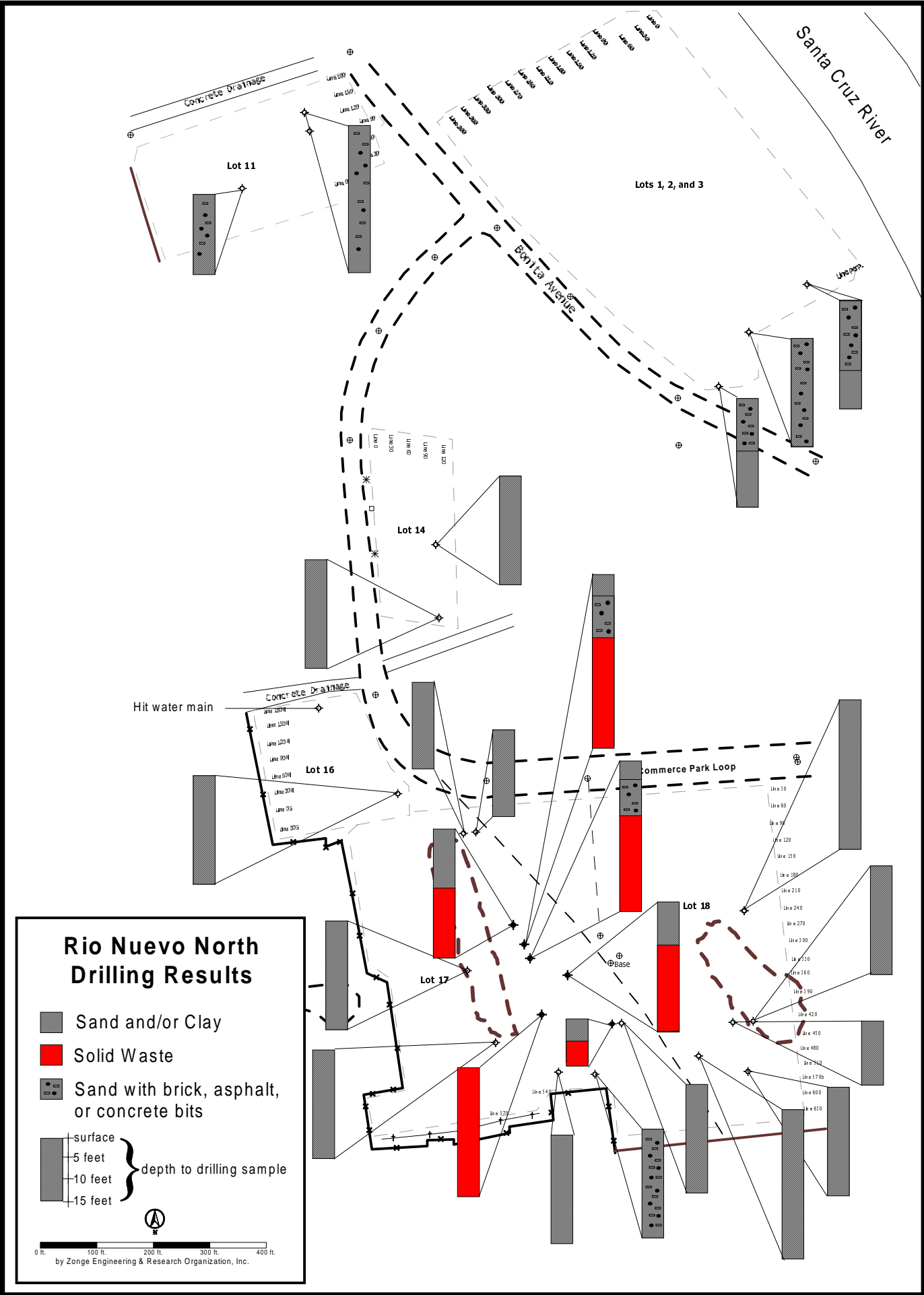


Reproduced from: Keller, G.V., and F.C. Frischknecht, 1966, Electrical methods in geophysical prospecting, Pergamon Press.

Down in the Dumps Workshop Notes

Of particular interest in the Tucson area is the possibility of IP responses from clay, since there are abundant amounts of clay at many locations, particularly near riverbeds. However, the abundance of clay must fall within specific ranges to increase the IP effect; thus an increased amount of clay does not simply result in an increased IP effect (from Keller and Frischkecht, 1966).





