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Crone Geophysics & Exploration Ltd. *Since 1962*

2015 GSN Symposium: SC-4 “New concepts and discoveries”

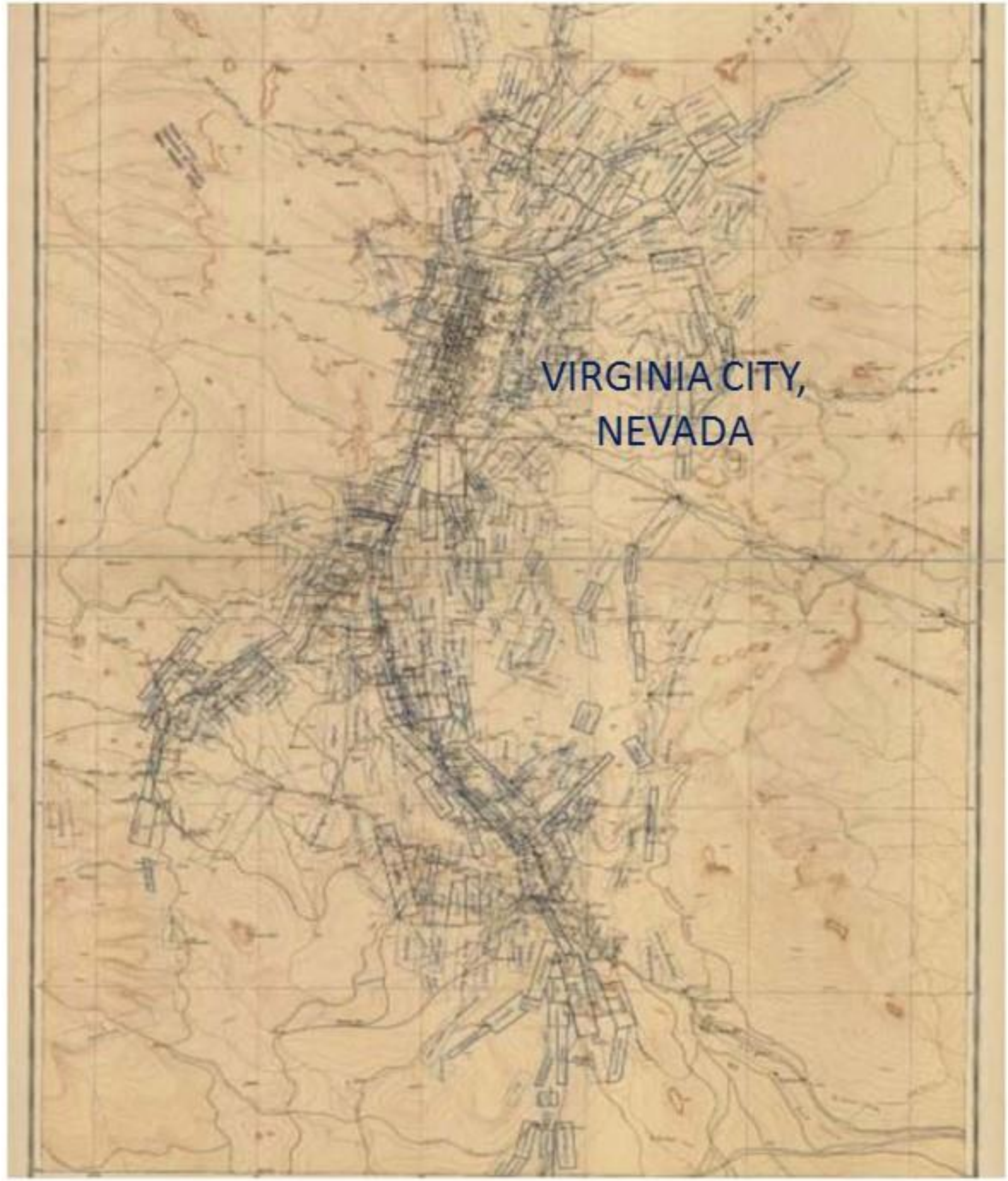
3D IP and resistivity mapping of an epithermal gold/silver mineralization setting on the Comstock Trend, Nevada.

Greg Shore, Geophysical Consultant
Larry Martin, Comstock Mining, Inc.
Bill Ravenhurst, Crone Geophysics and Exploration Ltd.
Josh Lymburner, Crone Geophysics and Exploration Ltd.

HISTORIC PRODUCTION

Since 1860, the Comstock Lode (district) has produced more than 8 million ounces of gold and 192 million ounces of silver from over 33 bonanza-grade epithermal vein deposits.

Most of this production came from underground mining, using primitive techniques.

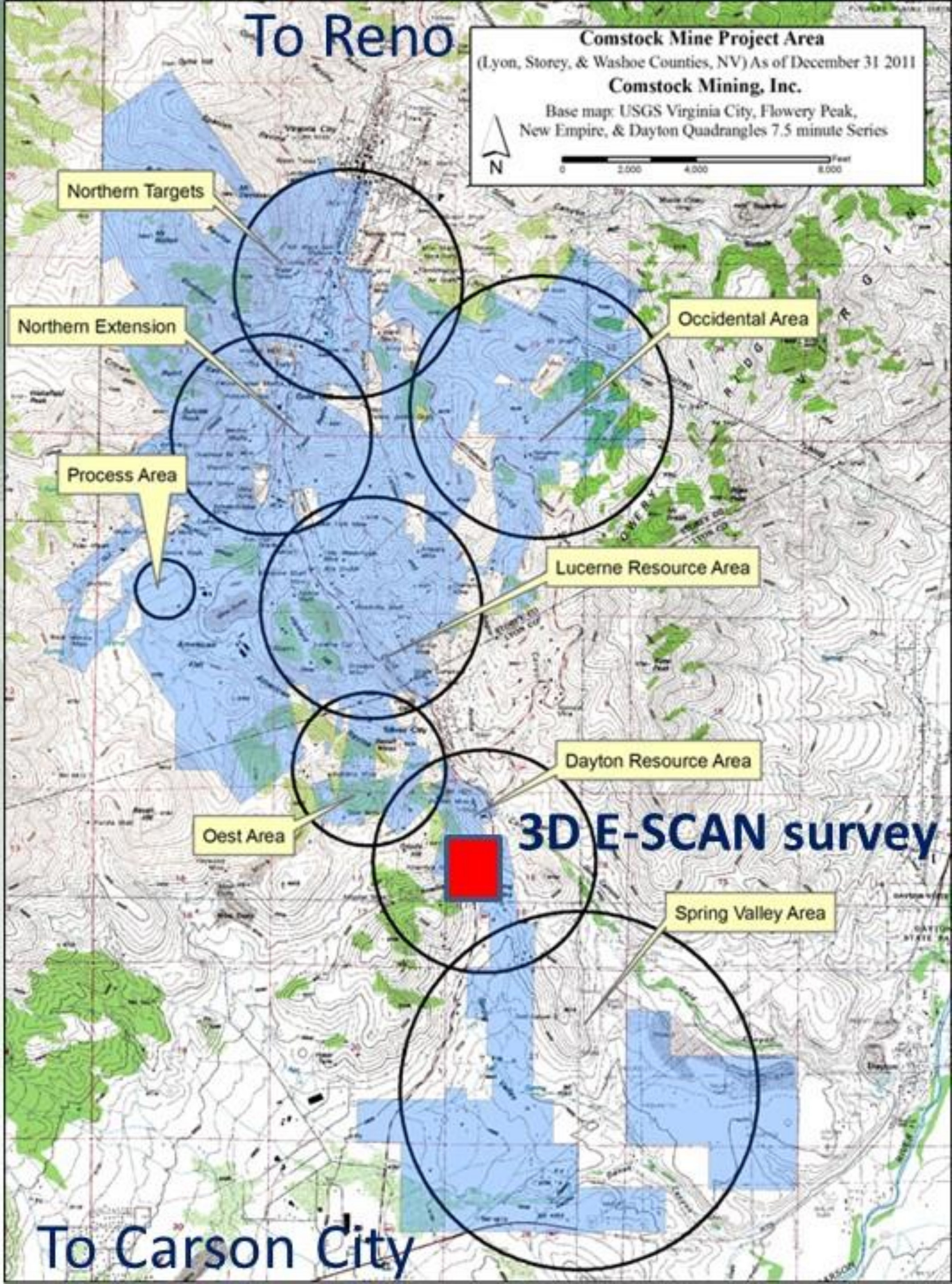


The modern era

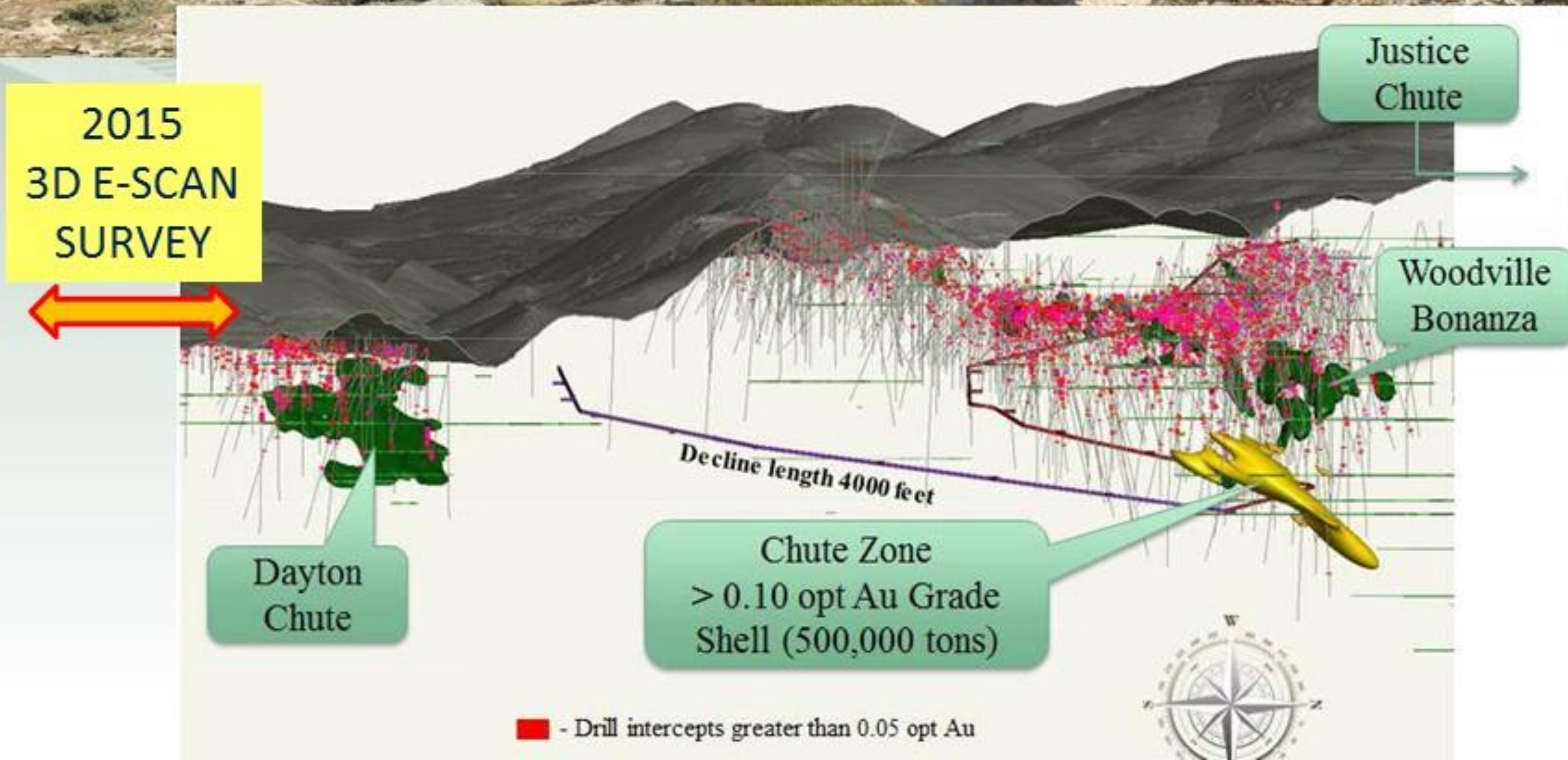
The present viability
of the district as a
renewed producer of gold
(and local economic benefits)
could not have been achieved
without the prior consolidation
(blue areas) of a great many
individual properties.

