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Aerial Image Analysis and Geophysical Investigation
Ortiz Park Landfill
Santa Fe, New Mexico

Prepared for:

City of Santa Fe
Environmental Services Division
Attention: Mr. Lawrence Garcia
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Introduction

An investigation of the Ortiz Park Landfill in Santa Fe, New Mexico has been conducted using a combination of historical aerial images and geophysical surveys. The primary objectives of the investigation were to delineate the lateral boundaries of the landfill and determine the thickness of the buried waste. Secondary objectives were to detect areas of high moisture or potential zones of leachate and anomalous buried wastes, such as metallic concentrations, suggestive of drums or containerized waste.

Historical information on this landfill is limited. It was reported that Ortiz Park operated as a municipal landfill for approximately 14 years, between 1954 and 1968, and there are no records of received volumes, weights, or types of waste (*Amended Stage 1 Abatement Plan, Ortiz Park Landfill, Santa Fe, New Mexico, March 1, 2010*). The limited background information and the relatively large size of Ortiz Park prompted an investigation consisting of four (4) Tasks:

- Task 1. Analysis of historical aerial images
- Task 2. Establishing spatial control and a reconnaissance survey
- Task 3. High resolution surveys to refine portions of the reconnaissance survey
- Task 4. Site recovery and reporting

The field survey activities were conducted during November 2014. Labor, instrumentation, and technical expertise for the surveys were provided by Sunbelt Geophysics of Socorro, New Mexico. Guidance and coordination were provided by the City of Santa Fe, Environmental Services Division.

Results

<u>Task 1. Analysis of Historical Aerial Images</u>

The investigation started with an analysis of historical aerial photographs and satellite images of the Ortiz Park area, with the goal of determining the historical development of the landfill. It was hoped that the aerial images would reveal information concerning the placement of the buried wastes within the landfill area. Information such as the locations, general size, shape and orientation of burial trenches or cells was sought for planning geophysical surveying, helping to focus field efforts.

Searches for aerial images were ordered from the Earth Data Analysis Center at the University of New Mexico, Albuquerque, and from Environmental Data Resources Inc., Milford, Connecticut. The searches identified 16 unique aerial images spanning the time from 1948 to 2011. It is likely additional images exist, especially more recent satellite images. Images from 1951, 1960, 1966, 1973, 1982, 1987, 1991, and 2011 were selected for processing, analysis, and inclusion in this report. These images were cropped, scaled, and oriented to a common base and are presented in Appendix A. The full suite of 16 aerial images has been provided to the Environmental Services Division in digital format.

A chronological analysis of Ortiz Park, keyed to the historical aerial images, is provided below:

The Ortiz Landfill is reported to have been active from approximately 1954 to 1968. The 1951 aerial image (Figure A – 1) shows the outline of the current park boundary as a dashed line enclosing essentially raw, undisturbed land. The only significant cultural feature within the current park boundary is a dirt road running along Torreon Arroyo. The World War 2 era Internment Camp is observed approximately 750 ft. to the southeast of the current park boundary.

The 1960 aerial image (Figure A – 2) also shows the outline of the current park enclosing undeveloped land with no significant changes since the 1951 aerial image. Away from the park boundary, the Internment Camp has been demolished and replaced with a housing development. Disturbed ground is observed at the Paseo de Vista Landfill to the northwest, indicating waste disposal.

No significant ground disturbance is observed within the current park boundary in the 1966 aerial image (Figure A – 3). Clearly, the previously reported period of active waste disposal (approximately 1954 to 1968) is in error. It is possible that a few small loads of waste are present and not resolved in the 1960 or 1966 aerial images, but clearly there had been no mechanical excavation.

Significant mechanical alteration of the ground surface is observed in the 1973 aerial image (Figure A – 4). Most of the former vegetation cover has been stripped and the local terrain appears to have been modified to essentially the same landform as the current Ortiz Park. The original Torreon Arroyo has been filled, with this local drainage shifted to the west. Fill material has been borrowed from west side of the former arroyo and from the ridge on the east side of the park.

There is only one feature on the 1973 aerial image suggestive of a waste disposal trench and this is annotated on Figure A – 4. There are a few other features that can be suspected of being related to former landfill activities, such as an access road and large areas of bare ground. The re-growth of vegetation over much of the northwest quadrant of the area indicates that at least one year may have passed since major earthmoving activities. The 1973 vegetation pattern in the southern portion of the site remains the essentially the same on subsequent aerial images.

The 1982 aerial image (Figure A – 5) shows that the park had been put into recreational use with the construction of tennis courts, an irrigated baseball field, and a parking lot. These features can be observed on a 1979 aerial image, but that image was not included because the resolution and scale are poor. The 1987 image (Figure A – 6) indicates that recreational use was enhanced by the addition of fences and possibly further earth moving.

Irrigated soccer fields have replaced the baseball field in the 1991 aerial image (Figure A – 7). Leveling measurements indicate that the soccer fields were constructed with the addition of 4 – 5 ft. of fill material. Construction of the soccer fields essentially completed modification of the local landform to current conditions. The 2011 aerial image (Figure A – 8) shows improvement

to the parking area to the west of the former soccer fields and stabilization of the drainage along the western edge of the park.

The 2011 aerial image is repeated as Figure 1 with historical features superposed on the current landform. These features include the baseball field, the soccer fields, the original position of Torreon Arroyo, and the former road and possible waste disposal trench from the 1973 aerial image.

The analysis of historical aerial images provides the following observations:

- The Ortiz Landfill was not active before 1966 and was closed with some re-growth of vegetation by 1973. This suggests that active waste disposal was limited to no more than approximately 6 years, and the volume of buried waste may be modest.

- Waste disposal is observed at the Paseo de Vista Landfill as early as 1960, providing a nearby alternative for waste disposal.

- A portion of the site received irrigation for a baseball filed as early as 1979, and expanded irrigation for soccer fields by 1991. Both of these activities overlapped the original trace of Torreon Arroyo before it was buried.

- No historical aerial images were found that showed obviously active waste disposal activities to provide locations, size or orientation of disposal trenches or pits. There is one possible waste disposal feature, oriented roughly east – west, observed on the 1973 aerial image (Figure A – 4). This feature, together with the orientation of the access road, areas of bare ground, and the general trend of earth moving from the east toward the western side of the site suggested that geophysical surveying along a grid oriented roughly north – south would be preferred.