Santa Cruz River

Concrete Drainage

Lot 11

Lots 1, 2, and 3

Bonita Avenue

Lot 14

Hit water main

Concrete Drainage

Lot 16

Commerce Park Loop

Lot 18

Lot 17

Base

Line 37

Line 54

Line 30

Line 60

Line 90

Line 120

Line 150

Line 180

Line 210

Line 240

Line 270

Line 300

Line 330

Line 360

Line 390

Line 420

Line 450

Line 480

Line 510

Line 540

Line 570a

Line 600

Line 630

Line 90a

Line 30

Line 60

Line 90

Line 120

Line 150

Line 180

Line 210

Line 240

Line 270

Line 300

Line 330

Line 360

Line 390

Line 420

Line 450

Line 480

Line 510

Line 540

Line 570a

Line 600

Line 630

Line 0

Line 10

Line 20

Line 30

Line 40

Line 50

Line 60

Line 70

Line 80

Line 90

Line 100

Line 110

Line 120

Line 130

Line 140

Line 150

Line 160

Line 170

Line 180

Line 190

Line 200

Line 210

Line 220

Line 230

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Line 370

Line 380

Line 390

Line 400

Line 410

Line 420

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Line 550

Line 560

Line 570

Line 580

Line 590

Line 600

Line 610

Line 620

Line 630

Line 640

Line 650

Line 660

Line 670

Line 680

Line 690

Line 700

Line 710

Line 720

Line 730

Line 740

Line 750

Line 760

Line 770

Line 780

Line 790

Line 800

Line 810

Line 820

Line 830

Line 840

Line 850

Line 860

Line 870

Line 880

Line 890

Line 900

Line 910

Line 920

Line 930

Line 940

Line 950

Line 960

Line 970

Line 980

Line 990

Line 1000

Down in the Dumps Workshop Notes

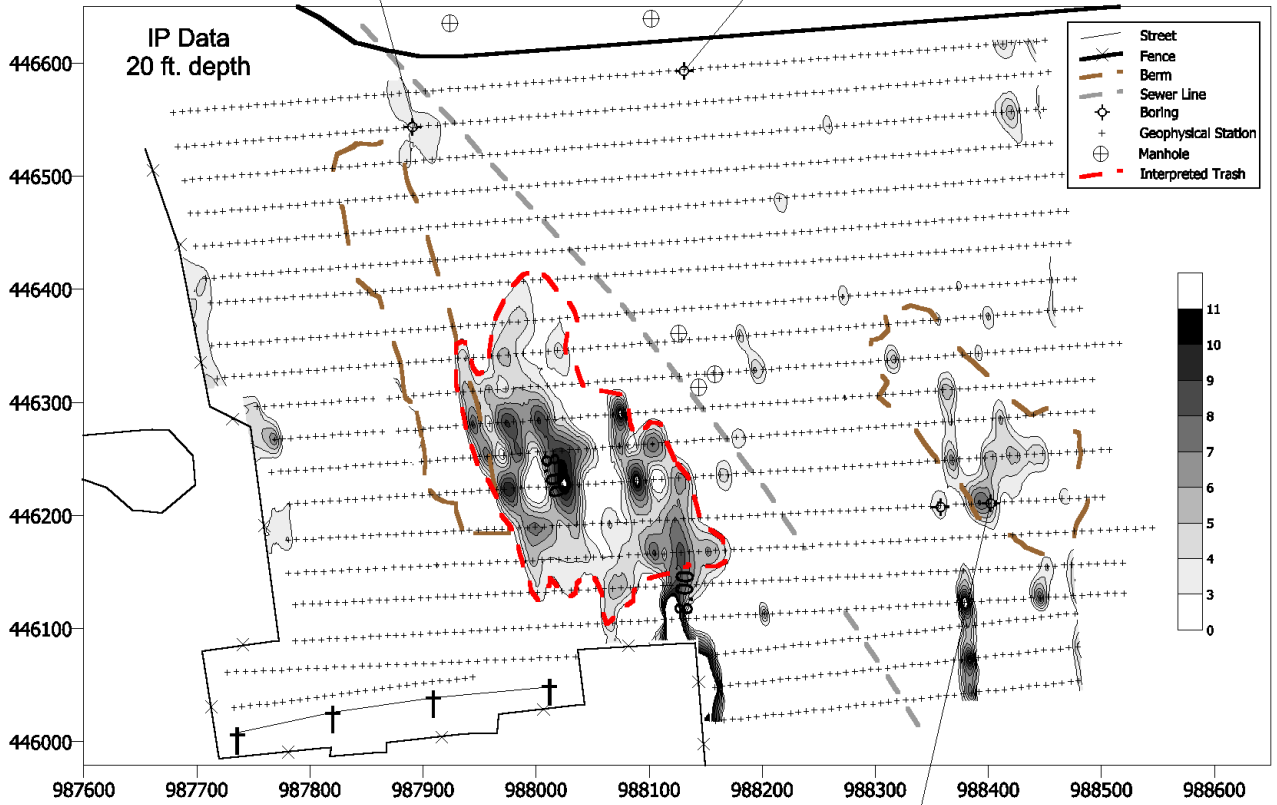
Drilling results on the 22 acres confirmed the accuracy of the IP results. Five borings drilled into the main anomaly encountered waste material.



