GEL Engineering of NC, Inc.

Determination of lateral and vertical extent of landfilled flyash using geophysical methods

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Andrew Eyer

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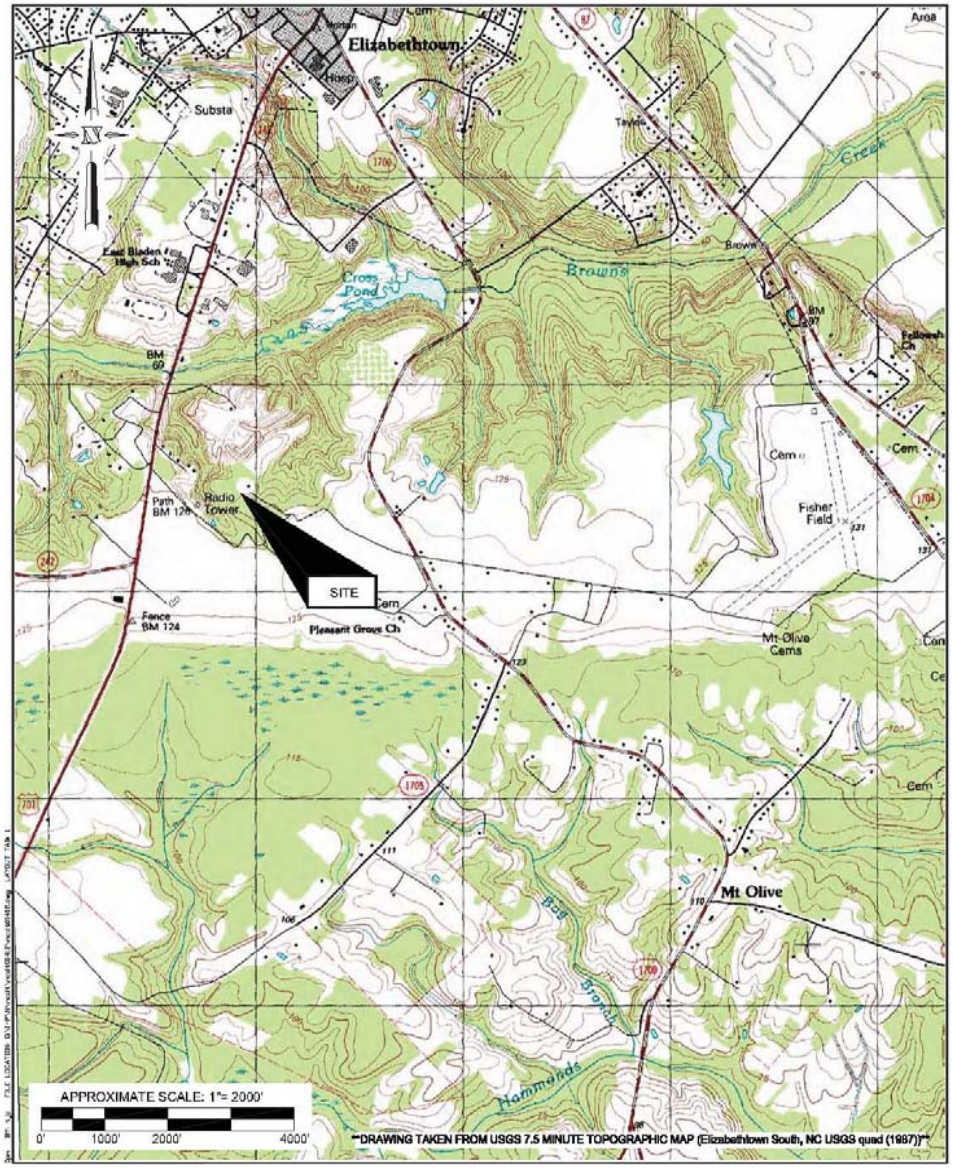
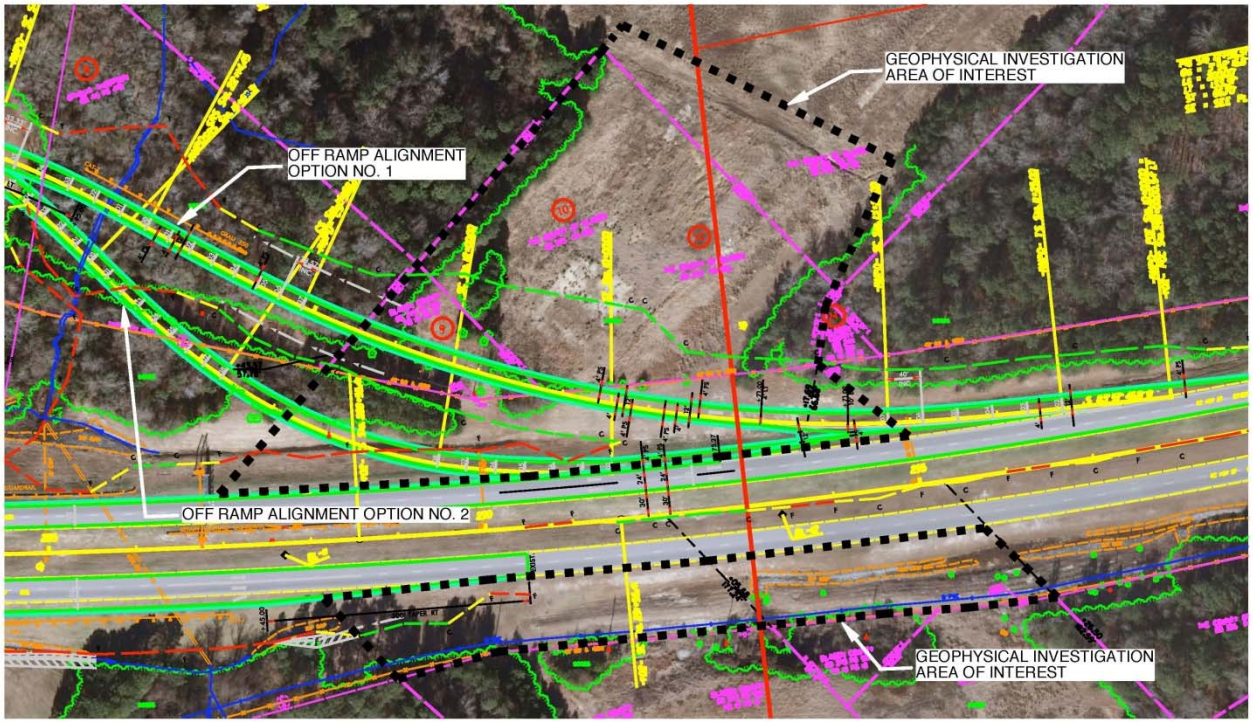
Embassy Suite Hotel, Raleigh, North Carolina