Figure 1. Ortiz Park Landfil, Santa Fe, NM

Historical Features Superposed on 2011 Aerial Image

250 0 250 500

(feet)

N

Task 2. Establishing Spatial Control and Perform a Reconnaissance Survey

A spatial control and data acquisition grid was placed using a transit and tape. This grid established data acquisition lines oriented N28.5°E. The grid extended from Torreon Arroyo on the west to the native ground along the eastern edge of the park. The northern boundary was near the relic tennis courts and the grid extended to the southern boundary of the park. The grid was marked with wooden stakes and small dots of spray caulk. The grid is show in Figure 2, overlaid on the 2011 aerial image.

The initial geophysical effort was a reconnaissance or screening survey covering most of Ortiz Park. This survey was designed to establish the overall lateral extents and general character of the buried wastes, and possibly identify individual trenches or pits. A ground conductivity survey deploying a Geonics Ltd. EM-31 ground conductivity meter was chosen for the reconnaissance survey. This instrument provides measurements to a depth of approximately 18 ft., and maps the contrast between the buried wastes and native soil. The EM-31 is sensitive to buried wastes that are both rich and poor in buried metal, and can identify relative wetness in the wastes. EM-31 data were acquired approximately every 2.5 ft. along data acquisition lines separated by 15 ft.

The EM-31 conductivity meter provides two different measurements, the apparent ground conductivity in milliSiemen/meter (mS/m) and the In-Phase response in parts per thousand (ppt).

The ground conductivity is a measurement of the ease with which electric current flows in the subsurface. This is primarily controlled by soil moisture and secondarily by soil constituents such as clay and mobile ions. Lateral variations of ground conductivity, in the absence of buried metal, are usually interpreted to be variation in retained soil moisture. The EM-31 ground conductivity measurement is sensitive to buried metal. Buried metal interferes with the instrument's primary (input) electromagnetic field and the secondary (ground response) field, often generating unrealistically high or low measurements.

The EM-31 In-Phase response is a measurement of the shift between the instrument's primary electromagnetic field and induced secondary field. The In-Phase is intentionally tuned to approximately zero (0 ppt) over barren ground at the start of a survey. The In-Phase response can vary slightly as the instrument traverses barren ground due to changes in soil constituents. The In-Phase response is very sensitive to buried metal which can generate large and abrupt changes from background.

Figure 2. Ortiz Park Landfill, Santa Fe, NM

Spatial Control Grid Superposed on 2011 Aerial Image

100 0 100 200 300

(feet)

The interpretation of EM-31 survey data acquired at a landfill site is reasonably straightforward and portions of the site usually fall into one of the following types:

- Smooth and slowly varying ground conductivity and In-Phase response indicate barren or native ground.

- Lateral variations in ground conductivity with no change in the In-Phase response suggest disturbed ground with little or no buried metal. This could be due to buried waste, such as concrete or asphalt rubble, wood, paper, and/or landscape trimming. A natural or man-made drainage feature or disturbed ground that alters local soil moisture could also generate such a conductivity anomaly. Elevated ground conductivity indicates a relatively moist subsurface, low conductivity suggests well drained conditions.

- Areas displaying high or low ground conductivity and modestly disrupted In-Phase response contain waste with some metal.

- An area with high or low ground conductivity that appears dimpled with abrupt changes and a chaotic In-Phase response indicates buried waste with significant buried metal. This is a typical response from municipal waste.

The EM-31 In-Phase survey data are imaged in Figure 3. These data display significant deviation from background (yellow) indicating buried metallic waste over much of the park. The In-Phase anomalies are both positive (orange to pink) and negative (green to blue). There appears to be a different character to the In-Phase response between the northern half and southern half of the landfill. The In-Phase anomalies are predominately positive to the north, and more negative to the south. This suggests a different character to the buried waste.

There are several above ground occurrences of metal that generate local interference with the In-Phase response. These are labeled on the figure and include two drainage channels, metallic furniture (benches, tables), trash bin, and a monitoring well. This interference does not have serious impact on recognizing the buried waste.

There is a gap in the EM-31 coverage that was omitted due to parked vehicles and a cable fence. This area was qualitatively screened with a Schonstedt magnetic locator which revealed continuity of the buried waste. Most of this gap was also covered by a follow-on high resolution survey. The EM-31 survey did not extend to the absolute edge of Torreon Arroyo where steep slopes made unstable footing for the instrument operator. Qualitative screening and visual observations indicate that the waste deposits extend to the edge of the arroyo.

The EM-31 ground conductivity data are imaged in Figure 4. These data mimic the In-Phase results, delineating essentially the same extent of buried waste. The ground conductivity data also suggests the buried waste is found in two different types of “deposits”, a northern section with elevated ground conductivity and a southern section with overall lower ground conductivity.