Rio Nuevo North Lab Results

10ft. depth
6.9 milliseconds

3ft. depth
0.1 and 1.0 milliseconds



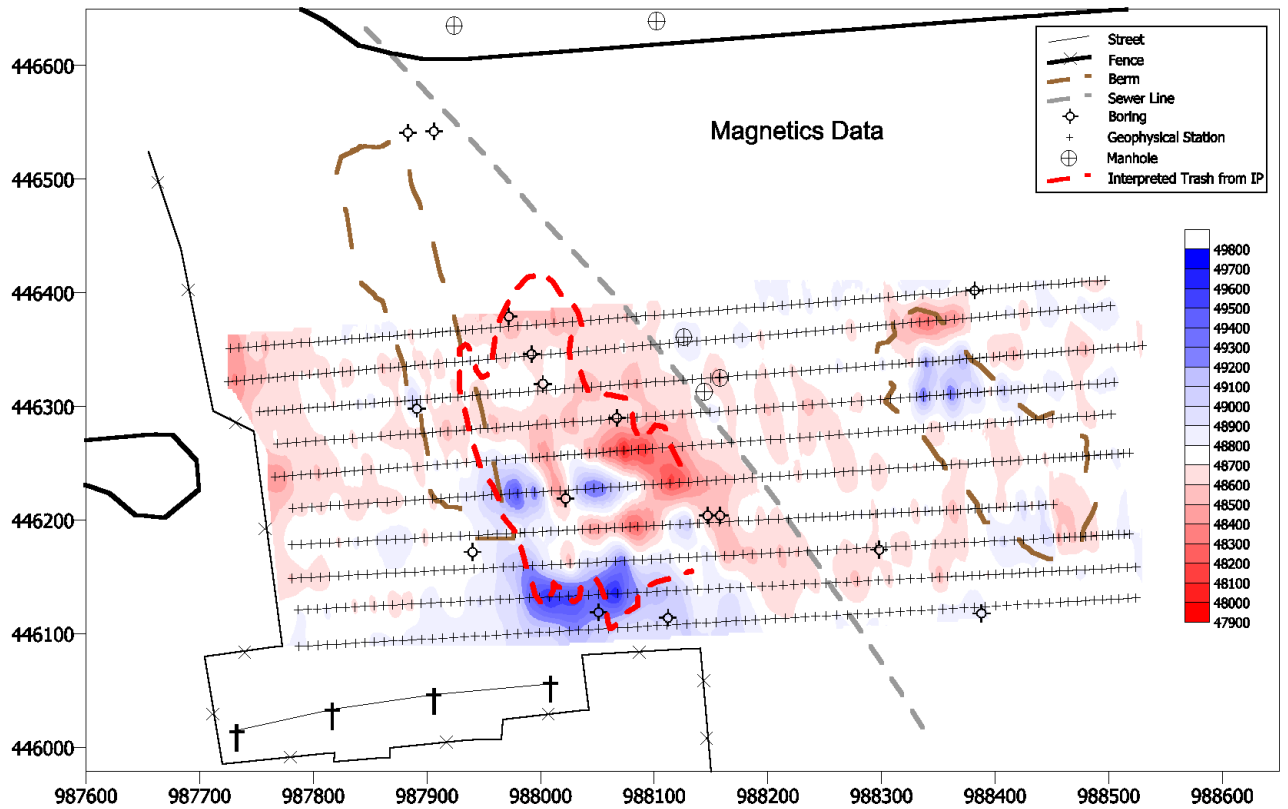
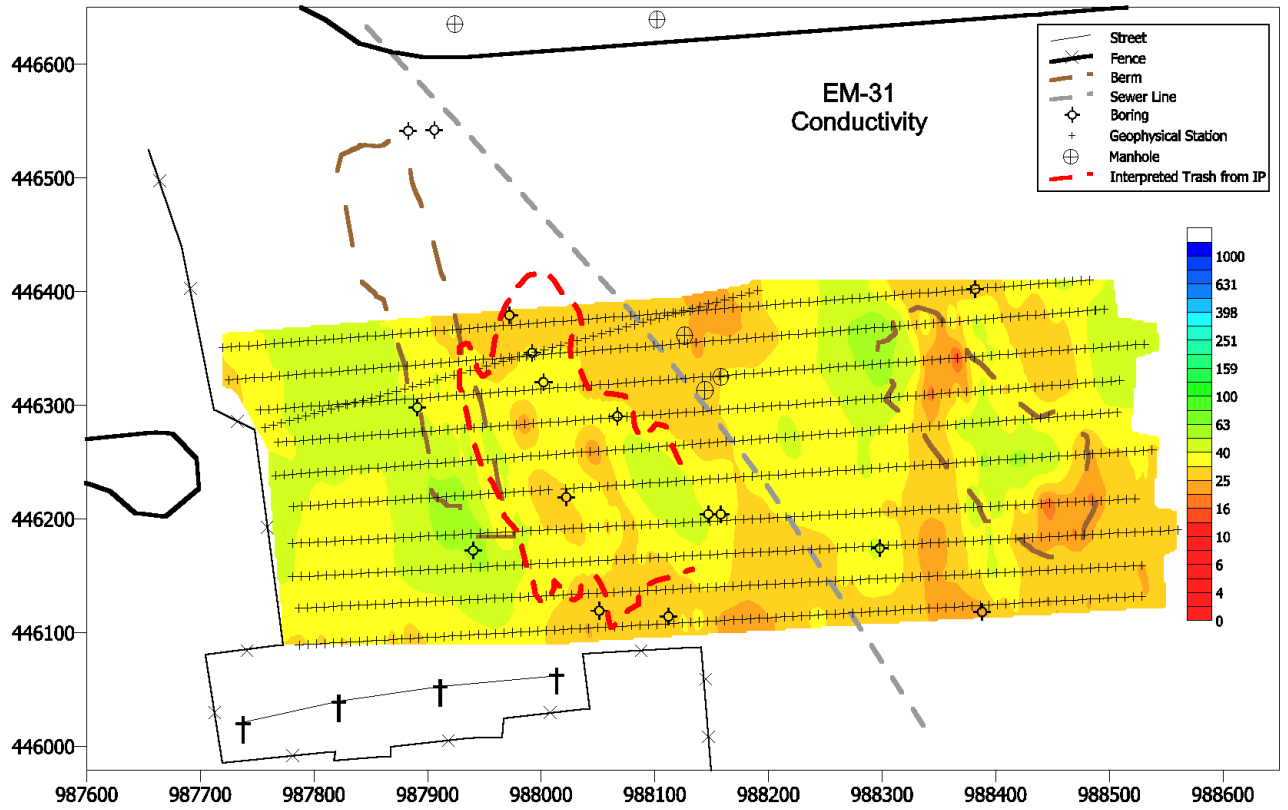
5 and 10 ft depth samples
6.3 and 2.7 milliseconds

Down in the Dumps Workshop Notes

Lab measurements were performed on a few samples from IP highs that did not correlate with garbage. Two borings were positioned on an IP anomaly in the northern portion of Lot 17, and both borings encountered only clean fill material. In laboratory measurements, a sample of the clean fill material collected at a depth of 10 feet exhibited an anomalous IP response of 6.9 milliseconds. In comparison, two shallow samples from near station 445 on Line 60 (in a "background" area where no anomalies were detected in the IP survey) showed background IP responses of only 0.1 and 1.0 milliseconds. Similar results were encountered on Lot 18, Line 420, station 630. In laboratory measurements, two samples collected at depths of 5 feet and 15 feet in this boring exhibited IP responses of 6.3 and 2.7 milliseconds respectively. This suggests that the anomalies are probably the result of very small amounts of clay, uniformly distributed in the subsurface at this location.