That process began in 2003.

Strategically located packages
continue to be acquired
to this day.



The renaissance of the district has featured modern open pit mining and heap leach technologies. The resumption of underground mining is indicated for the near future.

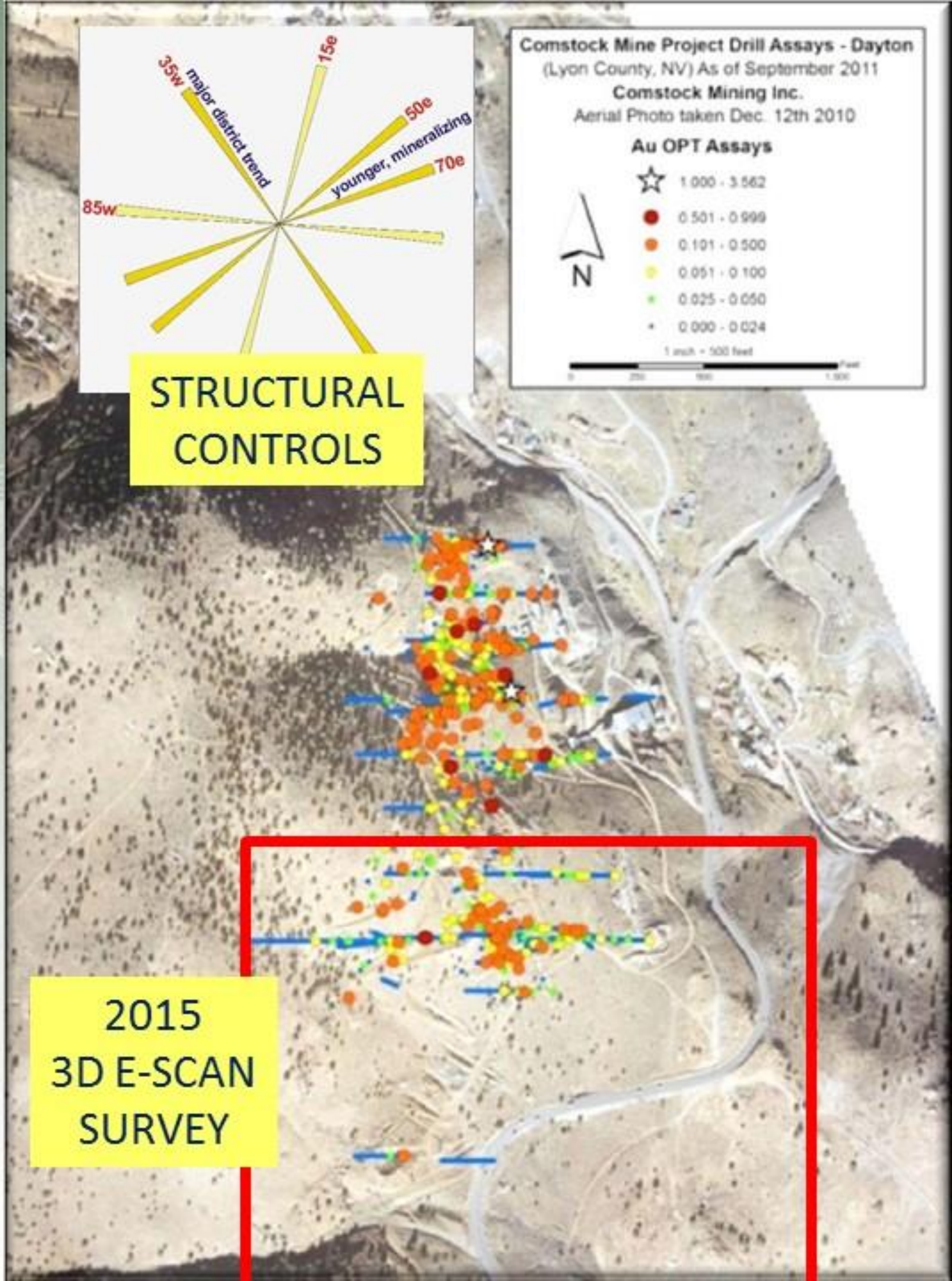


Dayton resource area.

The 2015 3D E-SCAN survey area included mineralization known as South Dayton.

As elsewhere along the southern Silver City fault trend, major NW fault structures have prepared conditions for mineralization associated with later NE-trending faulting.

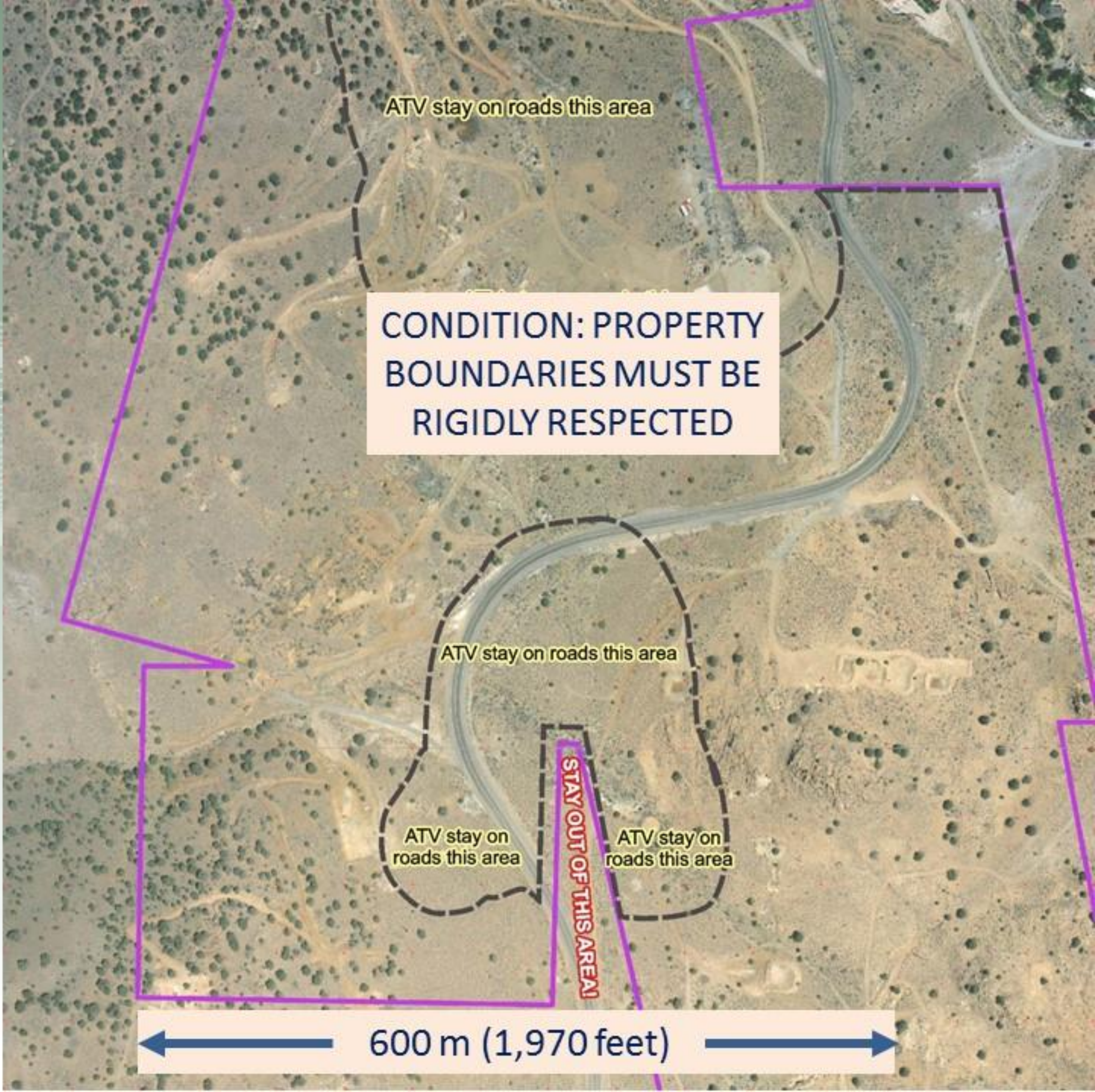
Tuffs (Santiago Canyon, Alta) are the principal ore host, with gold grades enhanced in areas where a quartz porphyry intrudes. The underlying metavolcanics have hosted high grade mineralization elsewhere; the potential at South Dayton remains untested.



The survey area.

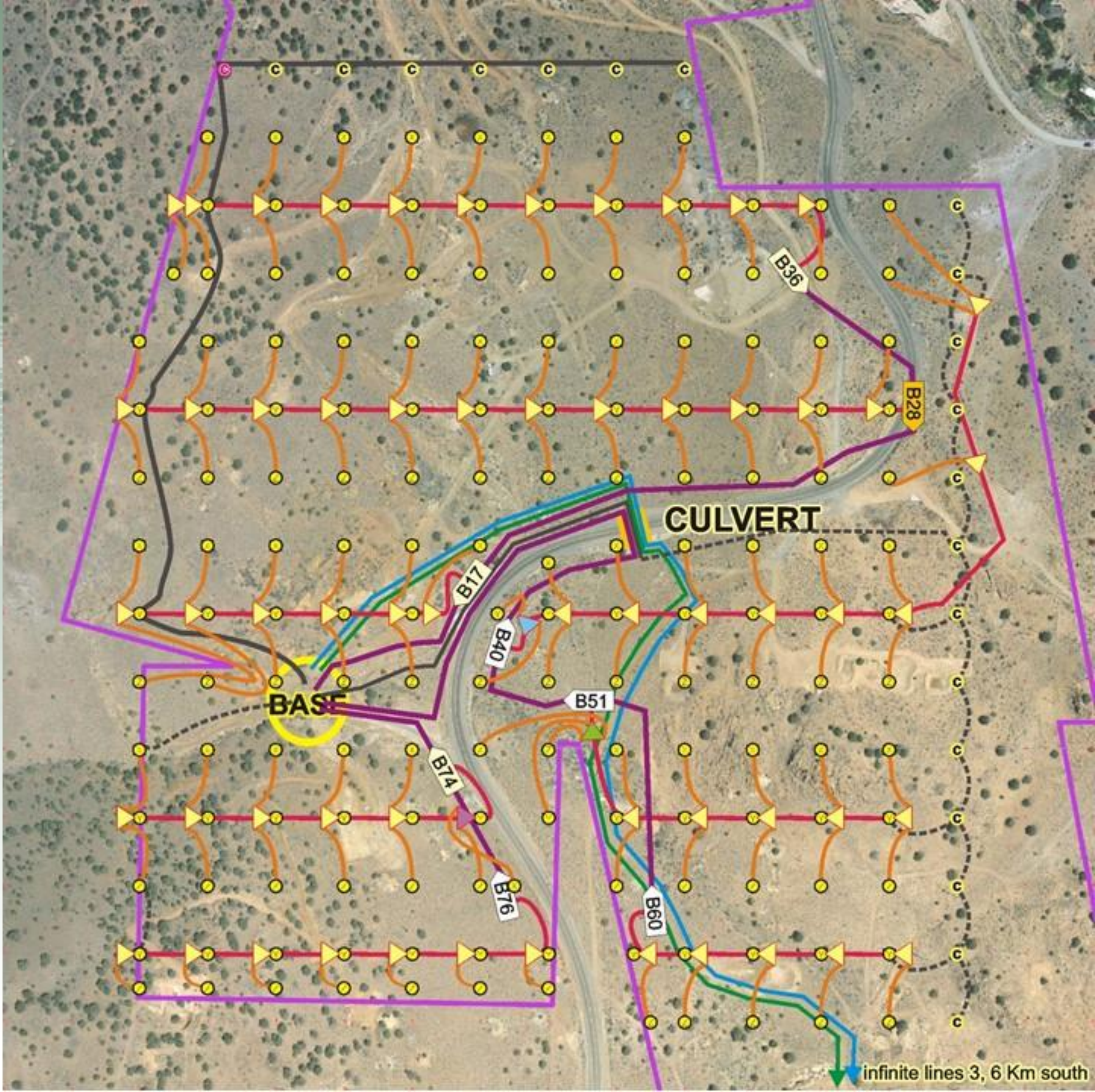
Very tight lateral constraints will challenge the ability to acquire deep data.