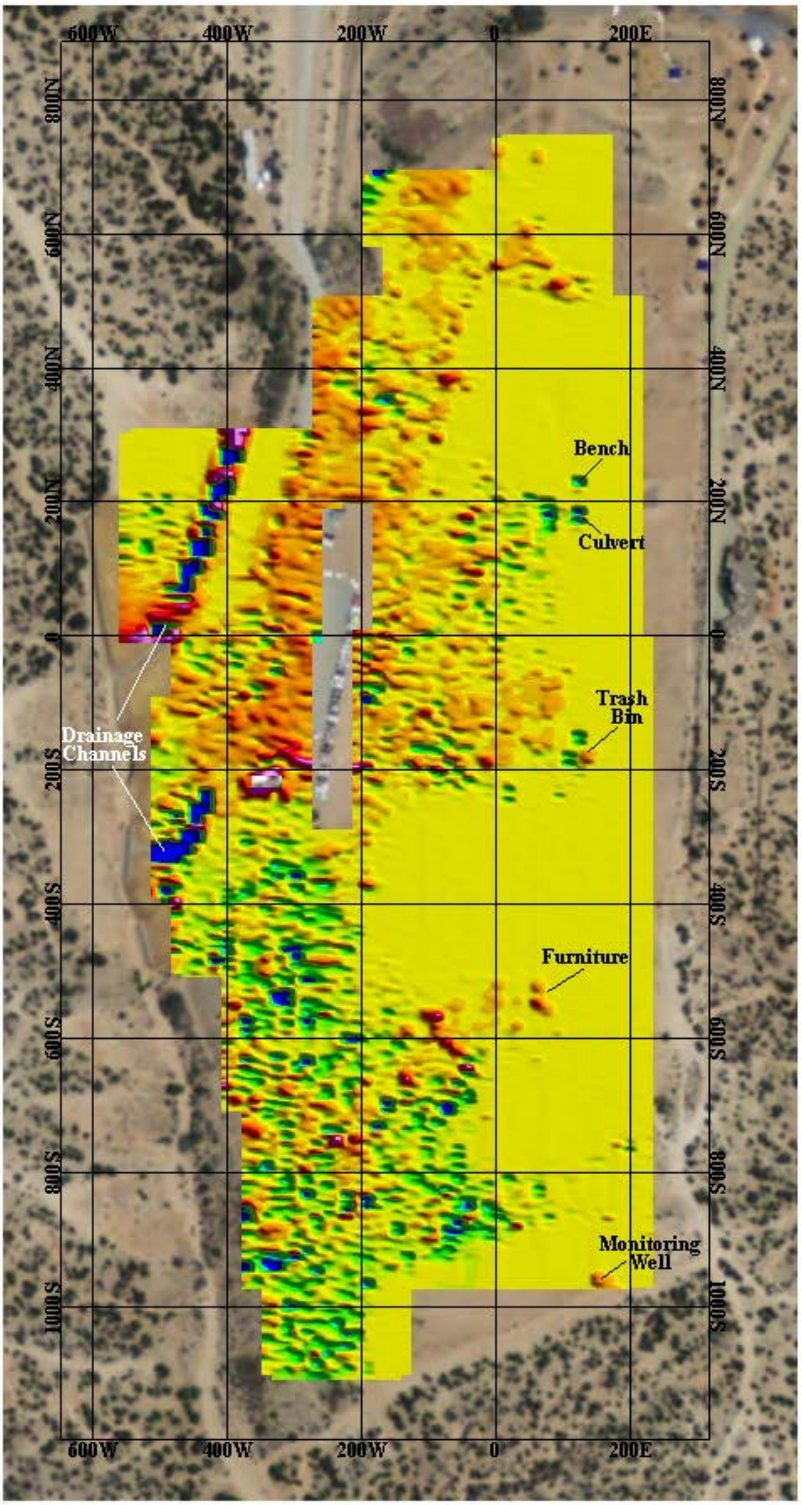

Figure 3. Ortiz Park Landfill, Santa Fe, NM

EM-31 In Phase Response

100 0 100 200 300

(feet)

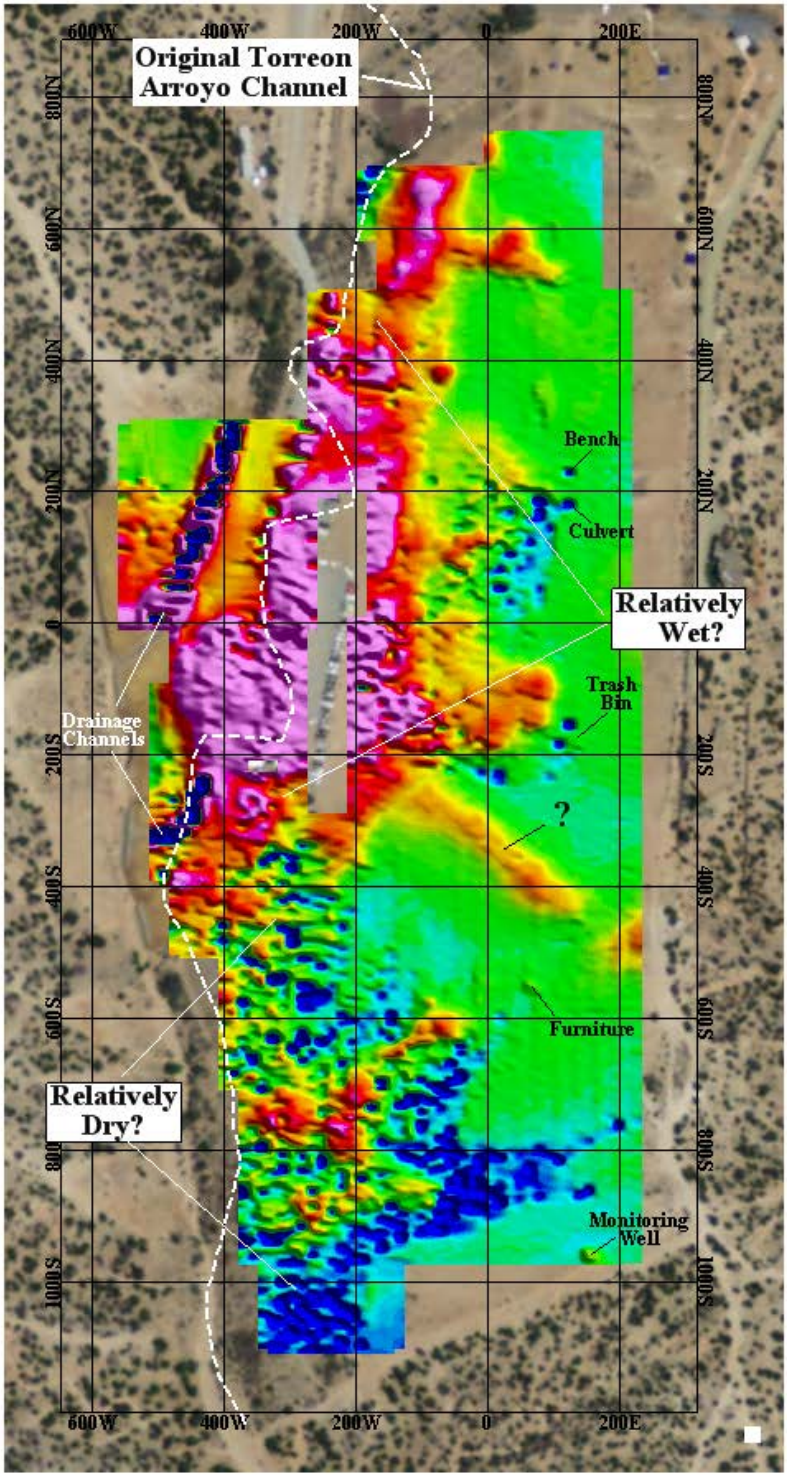

Figure 4. Ortiz Park Landfill, Santa Fe, NM

EM-31 Ground Conductivity

100 0 100 200 300

(feet)

The values of the ground conductivity data may be suspect due to the large amount of buried metal demonstrated by the In-Phase response. Despite this concern, the elevated conductivity strongly suggests that the northern deposit contains excess moisture compared to background and the southern deposit of waste. The trace of the original Torreon Arroyo is given as a dashed, white line. The elevated conductivity spans the original arroyo channel, but there does not appear to be a robust correlation between the buried waste and the former arroyo channel.