Elizabethtown
Substa
East Bladen High Sch
Cross Pond
Browns
Creek
BM 60
Radio Tower
Pgth BM 126
SITE
Fence BM 124
Pleasant Grove Ch
Fisher Field
Mt Olive Cems
Mt Olive
Hammonds
APPROXIMATE SCALE: 1"= 2000'
0' 1000' 2000' 4000'
DRAWING TAKEN FROM USGS 7.5 MINUTE TOPOGRAPHIC MAP (Elizabethtown South, NC USGS quad (1987))

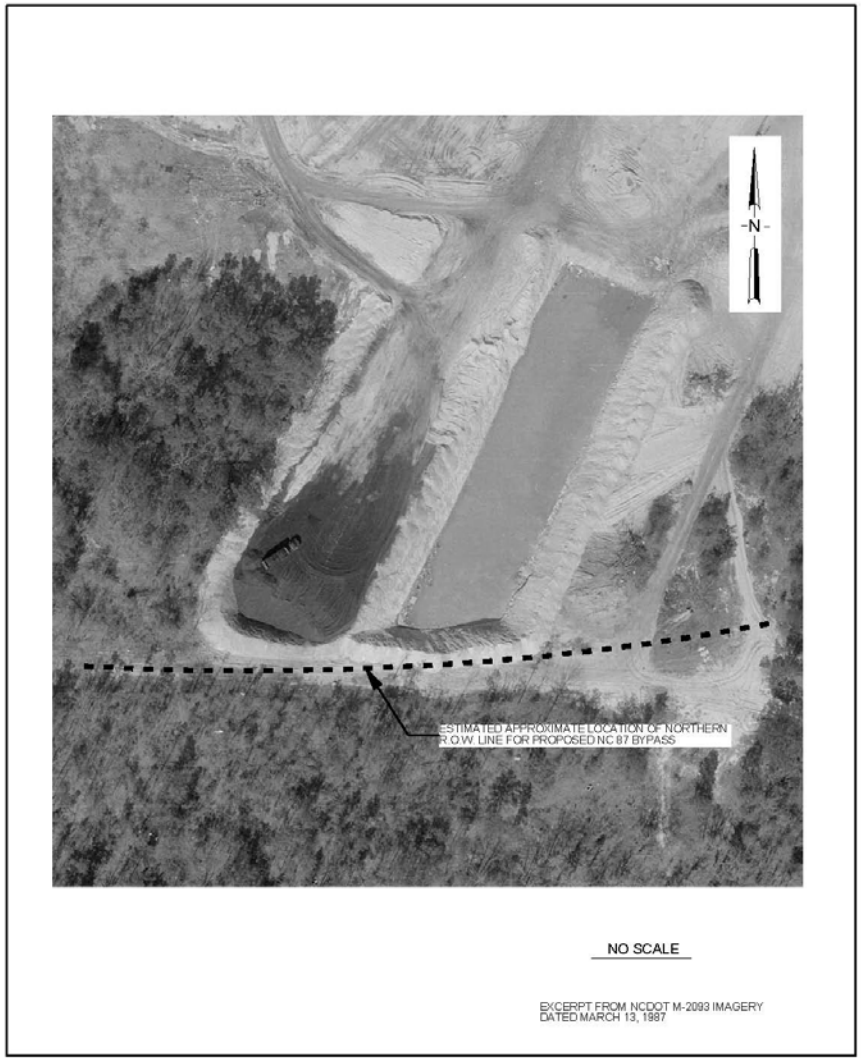

701
242
Grey Moss Ln
2
2030
Blueberry Hill Rd
701
242
NC HWY 87 BYPASS
2040
701
242
Imag



N

NO SCALE

FIGURE IS AN EXCERPT FROM NCDOT R4903_RDY_DSN.DGN FILE


-N-
ESTIMATED APPROXIMATE LOCATION OF NORTHERN
R.O.W. LINE FOR PROPOSED NC 87 BYPASS
NO SCALE
EXCERPT FROM NCDOT M-2093 IMAGERY
DATED MARCH 13, 1987