The location and nature of the known mineralization is withheld from the survey team.



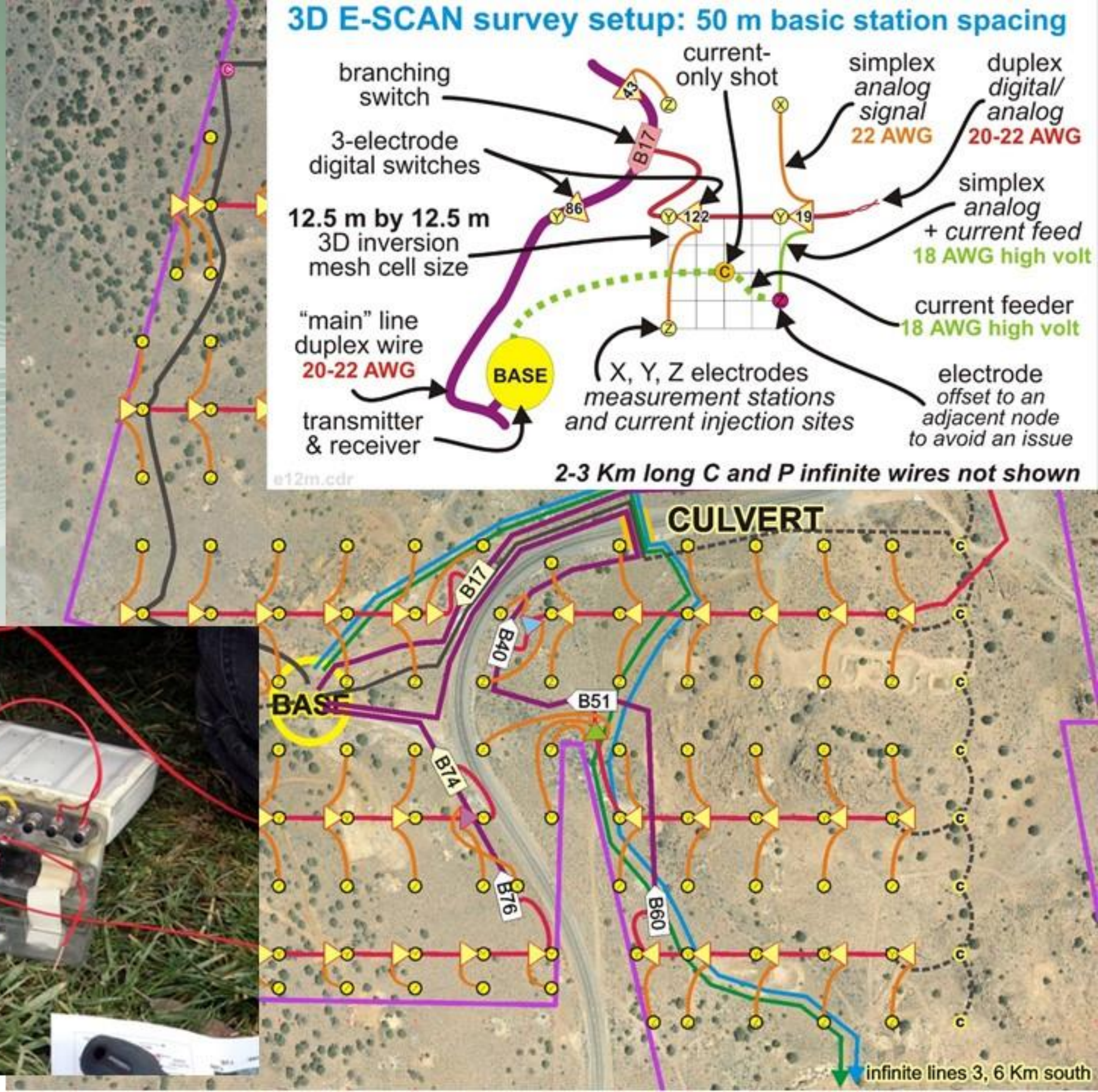
The 182-station 3D E-SCAN survey setup is completed in 3 days, by a crew of 4.

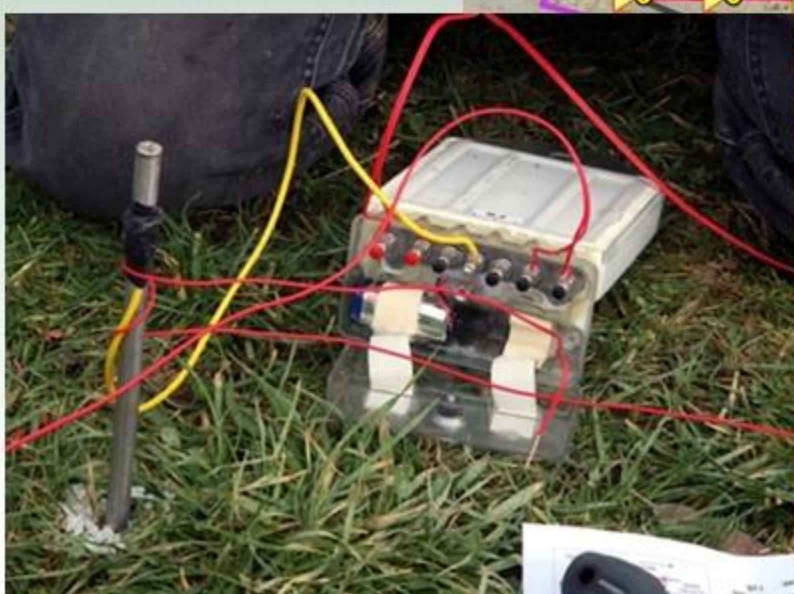
The entire SE quadrant is wired up via a 100 foot long culvert under the highway, maintaining the uniformity of the survey station spacing (and of the subsequently acquired 3D data).



Once the basic grid station spacing is selected (50 m), there are no more decisions.

No line orientation decisions, no line spacing or offset current parameters.