The break between the two deposits is at approximately 350S, which corresponds to a general break in the character of the ground surface. The ground surface in the northern section is relatively smooth and flat except for the rise of 4 – 5 ft. due to the relic soccer fields. The southern portion of the park has significant variation in elevation, falling to a local low at approximately 800S before rising into the southern edge of the park. The landform in the southern portion has been clearly been altered by mechanical earthmoving, but there seems to remain at least a hint of the original terrain. It would require stereographic analysis of the 1966 or earlier aerial photographs to be sure.

There is one significant feature observed on the ground conductivity image that has no corresponding In-Phase response. This is a 300 ft. long, linear "finger" of elevated ground conductivity running from 120W, 250S to 120E, 425S. This feature is labeled as "?".

The northern extent of the EM-31 survey was blocked by a stand of trees and the relic tennis courts. Both Figure 3 and Figure 4 show that a thin strip of buried waste may continue to the north, under the tennis courts. Qualitative screening with a Schonstedt magnetic locator was inconclusive due to re-enforcing mesh in the pavement of the tennis courts. This area could be investigated further, but it would require removing trees and scrub foliage.

The EM-31 reconnaissance survey provides the following information:

- Buried waste is found from the tennis courts in the north to the southern end of the park, concentrated in the western half of the site. The buried waste is relatively rich in metal.

- The buried waste appears to be divided into two different regimes or deposits. The northern deposit, designated as Deposit 1, has elevated ground conductivity, suggesting a moist or wet subsurface. The southern deposit has relatively lower ground conductivity, suggesting a dryer subsurface with better drainage.

- The separation of Deposit 1 and Deposit 2 is roughly correlated to a change in terrain or landform. The northern section is relatively smooth and flat except for a 4 – 5 ft. rise into the relic soccer fields. The southern section has significant changes in elevation and may mimic the original topography in places.

- An anomalous finger of elevated ground conductivity with no significant buried metal juts to the south from Deposit 1, extending approximately 300 ft. from 120W, 250S to 120E, 425S.

The results from the reconnaissance survey are summarized on Figure 5.

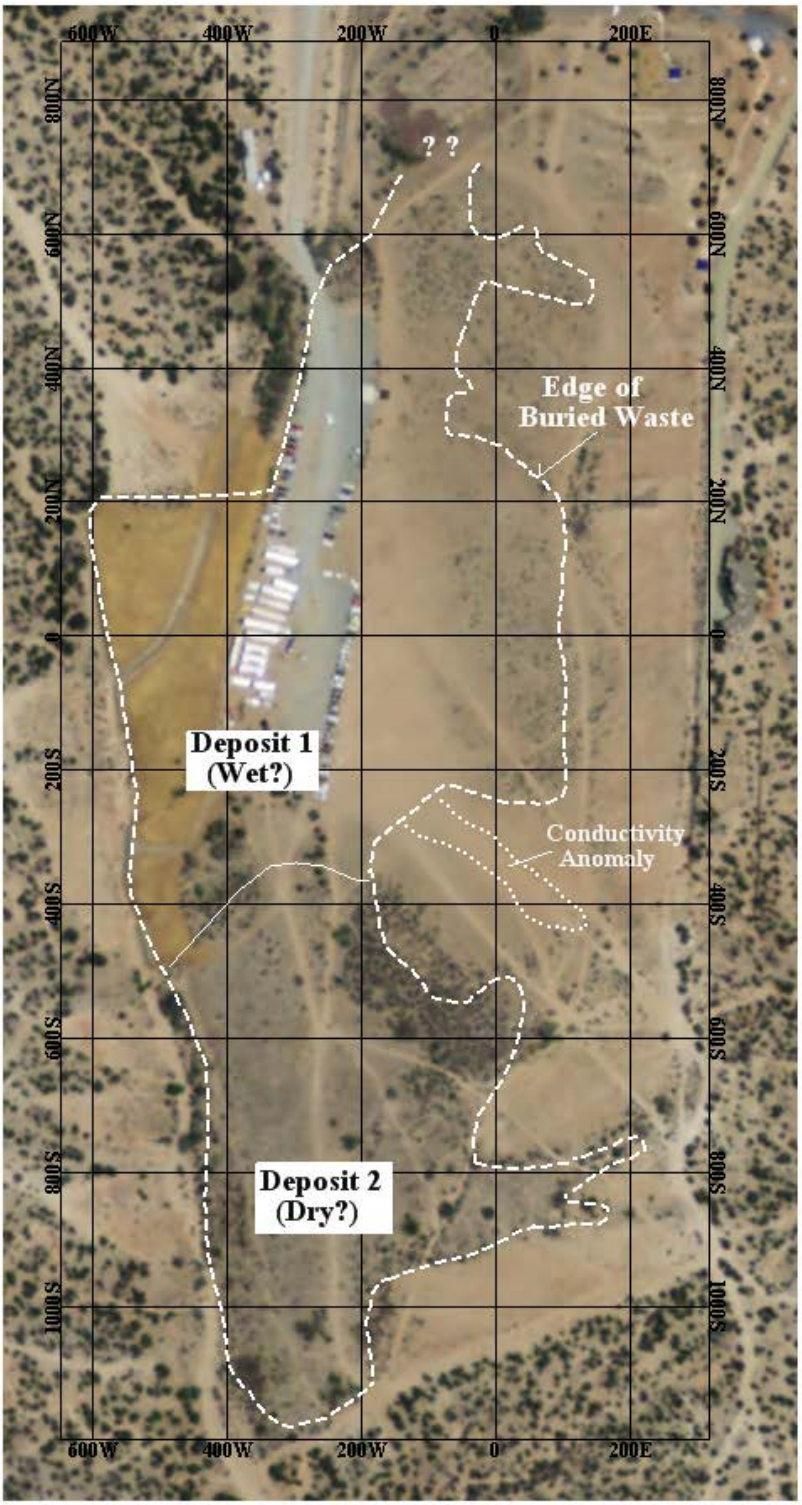

Figure 5. Ortiz Park Landfill, Santa Fe, NM

Extents of Buried Waste

100 0 100 200 300

(feet)

Task 3. High resolution surveys

Several high resolution surveys were conducted at selected areas to refine the results of the reconnaissance survey and gain further characterization of the buried waste. Three direct current (DC) resistivity soundings were performed using an Advanced Geosciences Inc. miniSting earth resistivity meter. Eight sections of ground were re-surveyed with a Geonics Ltd. EM-61 high resolution metal detector, and a Sensors & Software Ltd. ground penetrating radar (GPR) system was deployed over selected areas. The locations of the DC resistivity soundings and high resolution surveys are given on Figure 6.