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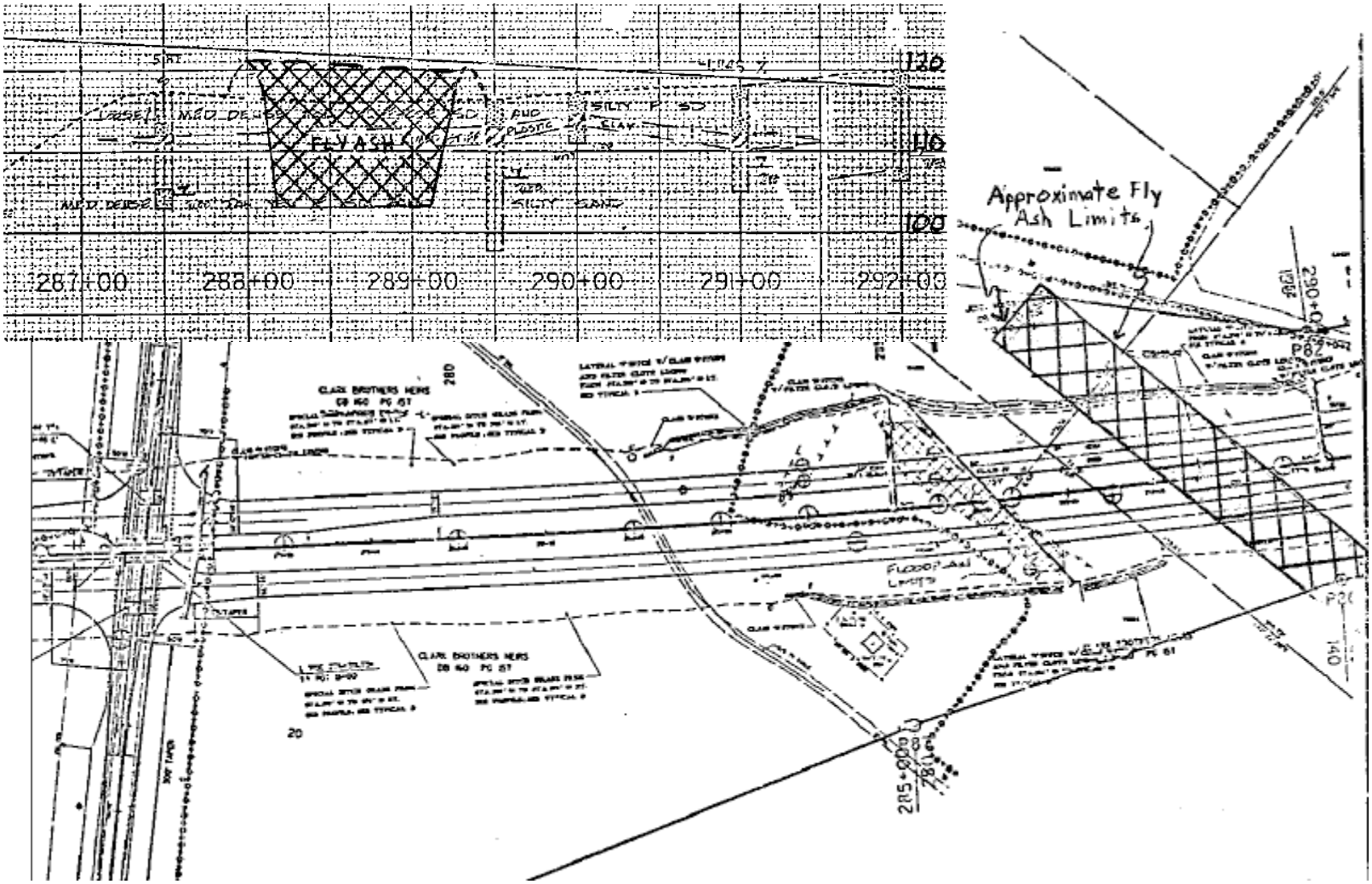
One flyash trench was encountered during the construction of NC 87 Bypass



Top of landfill

Defined edge of landfill on west side

Undefined edge of landfill on east side

South side of NC 87 Bypass. No visual evidence of flyash trench

Objectives of investigation

Perform a geophysical investigation to identify the lateral and vertical limits of the closed flyash landfill within the area of interest at the site

Geophysical Instrumentations used

- Electromagnetic ground conductivity instrument (CMD-4)

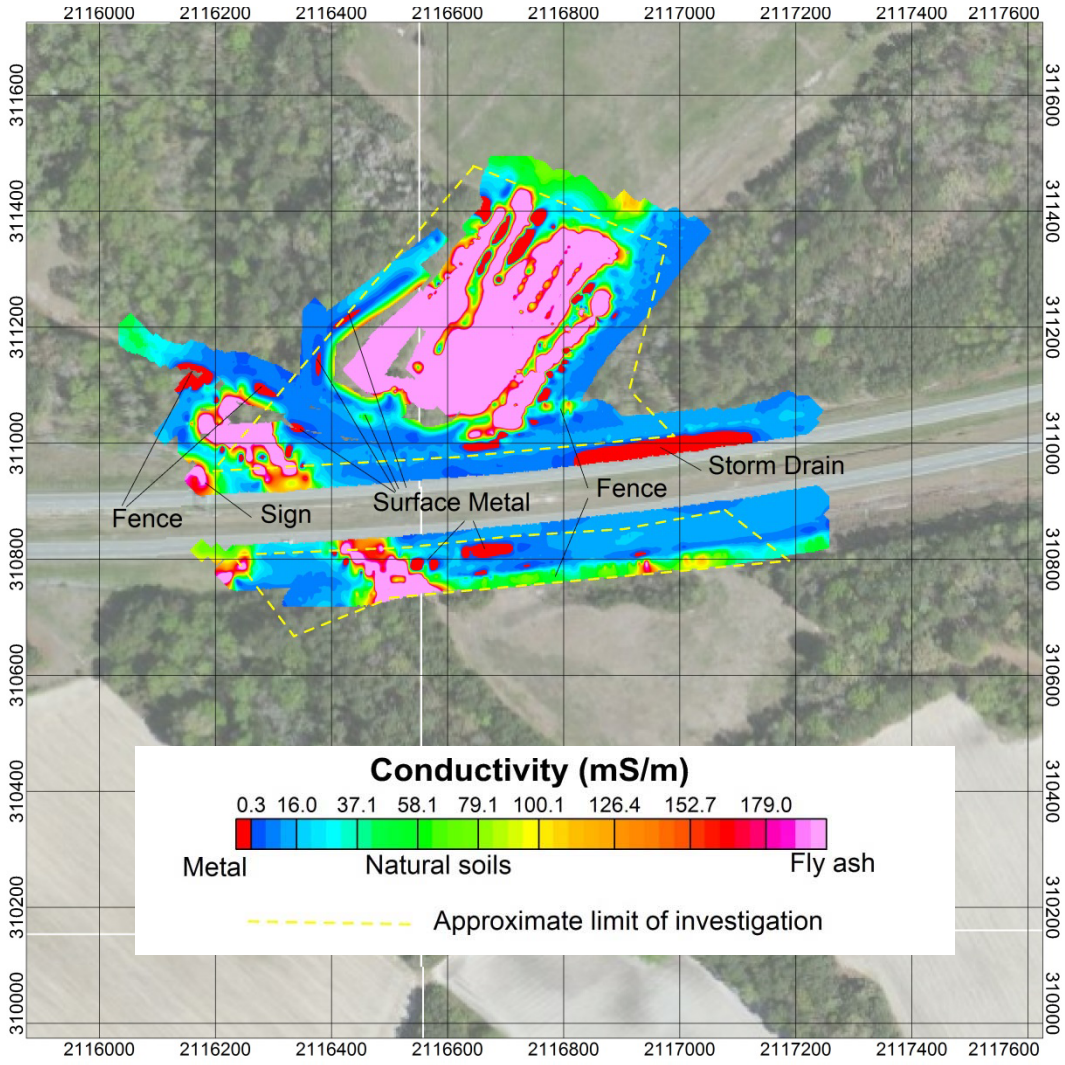
Applications:
Detect lateral extent of conductivity anomalies with metallic content (i.e. landfill cells)