Rio Nuevo North Lot 17 and 18



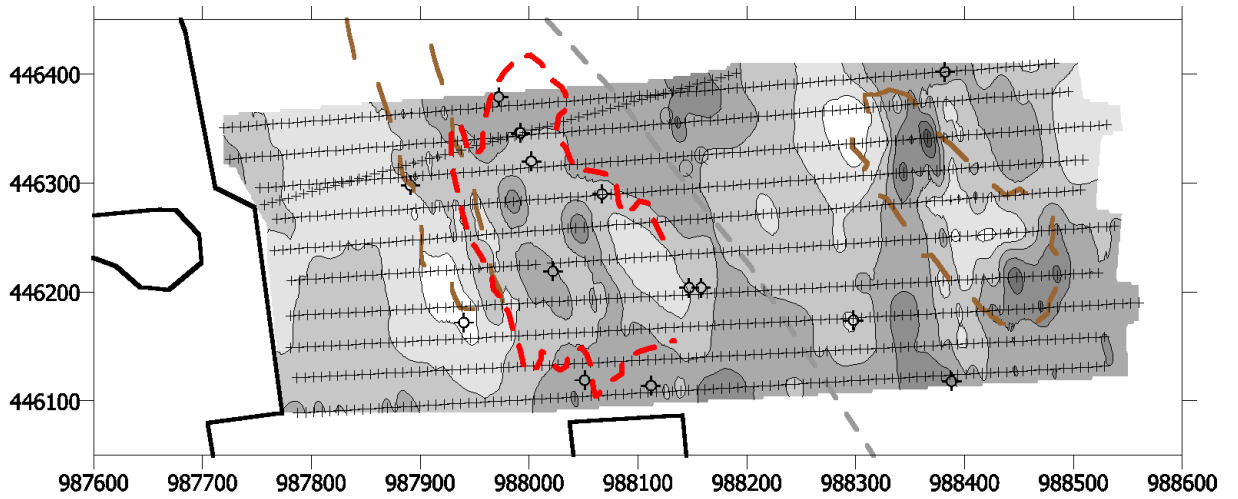
Down in the Dumps Workshop Notes

Neither the EM-31 nor Magnetics data collected over the area containing solid waste can be used to delineate the garbage. The highs in the magnetics data are most likely due to scrap metal on the surface (concrete blocks with rebar).