DC Resistivity Soundings

DC resistivity soundings provide a vertical profile of the soil resistivity. Resistivity is a measure of the resistance to flow of electric current and is the inverse of the ground conductivity, but is measured by a distinctly different method. Like the EM-31 ground conductivity measurements, resistivity is primarily controlled by soil moisture and secondarily by soil constituents. Unlike EM-31 conductivity measurements, the DC resistivity method is relatively insensitive to discrete pieces of buried metal. The soundings were conducted to test the suspicion that Deposit 1 was wet or moist and Deposit 2 was relatively dry.

The DC resistivity soundings were made utilizing a Wenner Array and stainless steel electrodes with electrode separation ("A" Spacing) from 2 ft. to 60 ft. One sounding was made in Deposit 1, one sounding in Deposit 2, and a sounding was made at a background location away from buried waste. These data were converted to metric units and interpreted using the Interpex Ltd. IX1D v3 inversion program. The results are given on Figure 7, with the background sounding in the top panel, Deposit 1 in the middle panel and Deposit 2 in the bottom panel. The field measurements are on the left side of each panel, the inversion is the right side. Please note that the depth scale on the inversion is given in feet below ground surface.

The background sounding displays a near-surface resistivity low of 37 ohm-m at a depth of 8 ft., increasing rapidly to 87 ohm-m at 15 ft., declining to 31 ohm-m at 25 ft. before increasing with depth. This is a reasonable vertical profile for the Tesuque Formation, although the fall to 31 Ohm-m at 25 ft. seems a little low and may indicate a relatively moist zone. It would be more typical if the higher resistivity of 87 Ohm-m at 15 ft. continued to depth. This area has been worked by earthmoving which could influence the resistivity to this depth. The shallow resistivity may also be influenced by run-off from the higher ground to the east and the nearby Torreon Arroyo.

The sounding at Deposit 1 shows a near-surface resistivity low of 15 Ohm-m at 8 ft. This is a clear indication of a saturated or nearly saturated zone from approximately 6 to 10 ft. below the surface. The resistivity rises to 75 Ohm-m at a depth of 25 ft., suggesting some confinement of the wet zone.

The sounding at Deposit 2 shows a high resistivity of 164 Ohm-m at 8 ft., indicating dry conditions. The resistivity then falls to a low of 37 Ohm-m at a depth of 28 ft., essential the same resistivity and depth as seen in the background sounding.

The DC resistivity soundings confirm that Deposit 1 is wet and Deposit 2 is relatively dry.

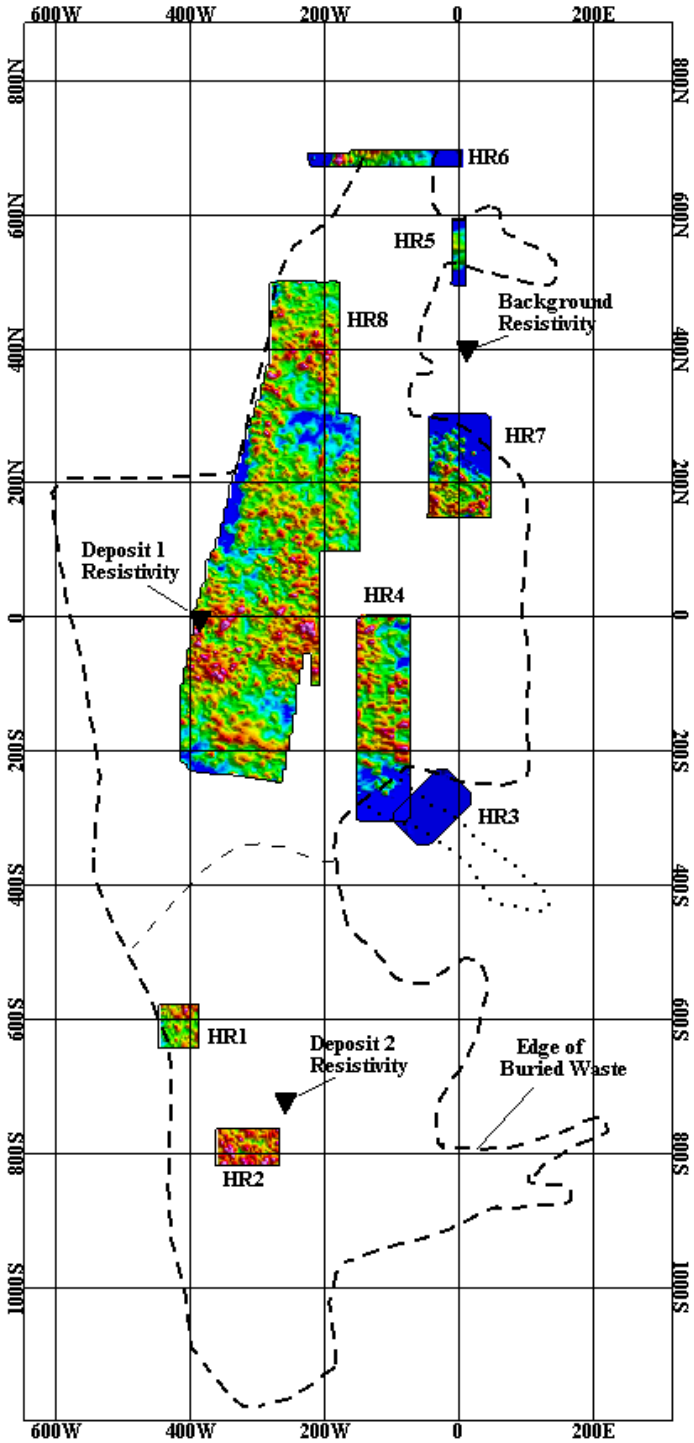

Figure 6. Ortiz Park Landfill, Santa Fe, NM

High Resolution Surveys

100 0 100 200 300

(feet)