Geophysical Instrumentations used

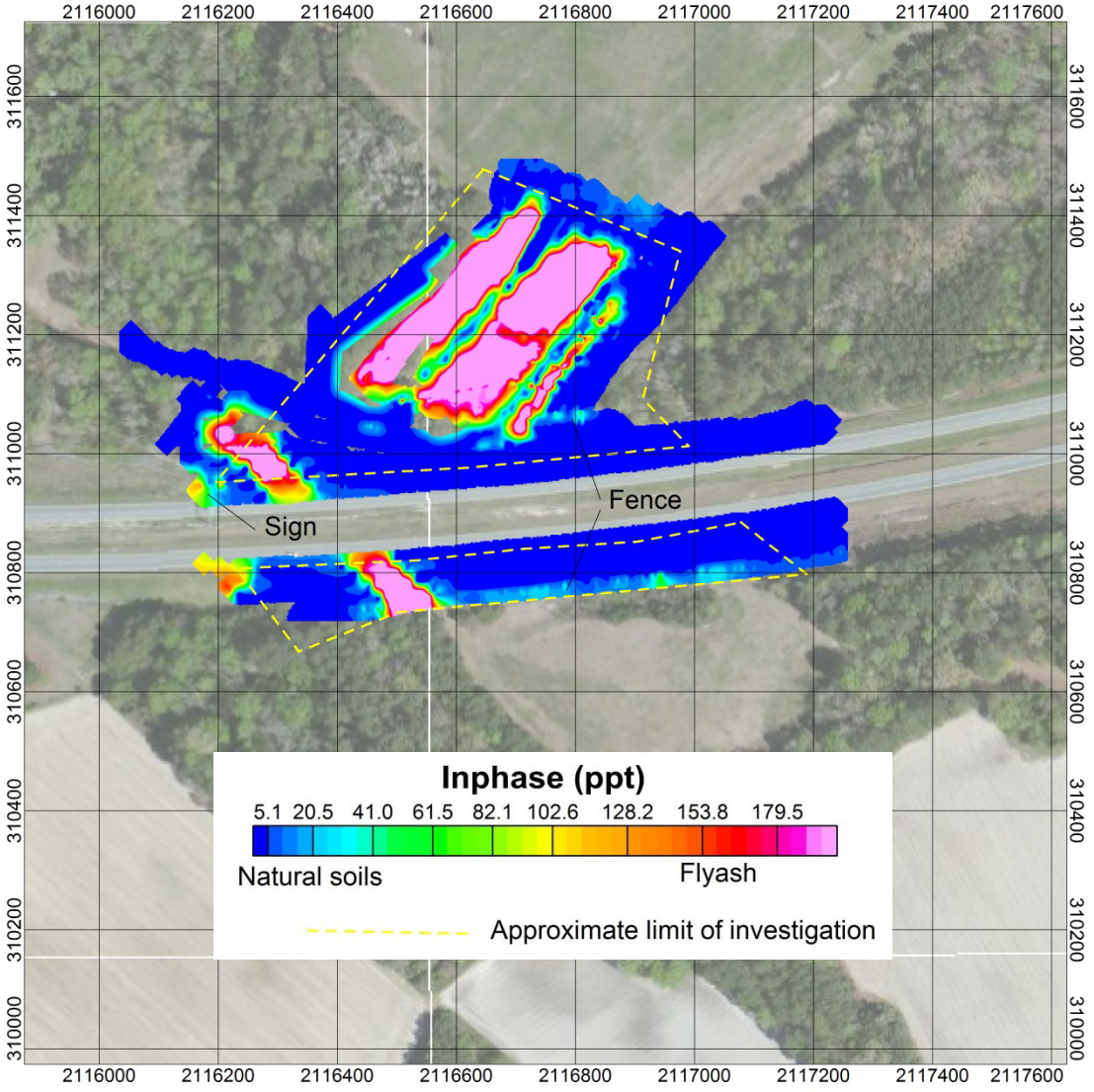
- Electrical resistivity imaging (Supersting R8 ERI/IP)