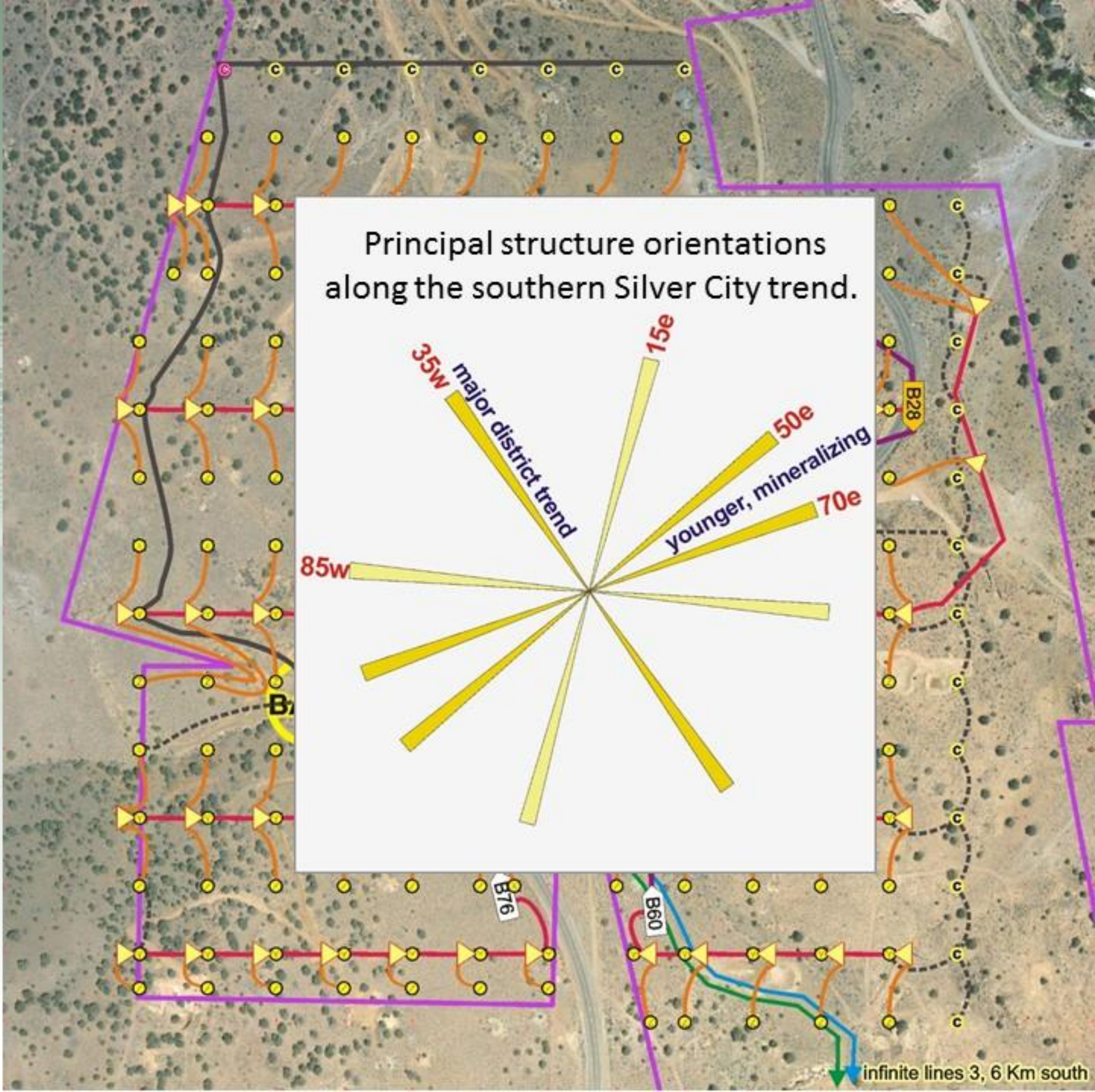


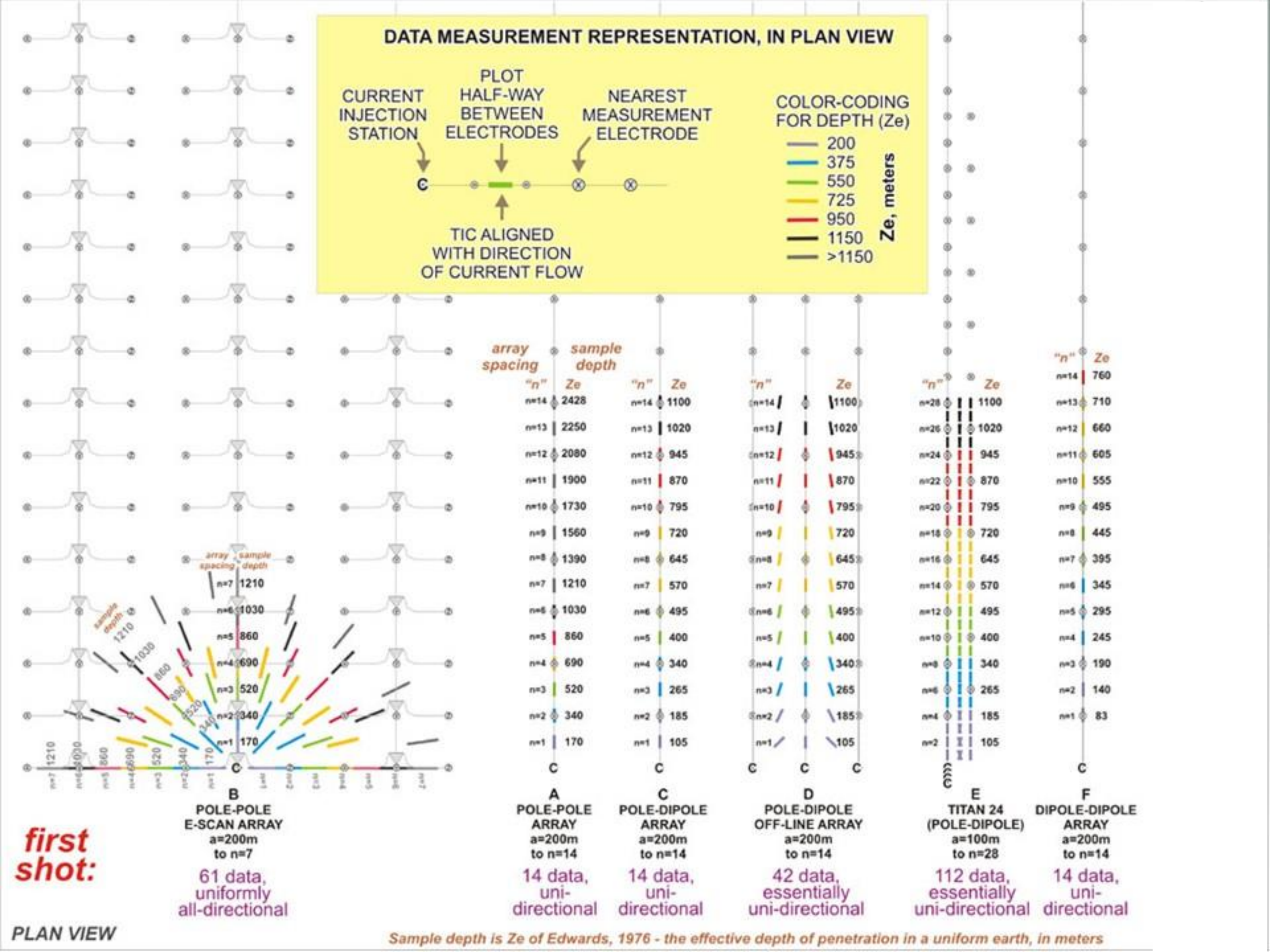


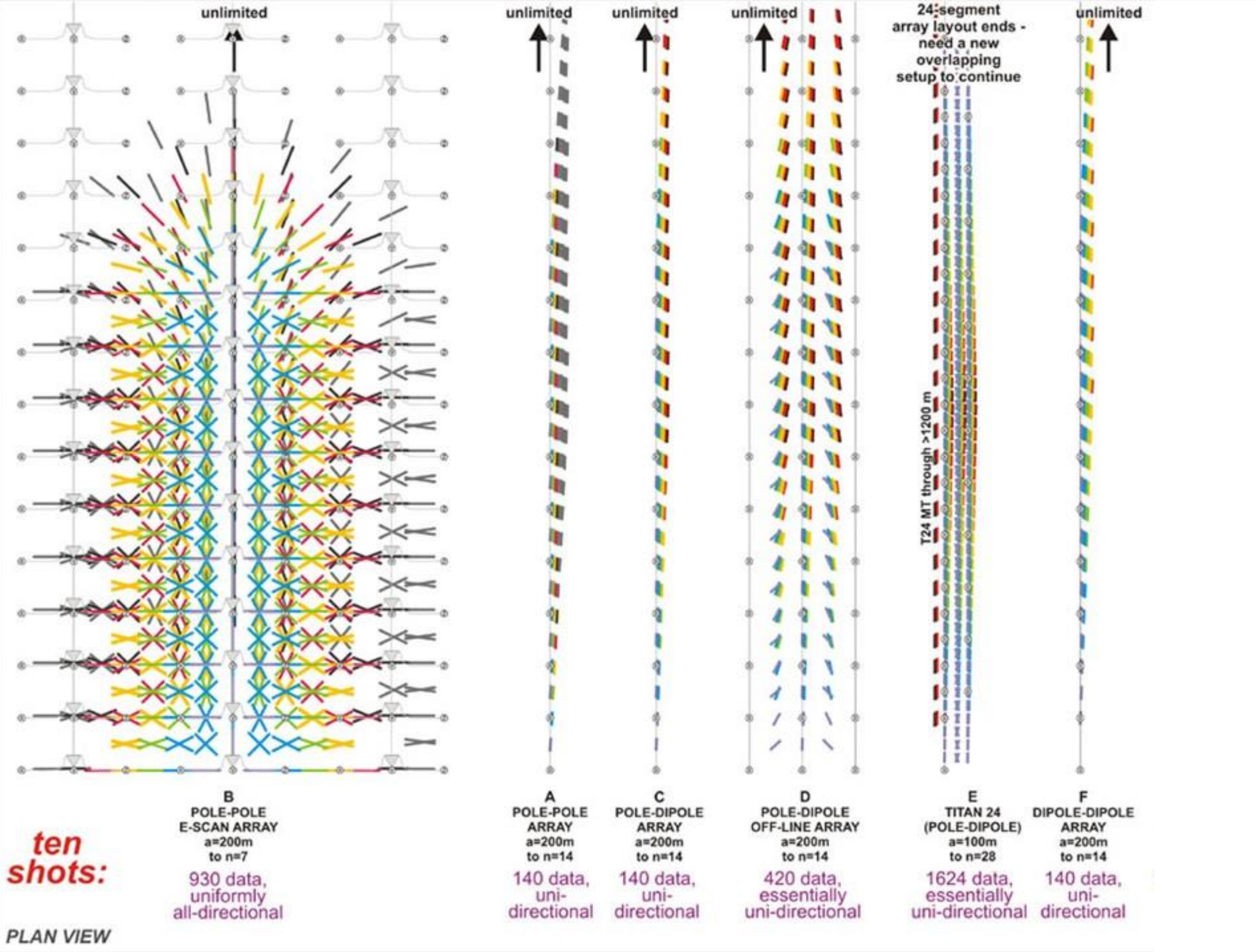
The diagram reminds us of the principal strike orientations of known structure in this area.

No single orientation of conventional survey line data can objectively map this complexity, let alone discriminate and reveal any other local structural orientations which may prove to be important, once they are known.

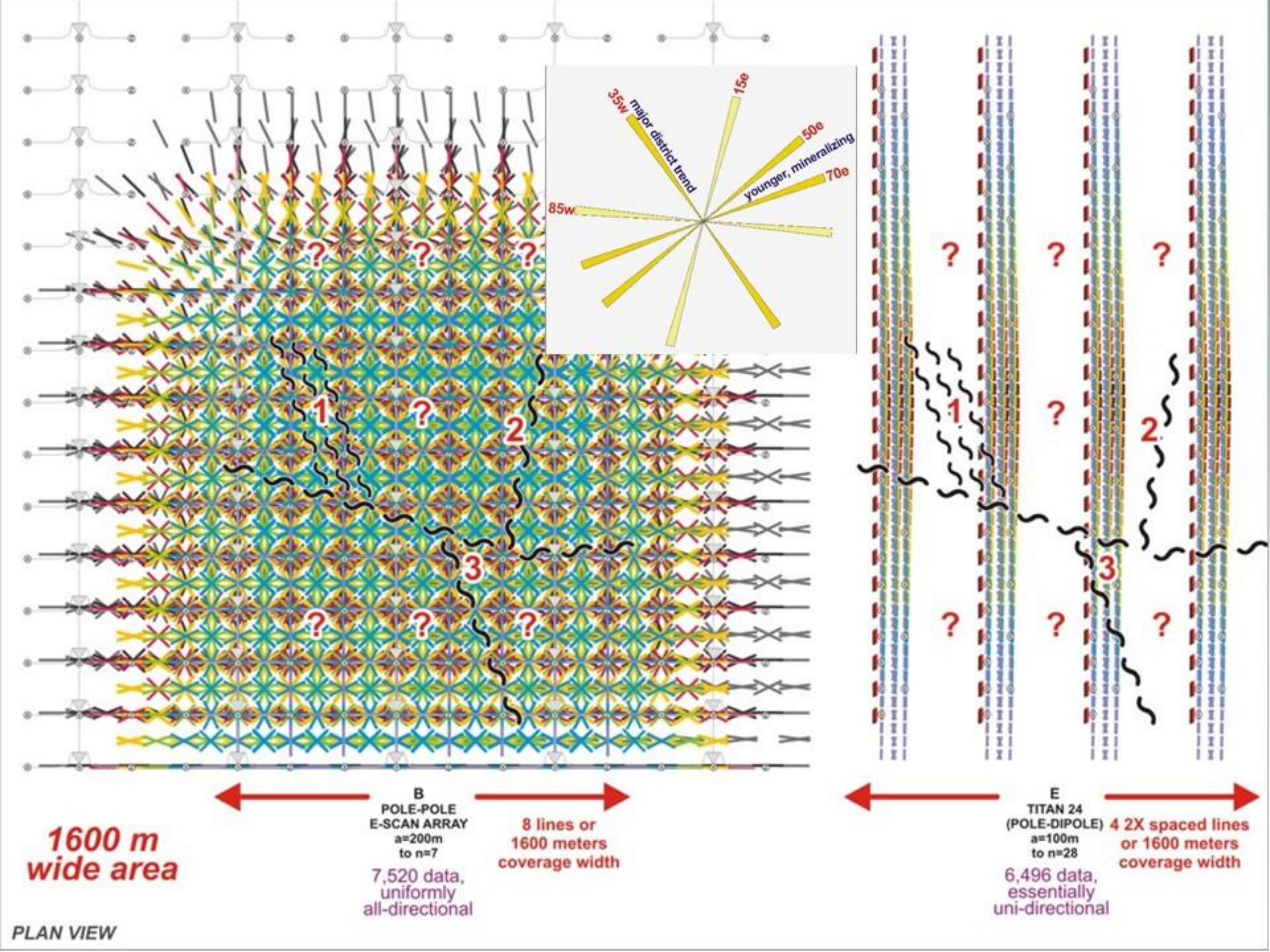
True 3D mapping objectivity appears to be essential here.