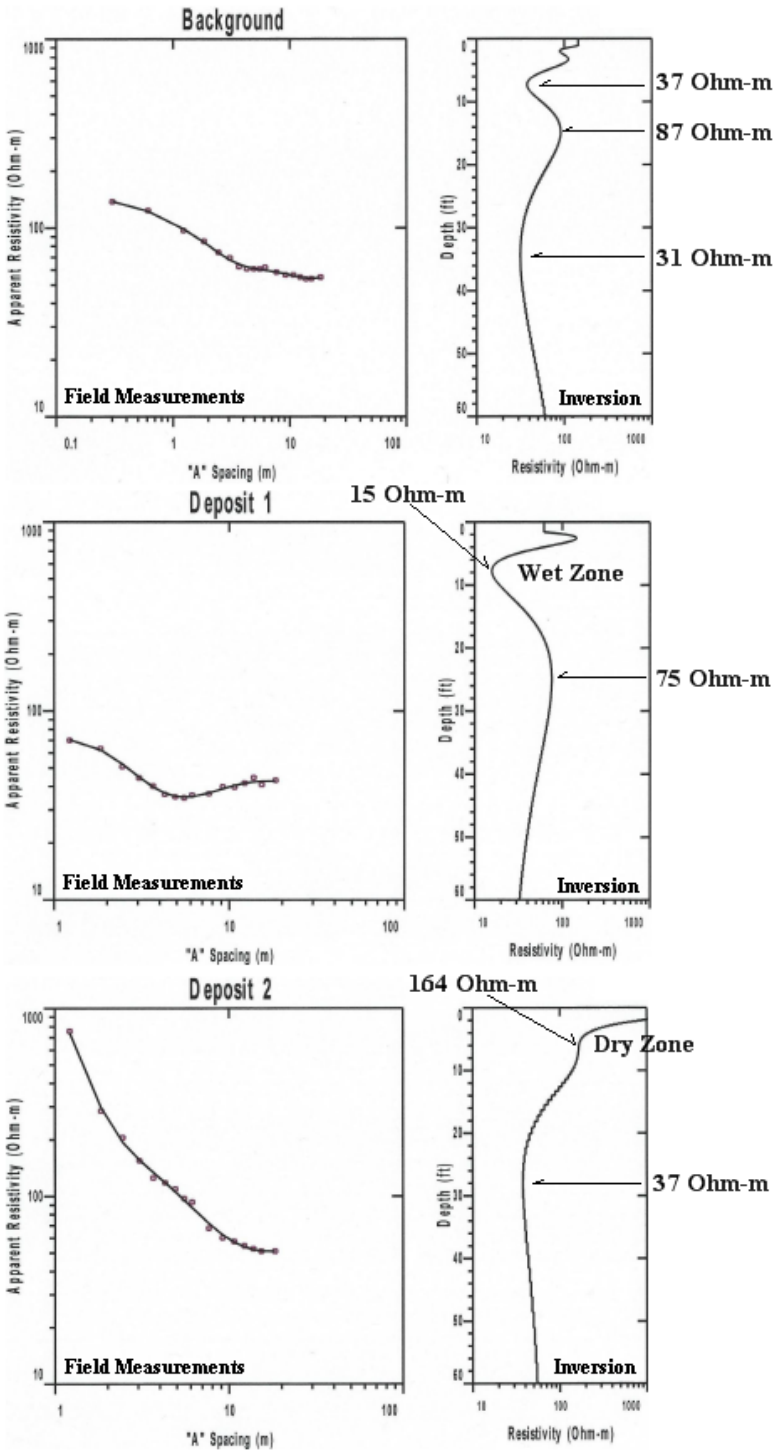

Figure 7. Ortiz Park Landfill, Santa Fe, NM
Direct Current Resistivity Soundings

EM-61 Metal Detection and GPR

The Geonics EM-61 high resolution metal detector is a time-domain electromagnetic instrument specifically designed to map concentrations of buried metal to depths of approximately 10 ft. The antennae are wheel mounted and are pushed or pulled along closely spaced traverses. Data are acquired approximately every 0.65 ft along traverse.

The instrument pulses to the ground and records a ground response proportional the mass and depth of buried metal. There are two receiver antennae, arraigned to acquire a gradient measurement. The gradient allows estimating the depth of buried metal. The EM-61 is insensitive to local ground conditions.

Parts of the high resolution surveys were also investigated using a Sensors & Software Ltd. 250 MHz ground penetrating radar (GPR) system. This system deploys the transmitting and receiving antennae in a wheel mounted sled that skims the ground surface. A GPR system transmits an electromagnetic pulse into the ground and records the pulses reflected from subsurface objects. GPR performance is very dependent on local ground conditions, and performance at Ortiz Park was mixed. Reflections were obtained from as deep as 5 ft. or more at some locations. Dissipation and scattering of the signal limited effective penetration to only a few feet at other locations.

The EM-61 was deployed over the eight sections shown on Figure 6. These sections are designated as High Resolution Survey 1 (HR1) through High Resolution Survey 8 (HR8). A first look at the EM-61 results is shown on Figure 6. Although these data images on Figure 6 are small, the figure demonstrates the agreement between the edge of buried waste interpreted from the reconnaissense survey and the high resolution surveys. Maps at a more useful scale are repeated with annotations in Appendix B.

The results from HR1 are presented in Figure B – 1. The EM-61 survey at HR1 detected metallic waste at depths from 3 to 4 ft. A GPR profile along Line 400W is also shown. The GPR detected objects at 3 ft. and objects as shallow as 1 ft. that generated no response fir the EM-61. This indicates non-metallic objects just below the surface. Concrete and asphalt debris are observed in the area.

The HR2 results are shown in Figure B – 1. Metallic objects are detected between 2 and 3 ft. below the surface. The GPR profile shows non-metallic objects within a foot of the surface. A “V” shaped feature is seen at the south end of the GPR profile, descending to a depth of approximately 5 ft. This suggests a buried arroyo containing waste.

HR3 was placed across and perpendicular to the elevated ground conductivity “finger” which generated no EM-31 In-Phase response, annotated as “?” on Figure 4. The results are shown on Figure B – 2. The EM-61 detected no buried metal associated with the high ground conductivity. The two GPR profiles across the “finger” both show compacted soil layers where the ground conductivity is high. It is assumed that there is a contrast in soil moisture generated by differential compaction of the fill.