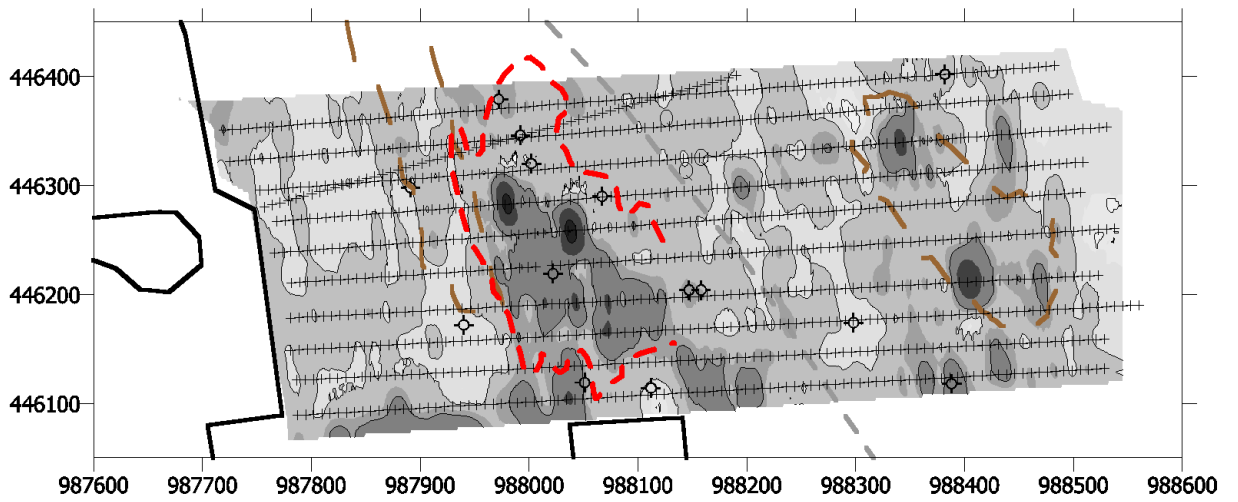


Rio Nuevo North

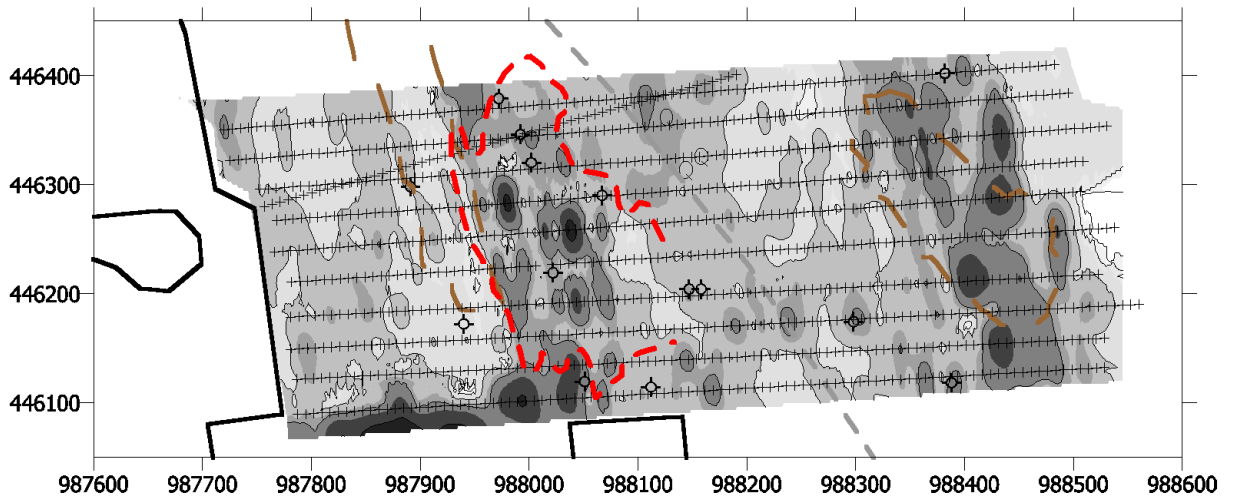
EM-31 Resistivity



ZETA Resistivity (8 ft. depth)



ZETA Resistivity (14 ft. depth)



Down in the Dumps Workshop Notes

EM-31 and resistivity data from the ZETA system at 8 and 14 feet in depth. The EM-31 results (vertical coil orientation) correlated best with the ZETA resistivity results in the 8-to-14 foot depth range.