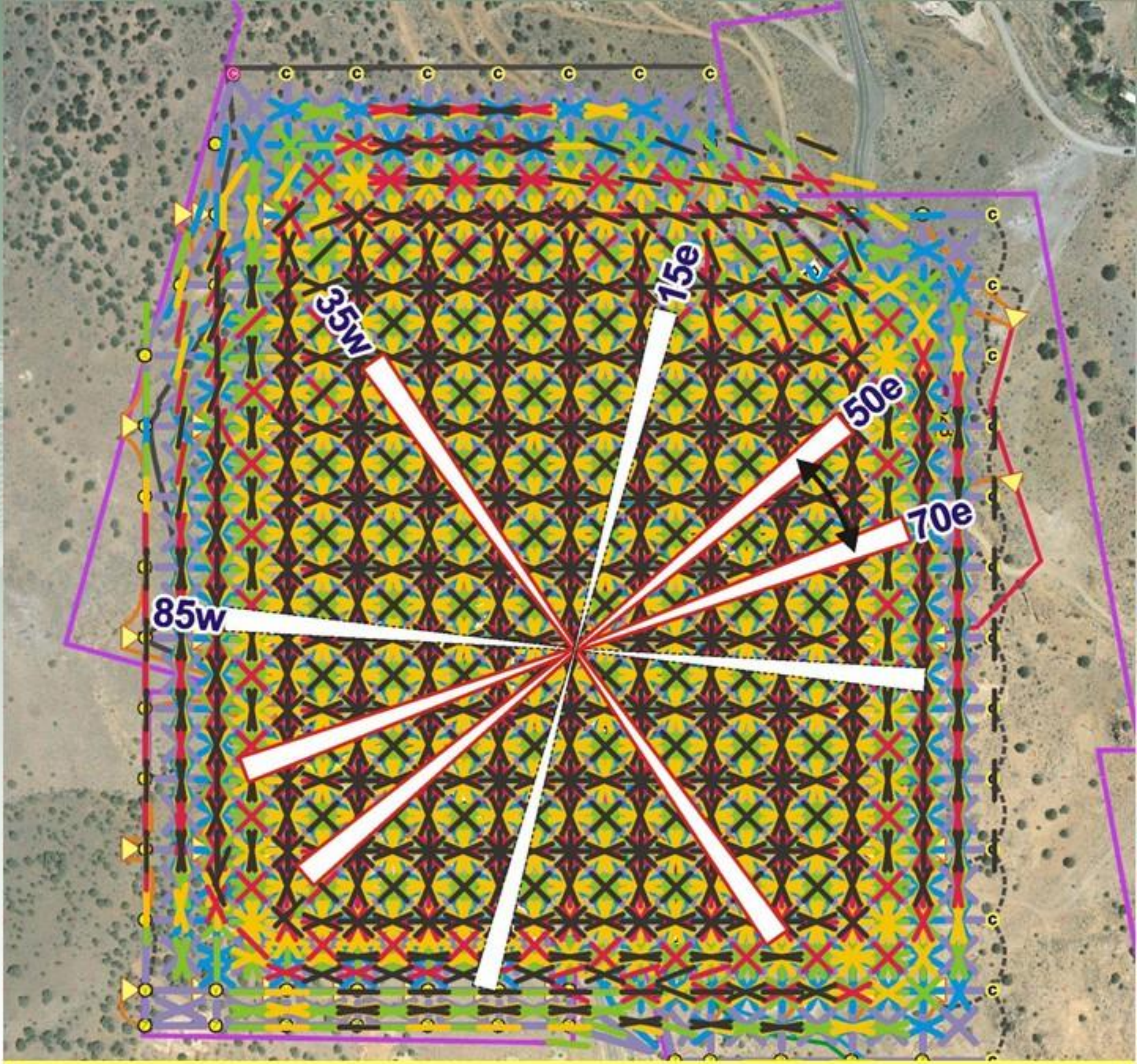

DATA MEASUREMENT REPRESENTATION, IN PLAN VIEW
CURRENT INJECTION STATION
PLOT HALF-WAY BETWEEN ELECTRODES
NEAREST MEASUREMENT ELECTRODE
TIC ALIGNED WITH DIRECTION OF CURRENT FLOW
COLOR-CODING FOR DEPTH (Ze)
200
375
550
725
950
1150
>1150
Ze, meters
array spacing
sample depth
"n"
Ze
B
POLE-POLE
E-SCAN ARRAY
a=200m
to n=7
61 data, uniformly all-directional
A
POLE-POLE ARRAY
a=200m
to n=14
14 data, uni-directional
C
POLE-DIPOLE ARRAY
a=200m
to n=14
14 data, uni-directional
D
POLE-DIPOLE OFF-LINE ARRAY
a=200m
to n=14
42 data, essentially uni-directional
E
TITAN 24 (POLE-DIPOLE)
a=100m
to n=28
112 data, essentially uni-directional
F
DIPOLE-DIPOLE ARRAY
a=200m
to n=14
14 data, uni-directional
first shot:
PLAN VIEW
Sample depth is Ze of Edwards, 1976 - the effective depth of penetration in a uniform earth, in meters



unlimited
unlimited
unlimited
unlimited
24-segment array layout ends - need a new overlapping setup to continue
unlimited
T24 MT through >1200 m
B
POLE-POLE
E-SCAN ARRAY
a=200m
to n=7
930 data, uniformly all-directional
A
POLE-POLE
ARRAY
a=200m
to n=14
140 data, uni-directional
C
POLE-DIPOLE
ARRAY
a=200m
to n=14
140 data, uni-directional
D
POLE-DIPOLE
OFF-LINE ARRAY
a=200m
to n=14
420 data, essentially uni-directional
E
TITAN 24
(POLE-DIPOLE)
a=100m
to n=28
1624 data, essentially uni-directional
F
DIPOLE-DIPOLE
ARRAY
a=200m
to n=14
140 data, uni-directional
ten shots:
PLAN VIEW


35w
major district trend
15e
50e
younger, mineralizing
70e
85w
1
2
3
?
B
POLE-POLE
E-SCAN ARRAY
a=200m
to n=7
7,520 data,
uniformly
all-directional
8 lines or
1600 meters
coverage width
E
TITAN 24
(POLE-DIPOLE)
a=100m
to n=28
6,496 data,
essentially
uni-directional
4 2X spaced lines
or 1600 meters
coverage width
1600 m
wide area
PLAN VIEW

This is the uniformly-distributed, high density, all-directional 3D data set* that is required to back up our intention to interpret and use even the most subtle *any-direction* patterns in the 3D earth model at South Dayton.



***Full Spectrum 3D** (fs3D)

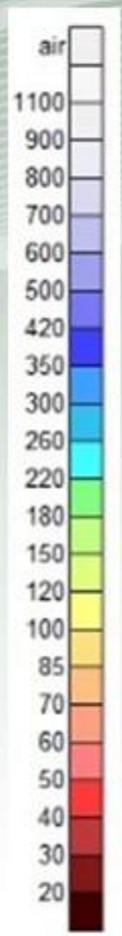
6,000 precisely selected all-directional data to >300m depth (Ze)