The results of HR4 are shown on Figure B – 3. Buried metal objects are detected between 3 and 5 ft. deep. There is a significant change in elevation at the south end of this survey, marking an edge of the relic soccer fields. Leveling measurements were made with a transit and elevation rod across this break in slope, revealing an elevation change of 3.7 ft. This is essentially the average depth of burial for the metallic waste, suggesting the fill for the soccer field was placed over waste that was at or near the surface.

The results of HR5 are shown on Figure B – 4. Buried metal is detected between 6.2 and 7.2 ft. below the surface. This buried metal correlates to EM-31 In-Phase and ground conductivity anomalies (see Figure 3 and Figure 4) and is coincident with the suspected burial trench observed on the 1973 aerial image (see Figure 1 and Figure A – 4).

The HR6 results are shown on Figure B – 4. Buried metal is detected at depths from 3.8 to 9.5 ft. There is an abrupt change in elevation across this area due to the relic soccer fields. Leveling measurements revealed a change in elevation of 5.3 ft. across the break in slope. This change in surface elevation accounts for the difference in depth between the deposits to the west of the slope (~4 ft.) and to the east of the slope (~9 ft.). A culvert was detected on the west side of the buried waste.

The HR7 results are given on Figure B – 5. The EM-61 detected buried metal at depths from 2.8 to 4.5 ft. The GPR profile along 25E shows additional buried objects at depths as shallow as 1 ft. These objects were not detected as buried metal by the EM-61. The shallow objects could be non-metallic waste or possibly cobbles in the fill. A fill layer is observed to the north of the buried waste.

HR8 covered the large parking lot on the west side of the park and the results are presented on Figure B – 6. Buried metal was detected at depth between 2.5 and 4.1 ft. The trace of the former Torreon Arroyo is shown on the figure. There is no apparent correlation between the buried metal and the former arroyo. The positions of 2 GPR profiles noted on Figure B – 6 and these profiles are shown on Figure B – 7.

The profile along Line 255W shows a subsurface depression overlying buried waste. This is possibly due to collapse or settling of the waste over time. This feature may collect infiltrating rain waters and provide a source for the moisture in Deposit 1. The profile along Line 330W shows waste breaching the ground surface. This may also be a source for moisture.

The Task 3 high resolution surveys provide the following information:

- The DC resistivity soundings confirm that parts of Deposit 1 are very moist and Deposit 2 is relatively dry. The moisture in Deposit 1 is in a zone from 6 to 8 ft. deep.

- The EM-61 surveys detected a narrow range in the depth of burial of the metallic wastes, suggesting that the waste is generally contained in a layer from 1 to 2 ft. thick.

- A possible filled arroyo was detected in Deposit 2.

- The depth of cover over the waste is typically approximately 3 ft., except where fill for the relic soccer field can increase the depth significantly.

- The GPR detected near-surface objects that may be non-metallic waste or cobbles in the fill.

- The “finger” of anomalous ground conductivity appears to be related to earthmoving.

- The feature identified in the 1973 aerial image as a possible waste disposal trench is verified to exist and contains metallic waste at a depth of approximately 6 ft. The fact that this trench was still open when the remainder of the site had been closed raises suspicions that this may have been a special purpose disposal area (dead animals, chemicals, etc.).

Conclusions

The aerial image analysis and geophysical survey at the Ortiz Park Landfill sugport the following conclusions:

- The Ortiz Landfill was not active before 1966 and was closed with some re-growth of vegetation by 1973. This suggests that active waste disposal was limited to no more than approximately 6 years.

- A portion of the site received irrigation for a baseball filed as early as 1979, and expanded irrigation for soccer fields by 1991.

- Buried waste is found from the tennis courts in the north to the southern end of the park, concentrated in the western half of the site. The buried waste is rich in metal and the deposits are generally thin, on the order of 2 ft. or less. The overall volume of buried waste is modest.

- The buried waste is divided into two different types of deposits. The northern deposit has a very moist or wet subsurface. The southern deposit is relatively dry, and appears to retain some of the original landform.

- The depth of cover over the waste is on the order of 3 ft., except where fill for the relic soccer field can increase the depth significantly.

- The feature identified in the 1973 aerial image as a possible waste disposal trench is verified to exist and contains metallic waste at a depth of approximately 6 ft.