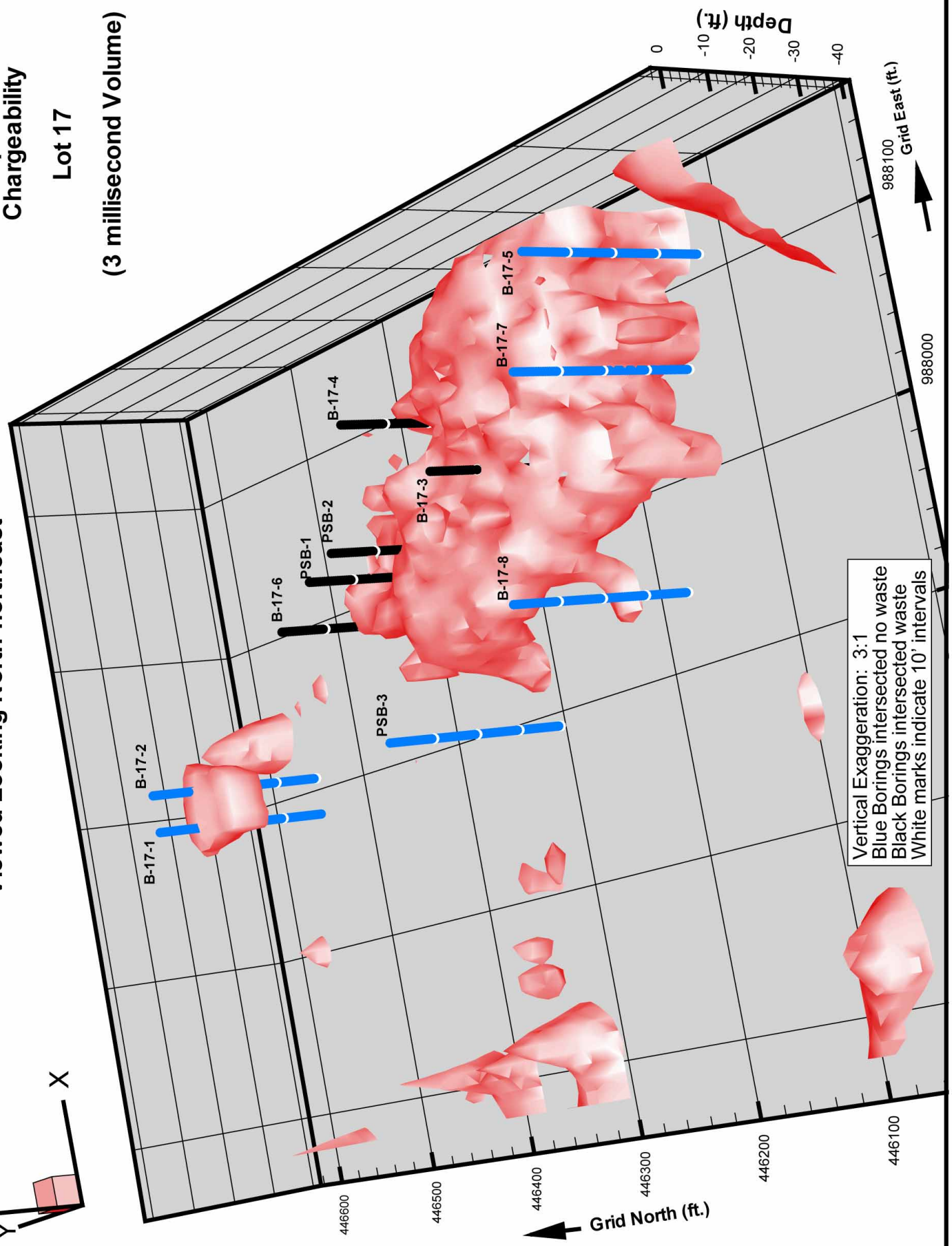
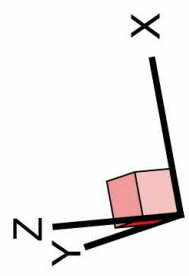


3-D Perspective Plot Chargeability

Lot 17

(3 millisecond Volume)

Viewed Looking North-northeast



Vertical Exaggeration: 3:1
Blue Boreholes intersected no waste
Black Boreholes intersected waste
White marks indicate 10' intervals

Down in the Dumps Workshop Notes

The large grid of lines, combined with the higher-than-normal vertical resolution (12 n-spacings per diagonal) provides sufficient data for 3-D images of the results. The 2-D smooth model inversion results for each line have been combined, and the red-shaded iso-surface shows the volume of earth enclosed by the 3 millisecond surface. Borings are shown in blue or black. Note in particular Boring B-17-7, which was deliberately drilled very close to, but outside, the anomaly. This boring intersected no waste, verifying the southern extent of the landfill.