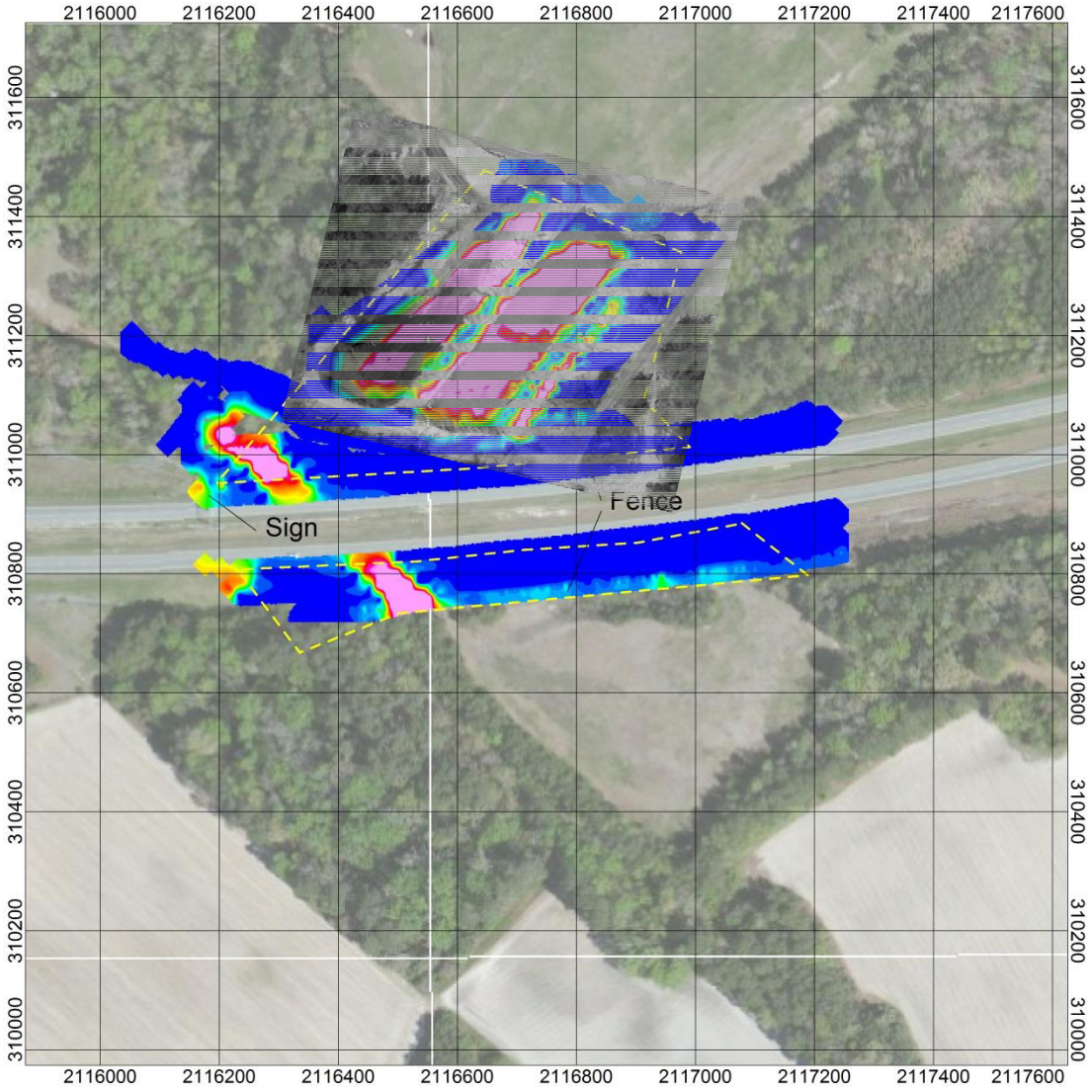
Applications
Determining vertical extent of conductivity and chargeability anomalies (i.e. landfill cells)