3D INVERSION MODEL

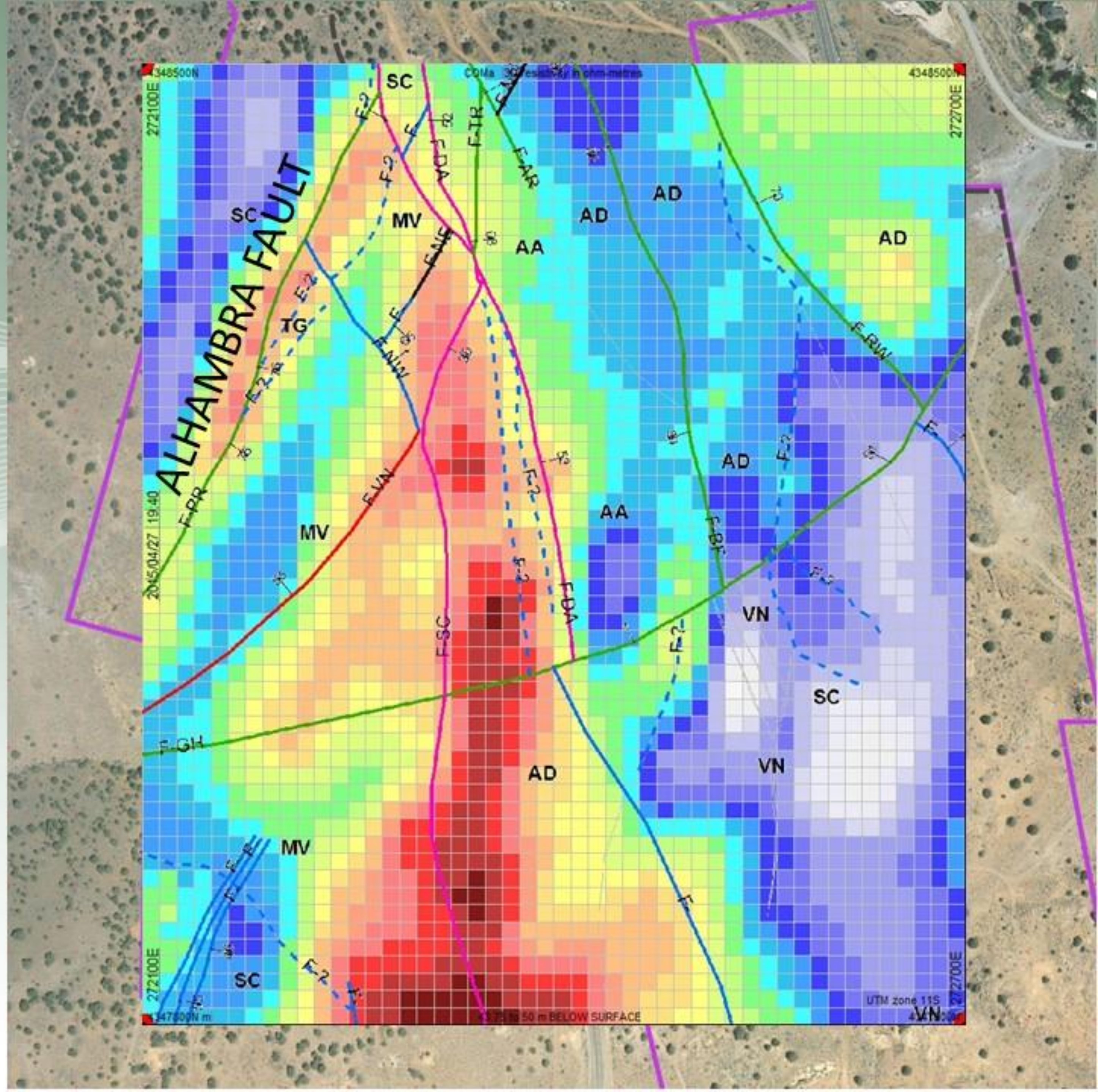
RESISTIVITY

44-50 m

below surface



OHM-
METERS

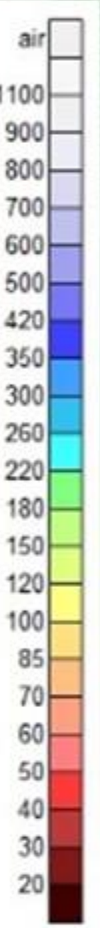


3D INVERSION MODEL

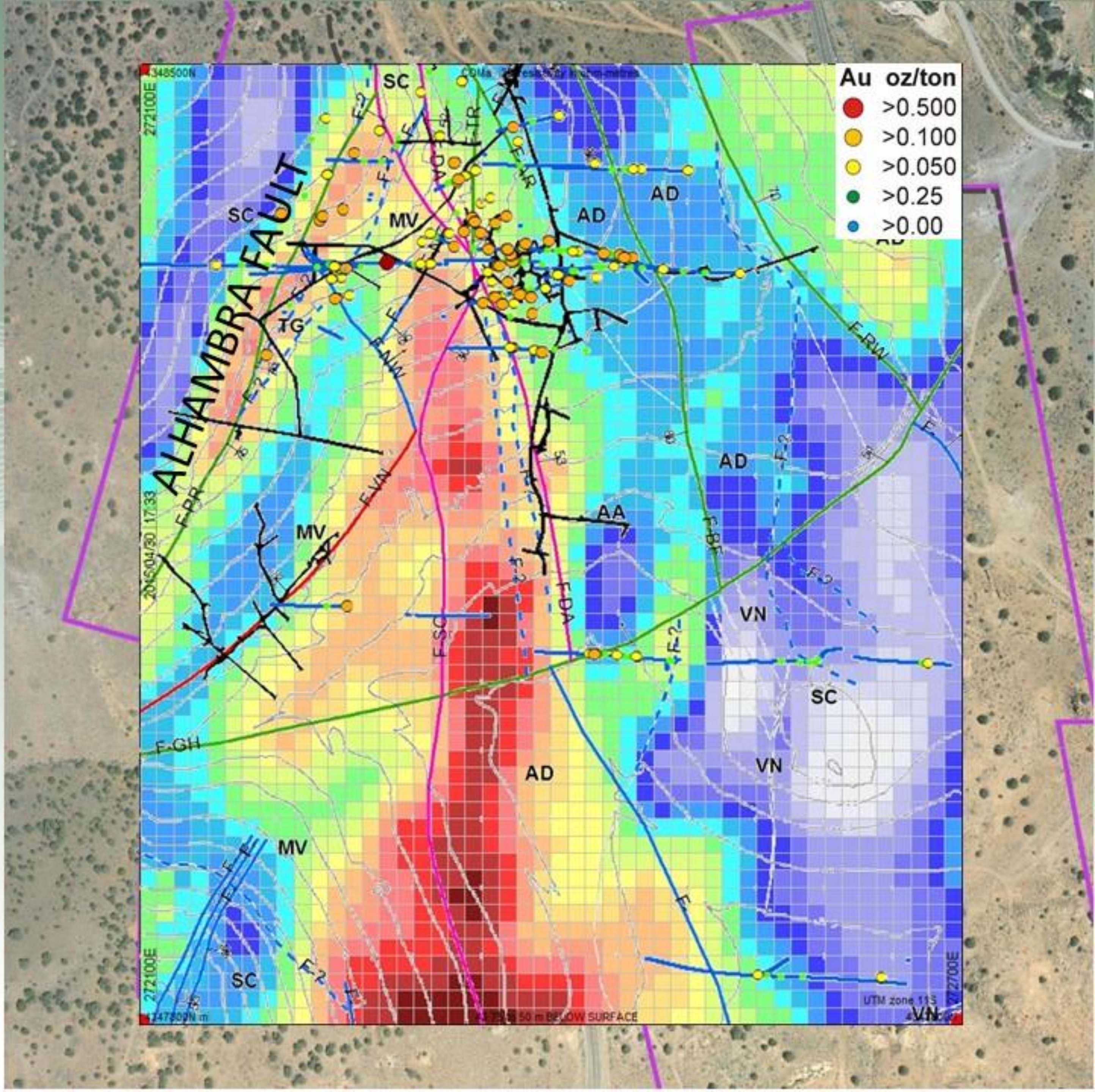
RESISTIVITY

44-50 m

below surface



OHM-METERS

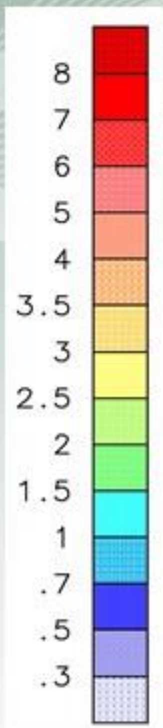


3D INVERSION MODEL

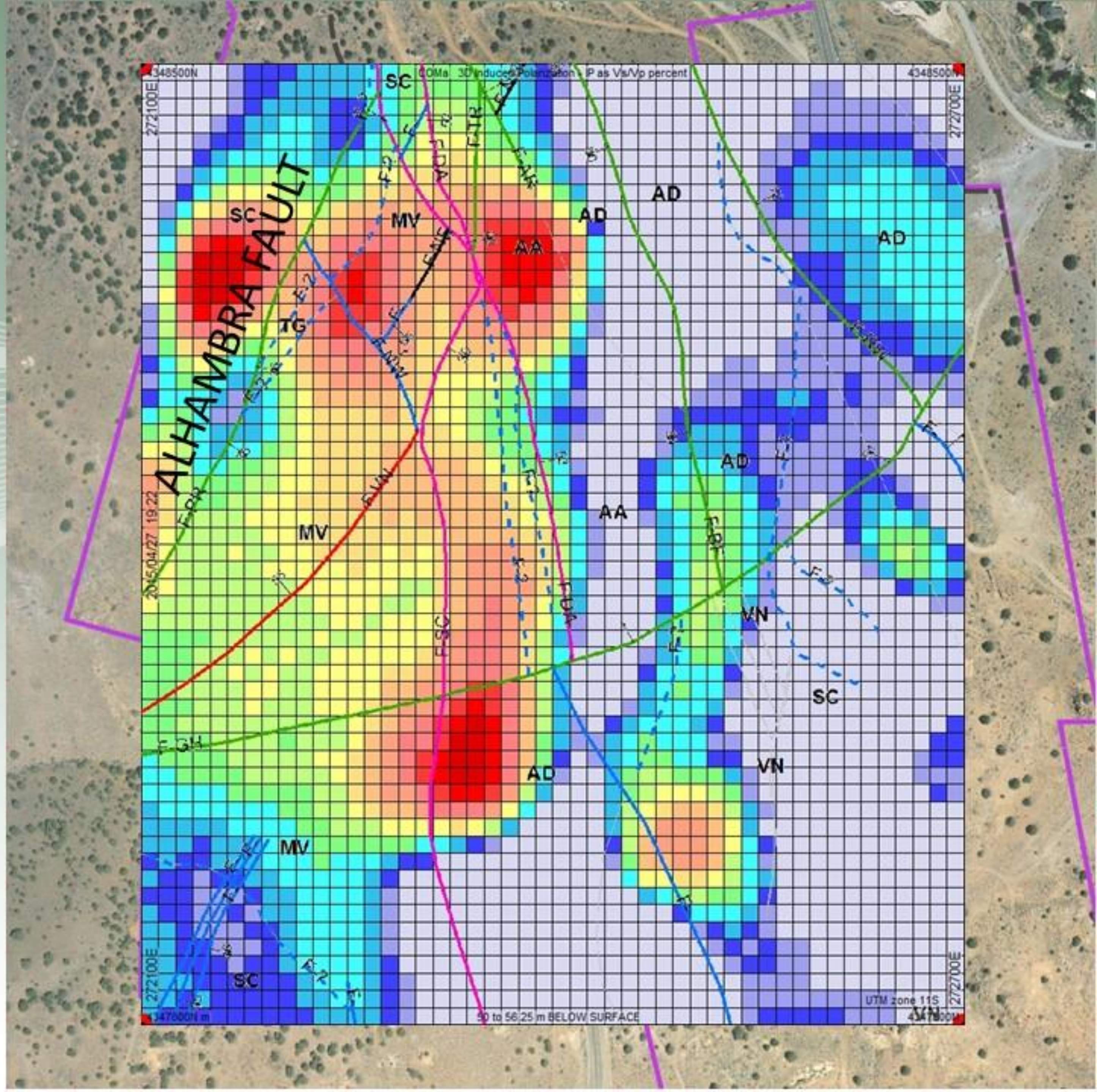
IP (%)

50-56 m

below surface



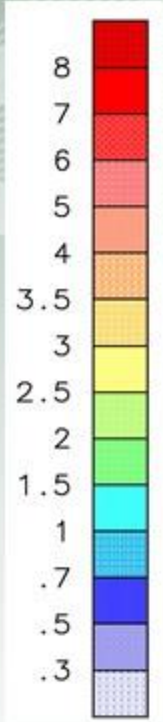
INDUCED POLARIZATION %



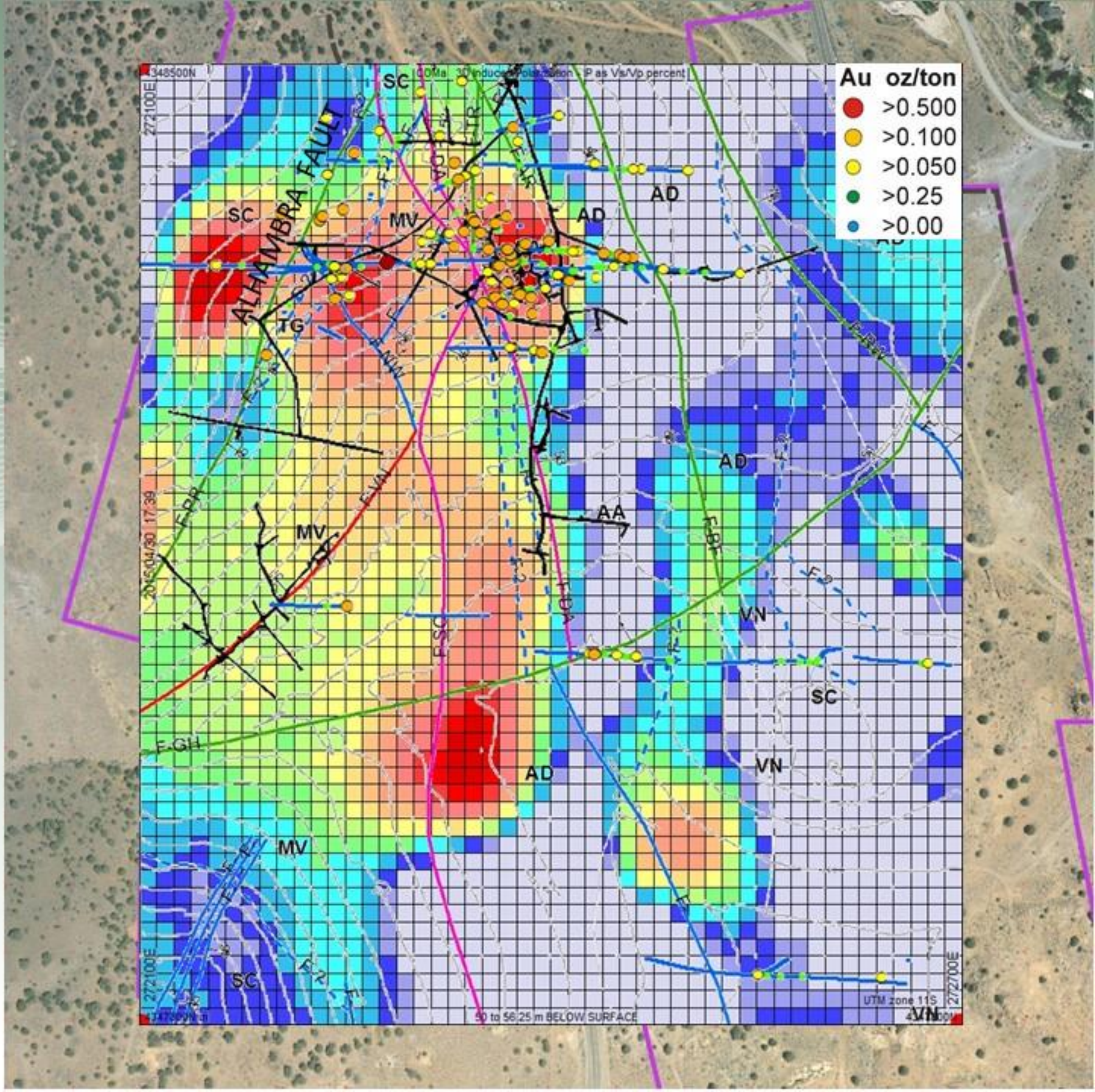
3D INVERSION MODEL

IP (%)