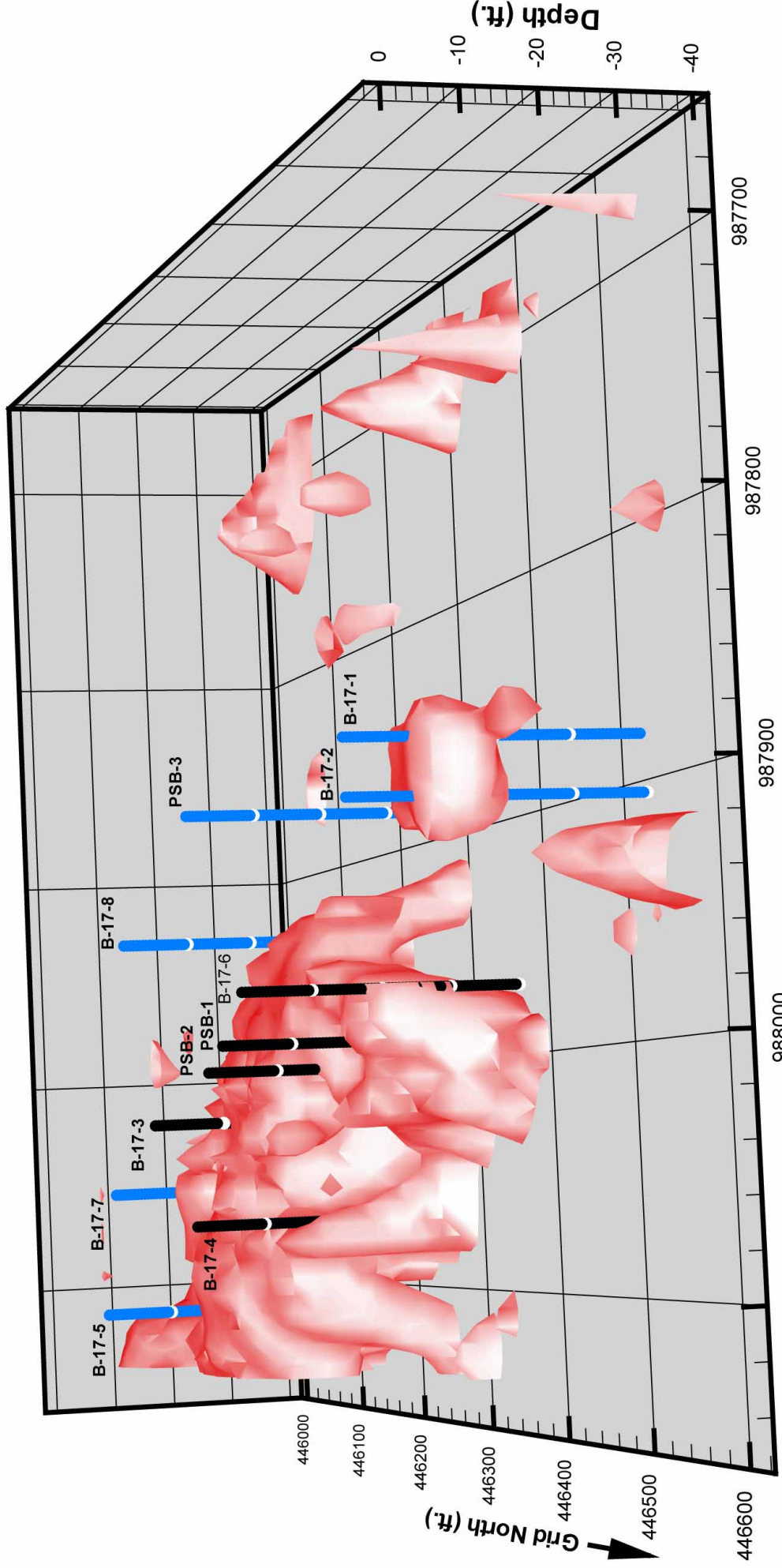
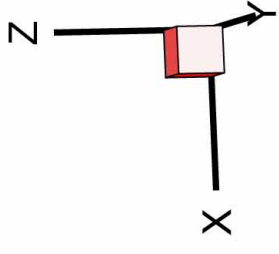
Note that some cultural anomalies that are evident in the plan views have been removed from this plot for graphical purposes.



Viewed Looking South

3-D Perspective Plot Chargeability

Lot 17 (3 millisecond Volume)



Vertical Exaggeration: 3:1
Blue Borings intersected no waste
Black Borings intersected waste
White marks indicate 10' intervals

Down in the Dumps Workshop Notes

Boring B-17-6 was deliberately drilled very close to, but within, the northern edge of the IP anomaly. This boring intersected a significantly smaller amount of waste than any of the other borings in the anomaly, verifying the northern limit of the landfill.

Although the correlation has been excellent between the IP anomaly and the buried waste encountered in subsequent borings, it should be noted that the 3-D images are not 3-D models, and that assumptions are made in the gridding and interpolation process. Our interpretations are always based on the individual line inversions, although the 3-D images are very useful in helping to visualize the size, shape, and orientation of the anomalous area in the subsurface.

