butte, MT 59701
(406) 496-4891
aroth@mtech.edu | mbmg.mtech.edu