50-56 m
below surface

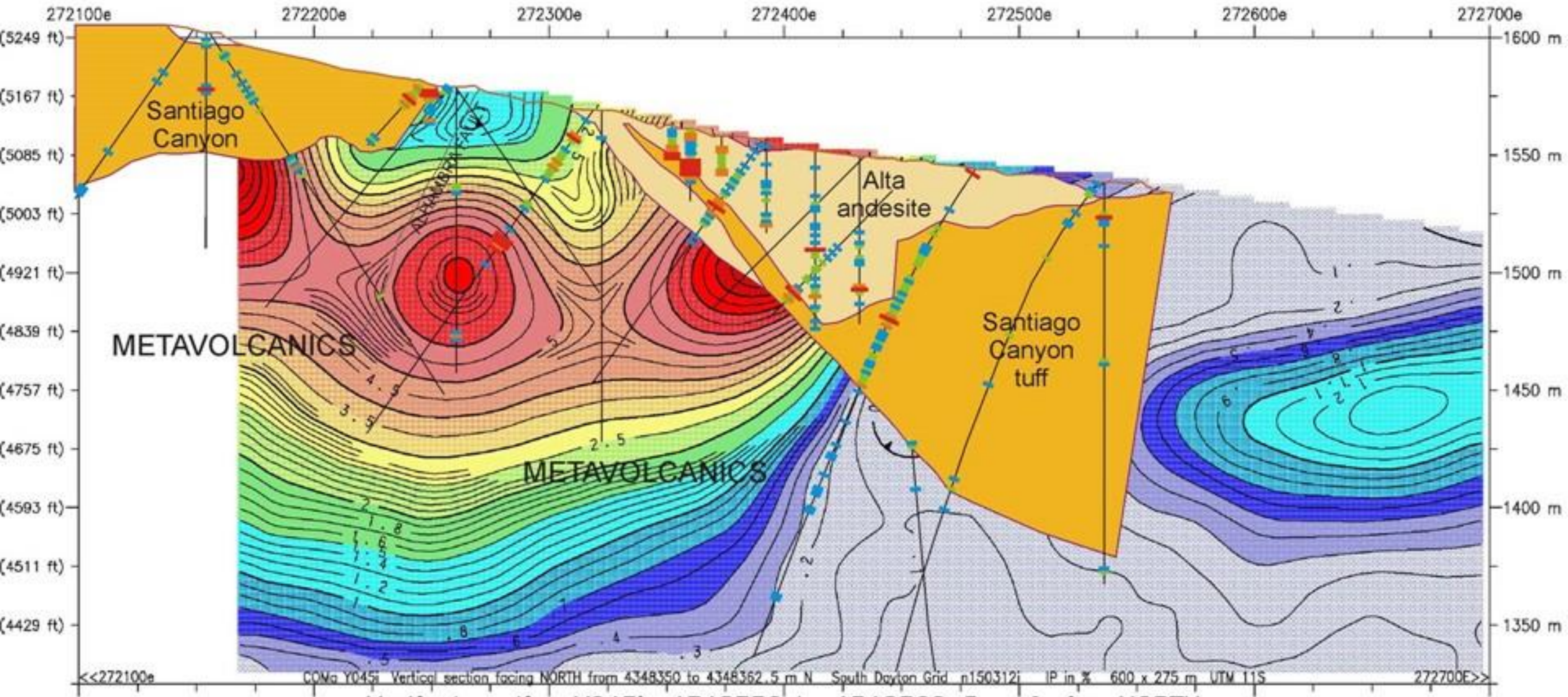


INDUCED POLARIZATION %



3D INVERSION MODEL IP (%) VERTICAL SECTION

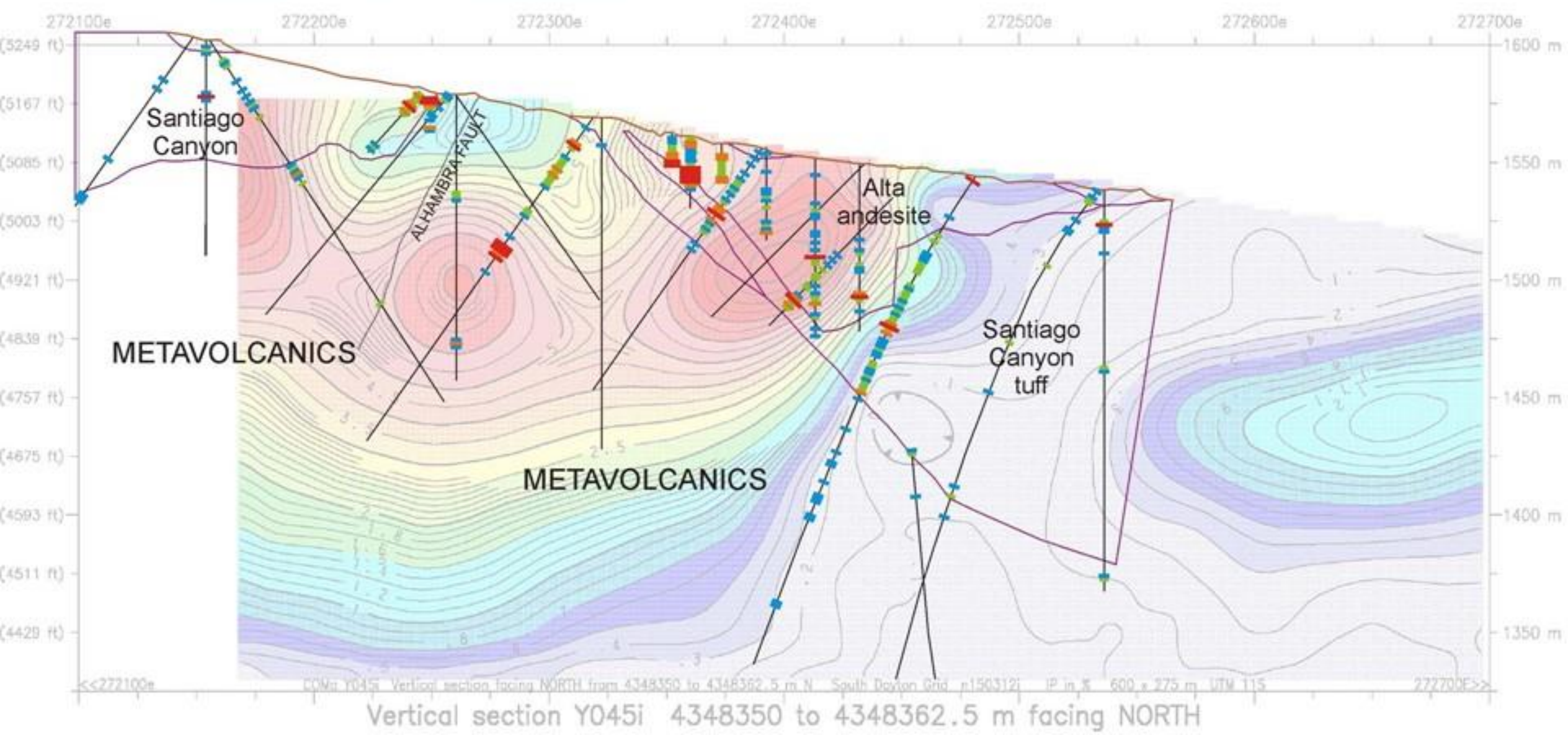
Au oz/ton
=>0.100
=>0.067
=>0.036
=>0.015
=>0.007



Vertical section Y045i 4348350 to 4348362.5 m facing NORTH

3D INVERSION MODEL IP (%) VERTICAL SECTION

Au oz/ton
=>0.100
=>0.067
=>0.036
=>0.015
=>0.007

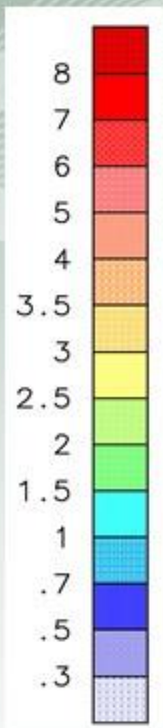


3D INVERSION MODEL

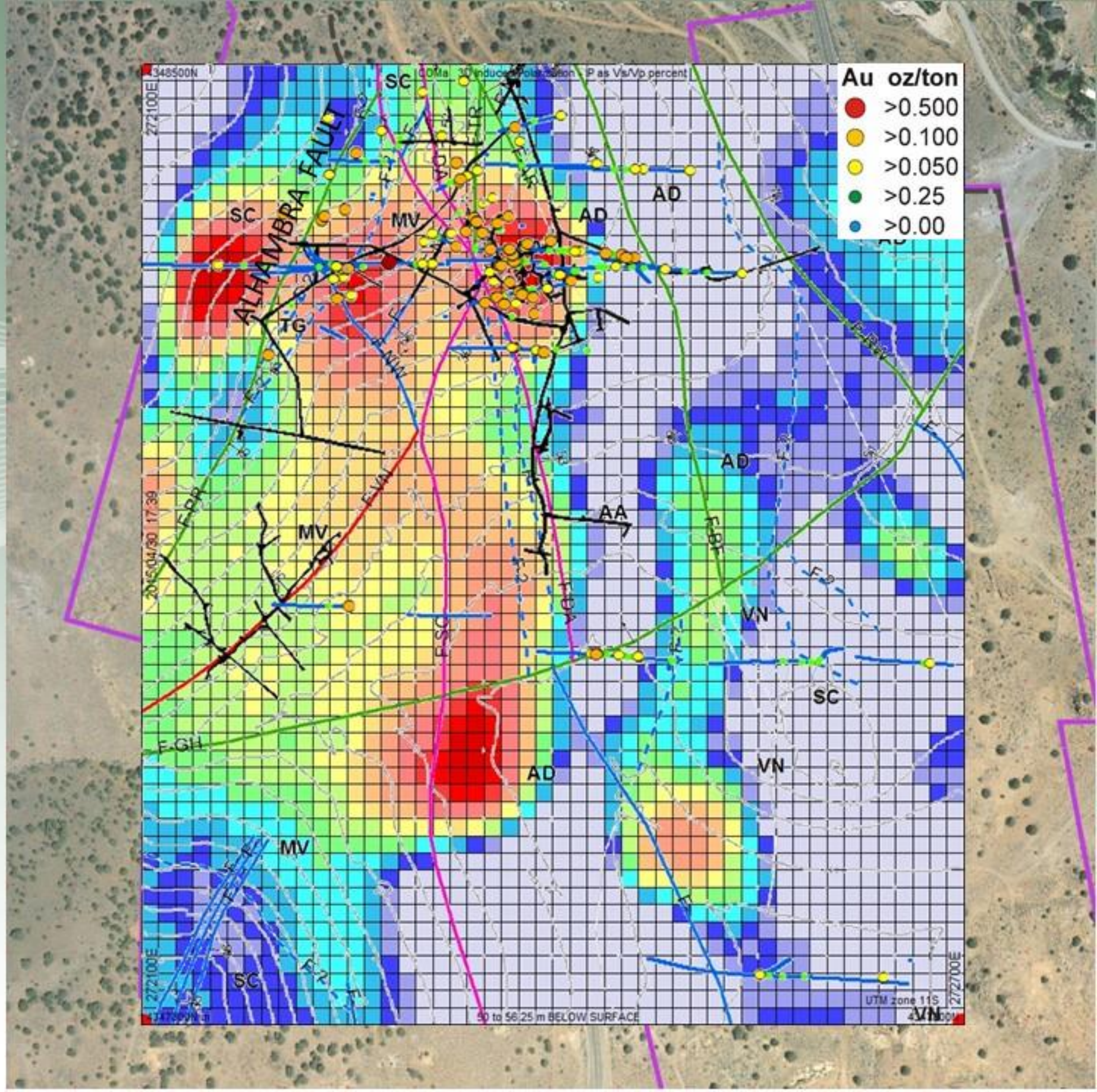
IP (%)