CMD-4 Conductivity data

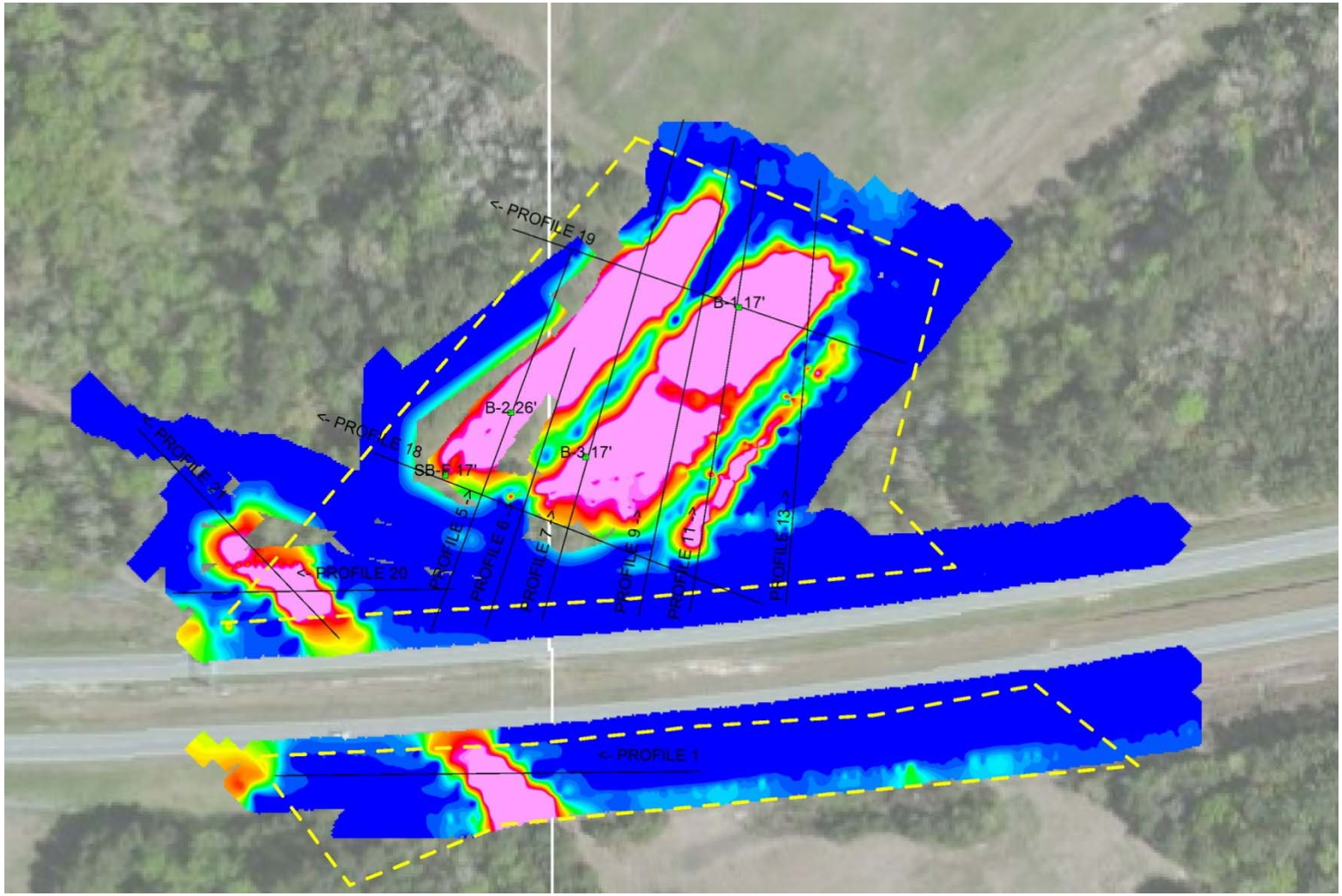


CMD-4 In-phase Data



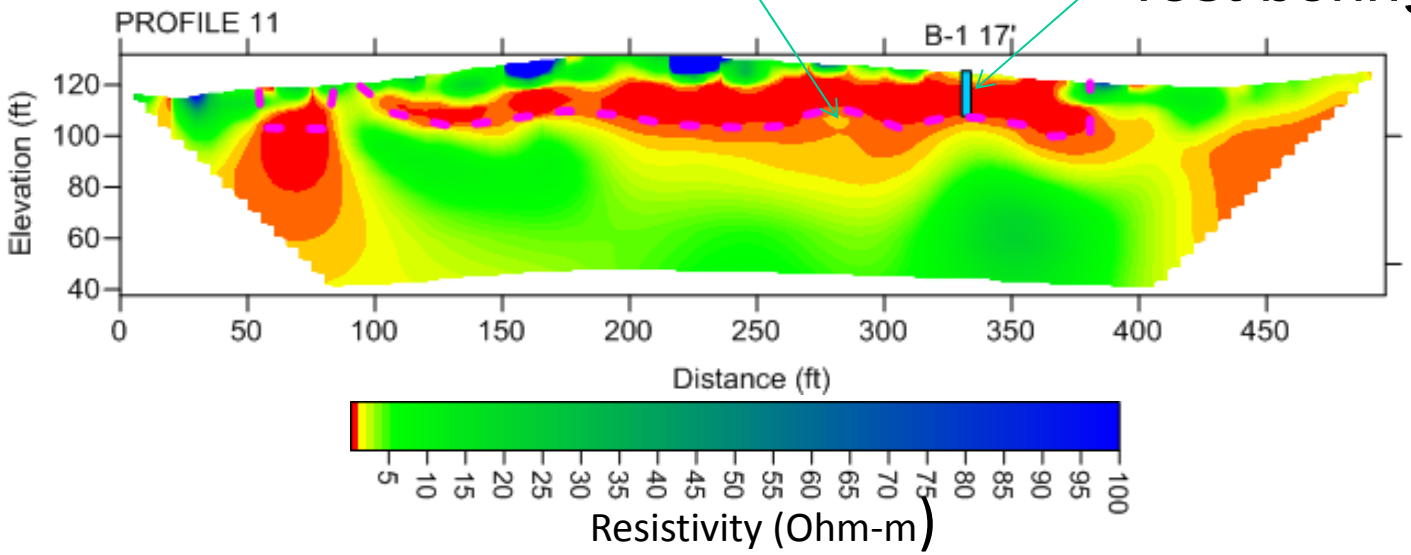

2116000
2116200
2116400
2116600
2116800
2117000
2117200
2117400
2117600
311600
311400
311200
311000
310800
310600
310400
310200
310000
Sign
Fence