50-56 m

below surface



INDUCED POLARIZATION %

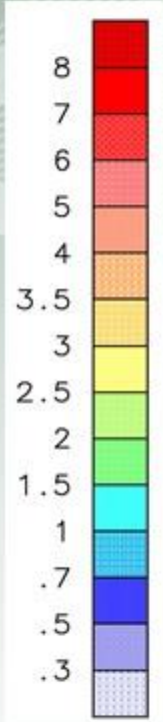


3D INVERSION MODEL

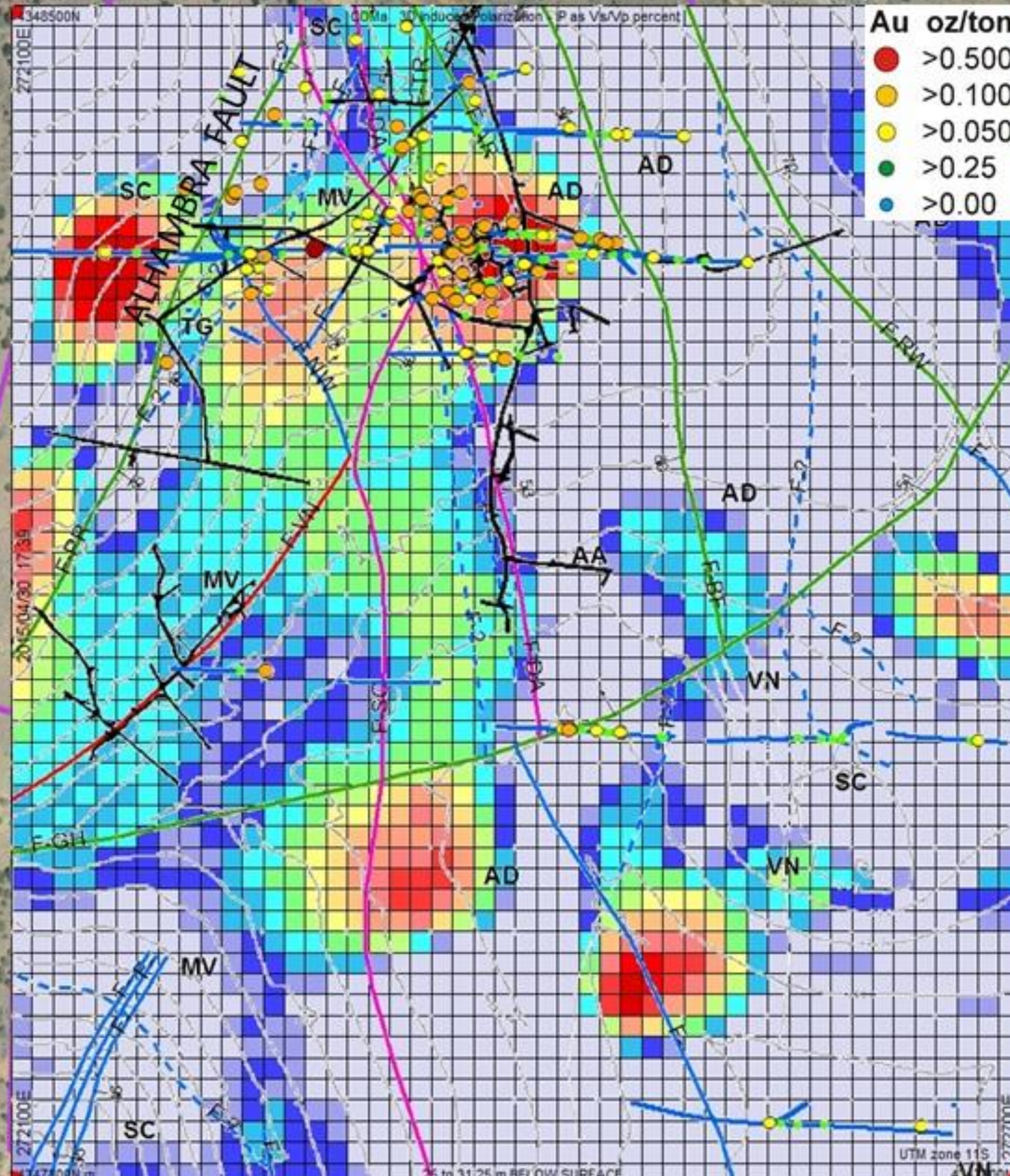
IP (%)

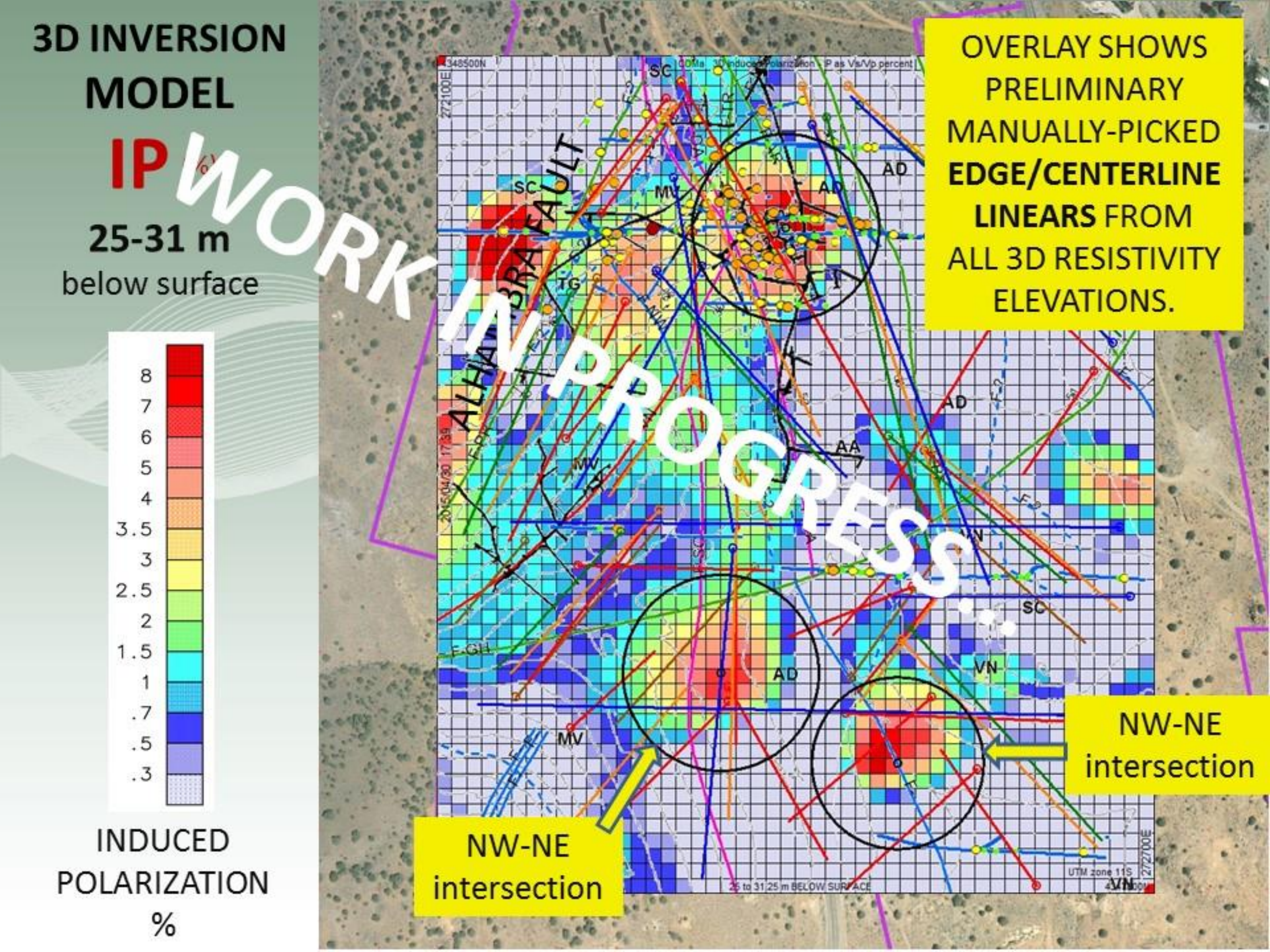
25-31 m

below surface

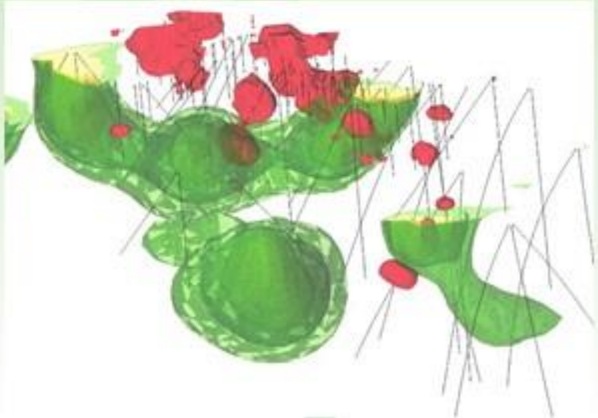


INDUCED POLARIZATION %




3D INVERSION MODEL
IP (%)
25-31 m
below surface
8
7
6
5
4
3.5
3
2.5
2
1.5
1
.7
.5
.3
INDUCED POLARIZATION %
WORK IN PROGRESS...
OVERLAY SHOWS PRELIMINARY MANUALLY-PICKED EDGE/CENTERLINE LINEARS FROM ALL 3D RESISTIVITY ELEVATIONS.
ALHAMBRA FAULT
NW-NE intersection
NW-NE intersection
25 to 31.25 m BELOW SURFACE
UTM zone 11S
SC
MV
TG
AD
AA
VN

With the 3D E-SCAN field survey program wrapping up just over 3 months ago, this very substantial amount of 3D IP and 3D resistivity model imaging and mapping product is today only at the earliest stages of analysis, of correlation with known site geology, and interpretation of new drill targets and exploration insights.



The establishment of an IP anomaly spatially associated with known South Dayton ore mineralization, and the mapping of hidden, often subtle NE-trending features throughout the area, are early examples that indicate the potential for local and wider-area exploration benefits from fs3D IP/resistivity mapping.

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COMSTOCK
MINING

Thanks are due to Larry Martin
and Comstock Mining Inc.
for permission to show these results,
and for their excellent support before,
during and after the field survey.