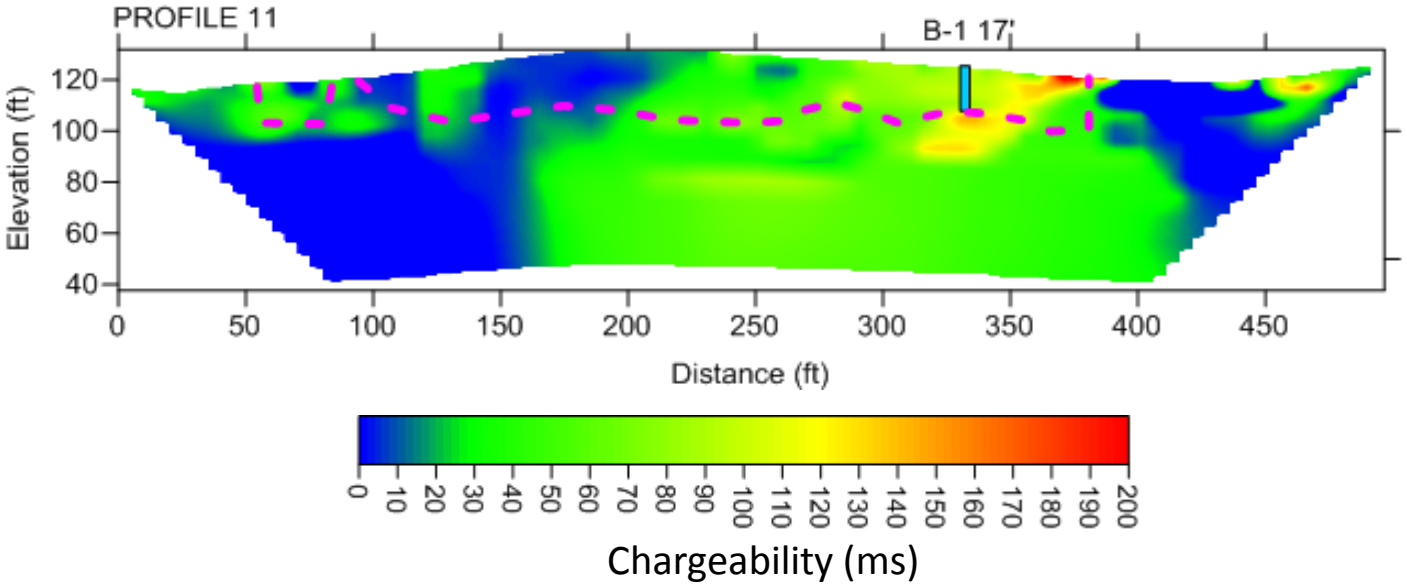
ERI/IP Data Profile Locations



Interpreted base of flyash

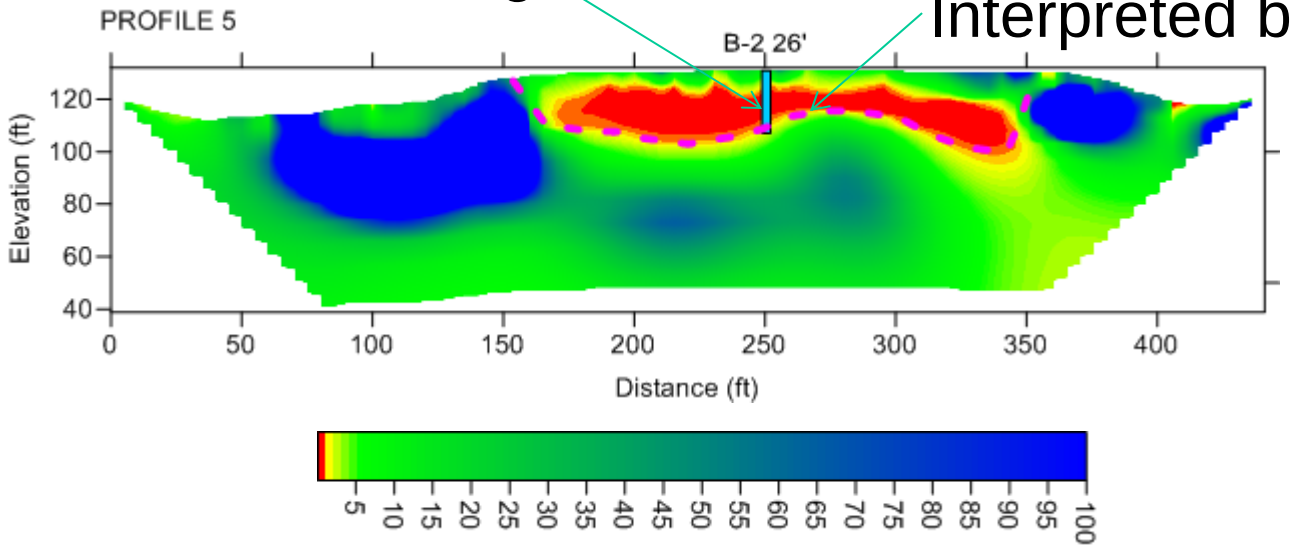
Test boring



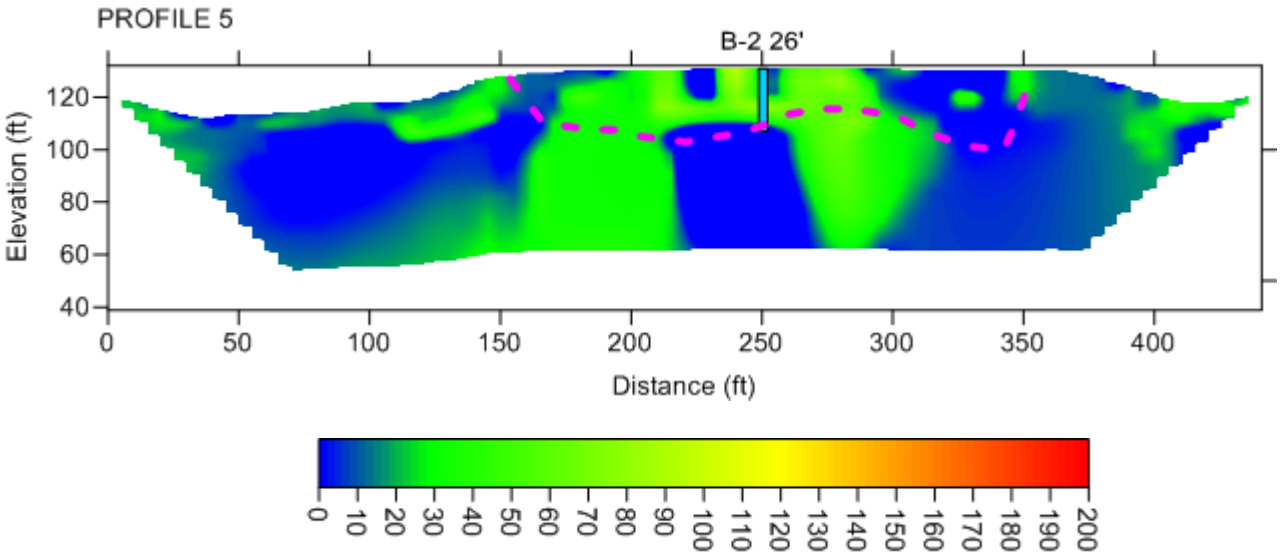


Test boring

Interpreted base of flyash

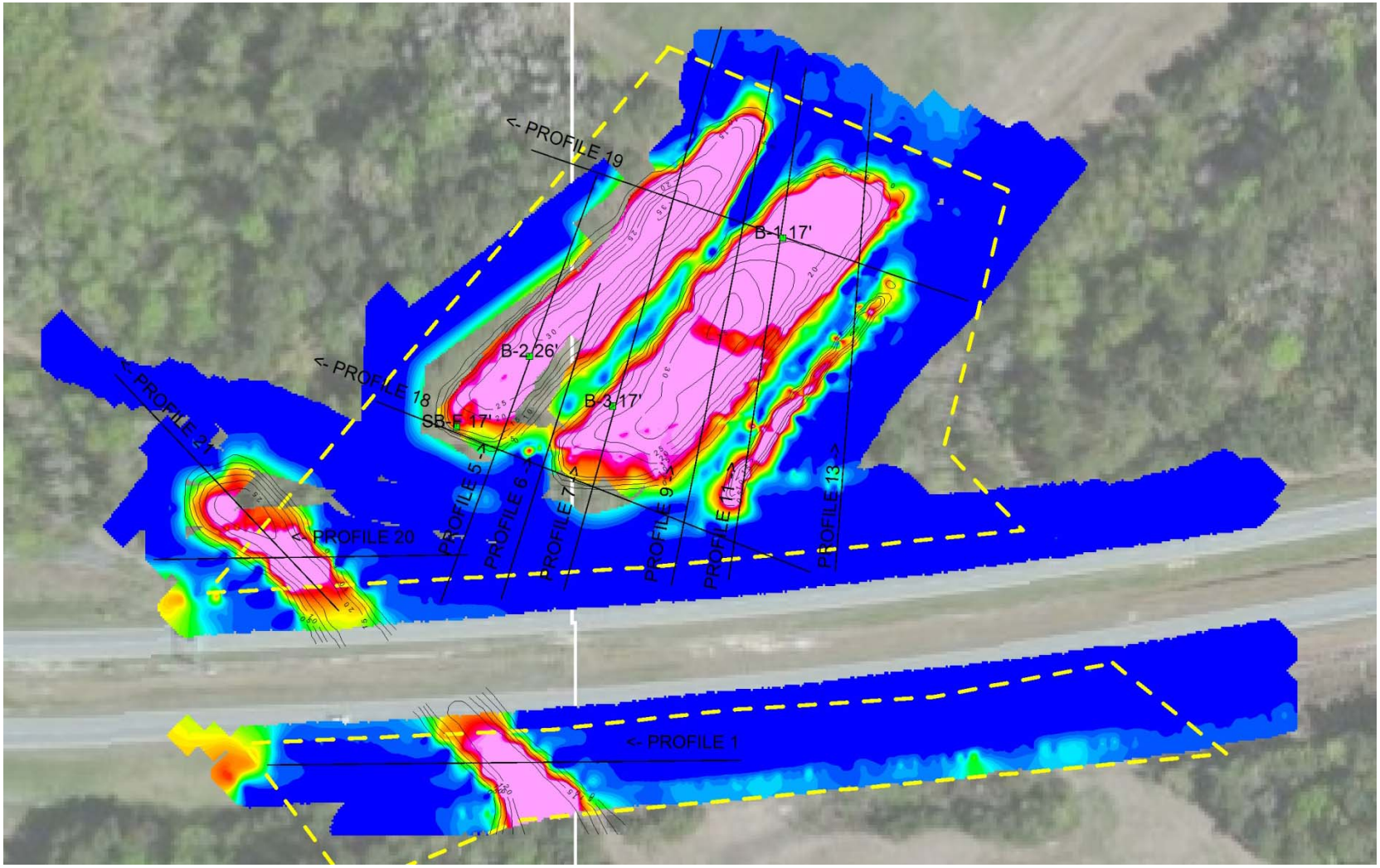


Resistivity (Ohm-m)



Chargeability (ms)

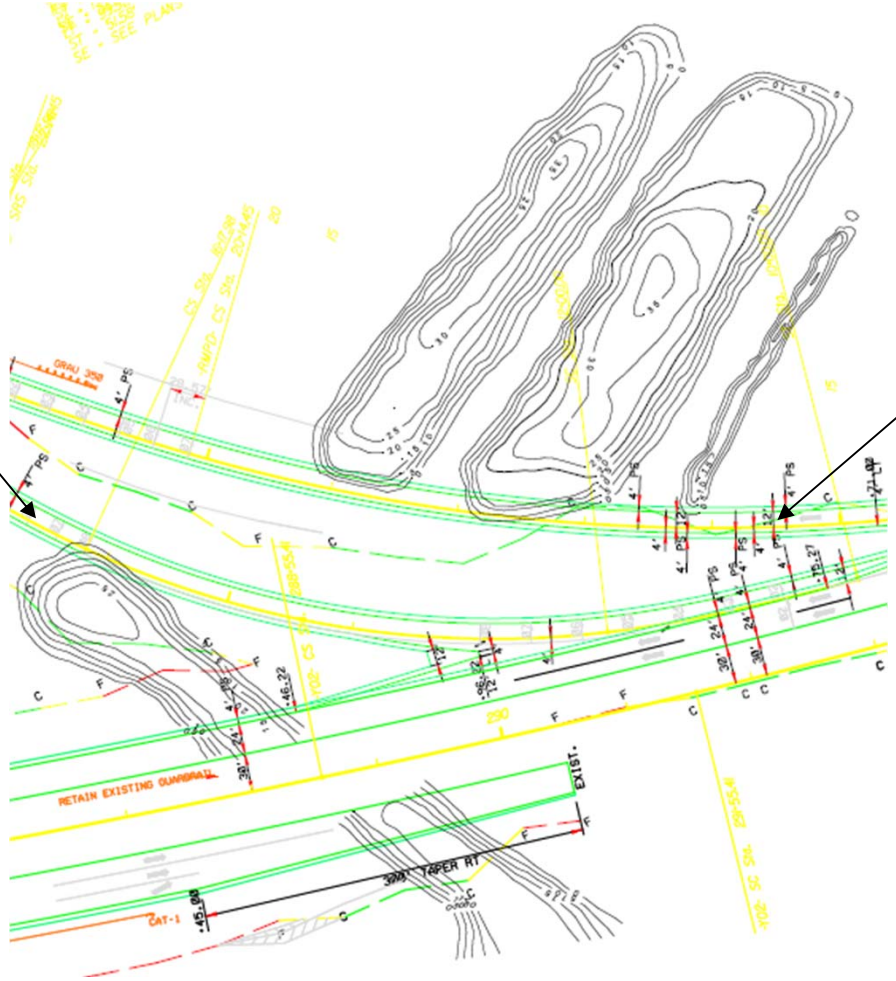
Flyash thickness contour lines from CMD-4 and ERI data



Flyash thickness contour lines from geophysical data overlaid on planned alignments for exit ramp

Option 2
(Final)

Option 1



Conclusions

- Lateral and vertical limits of landfilled flyash trenches were determined through a combination of electromagnetic and electrical resistivity imaging
- Borehole data was used to calibrate the geophysical data and improve the accuracy of the geophysical models
- Based on the geophysical results, NCDOT selected a different option for the proposed alignment of the exit ramp to minimize the amount of flyash to be removed

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Thank you

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