Appendix A
Aerial Images

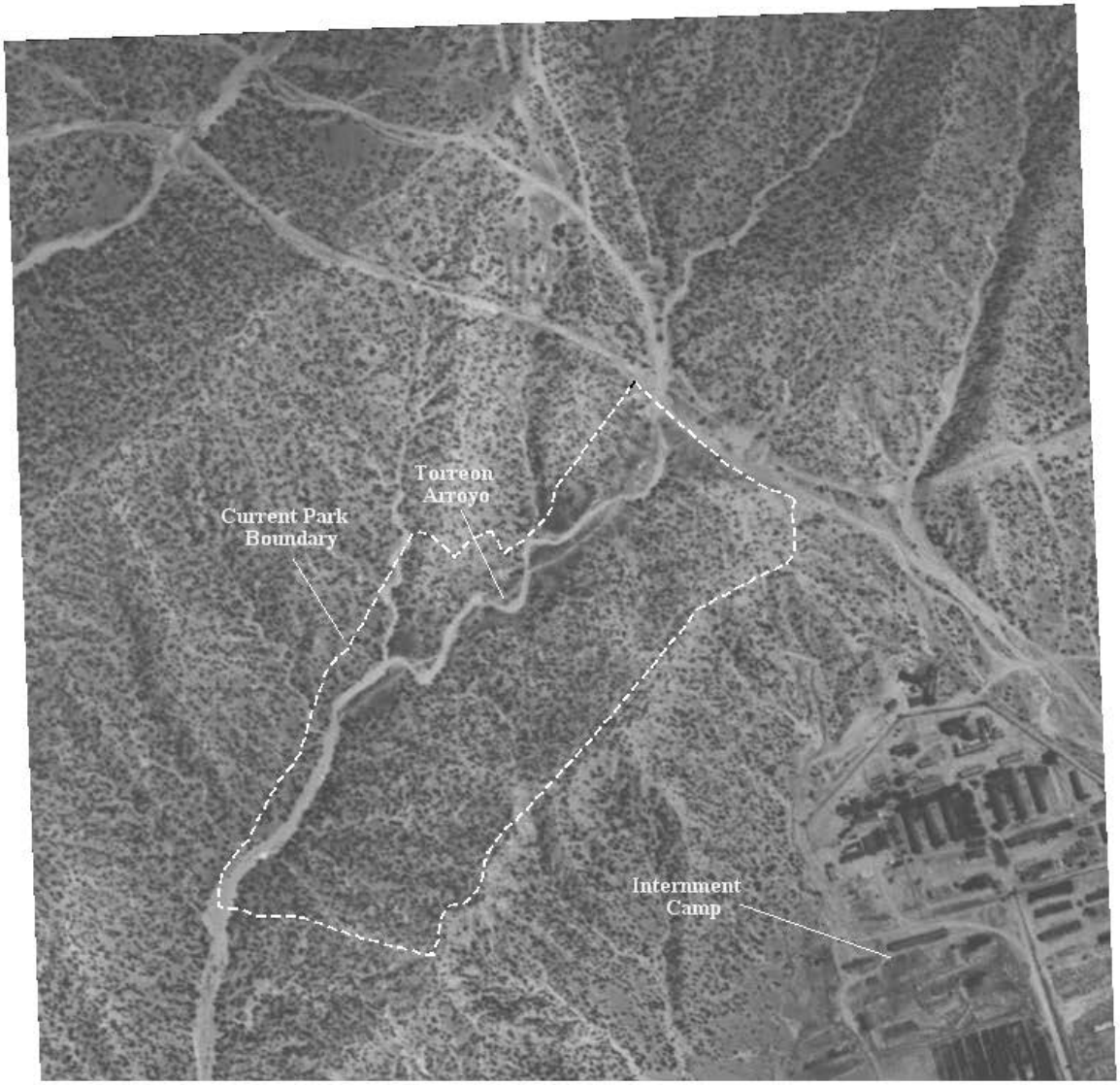

Figure A - 1. Ortiz Park Landfill, Santa Fe, NM

1951 Aerial Image

250 0 250 500

(feet)

N

Figure A - 2. Ortiz Park Landfill, Santa Fe, NM

1960 Aerial Image

250 0 250 500

(feet)

N

Figure A - 3. Ortiz Park Landfill, Santa Fe, NM

1966 Aerial Image

250 0 250 500

(feet)

N

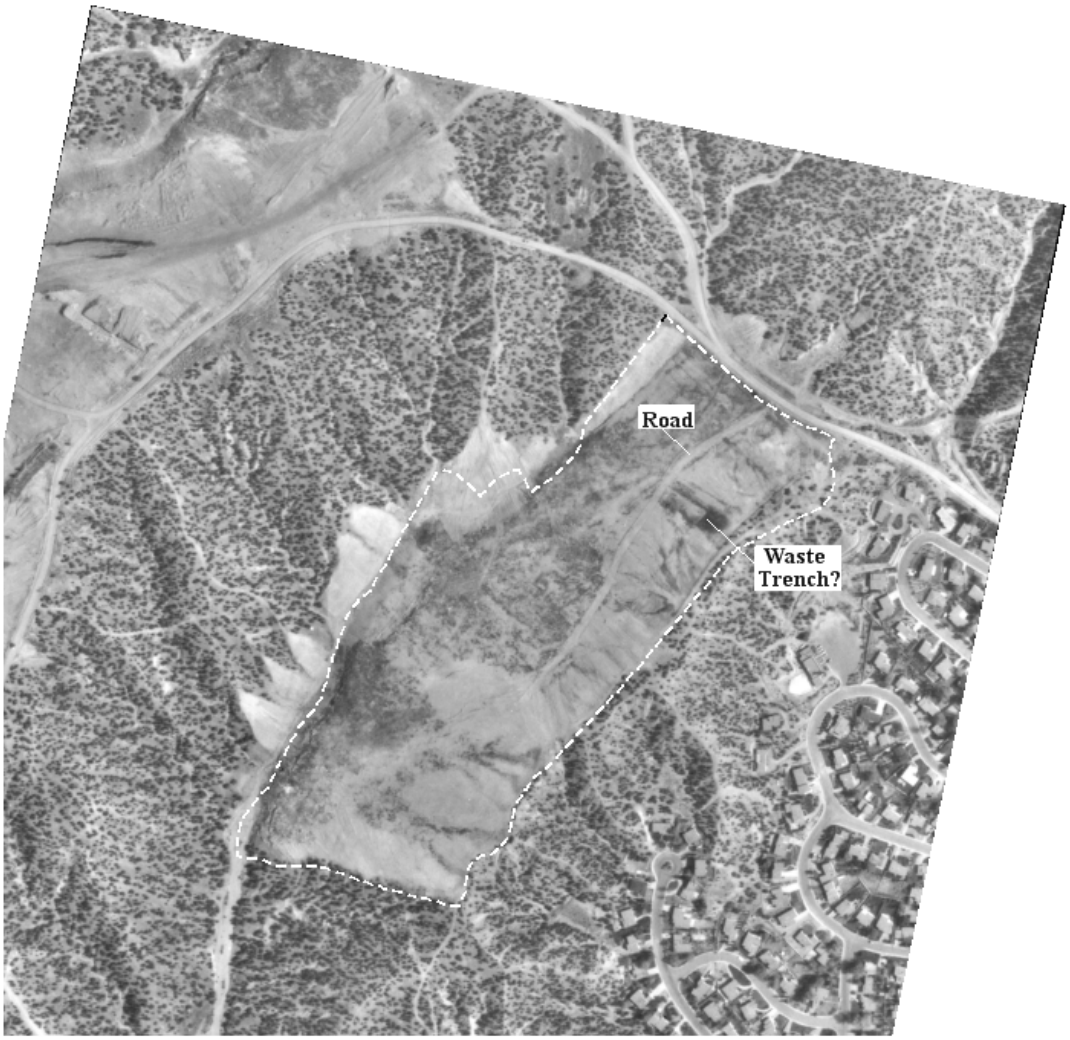

Figure A - 4. Ortiz Park Landfill, Santa Fe, NM

1973 Aerial Image

250 0 250 500

(feet)

N

Figure A - 5. Ortiz Park Landfill, Santa Fe, NM

1982 Aerial Image

250 0 250 500

(feet)

N

Figure A - 6. Ortiz Park Landfill, Santa Fe, NM

1987 Aerial Image

250 0 250 500

(feet)

N

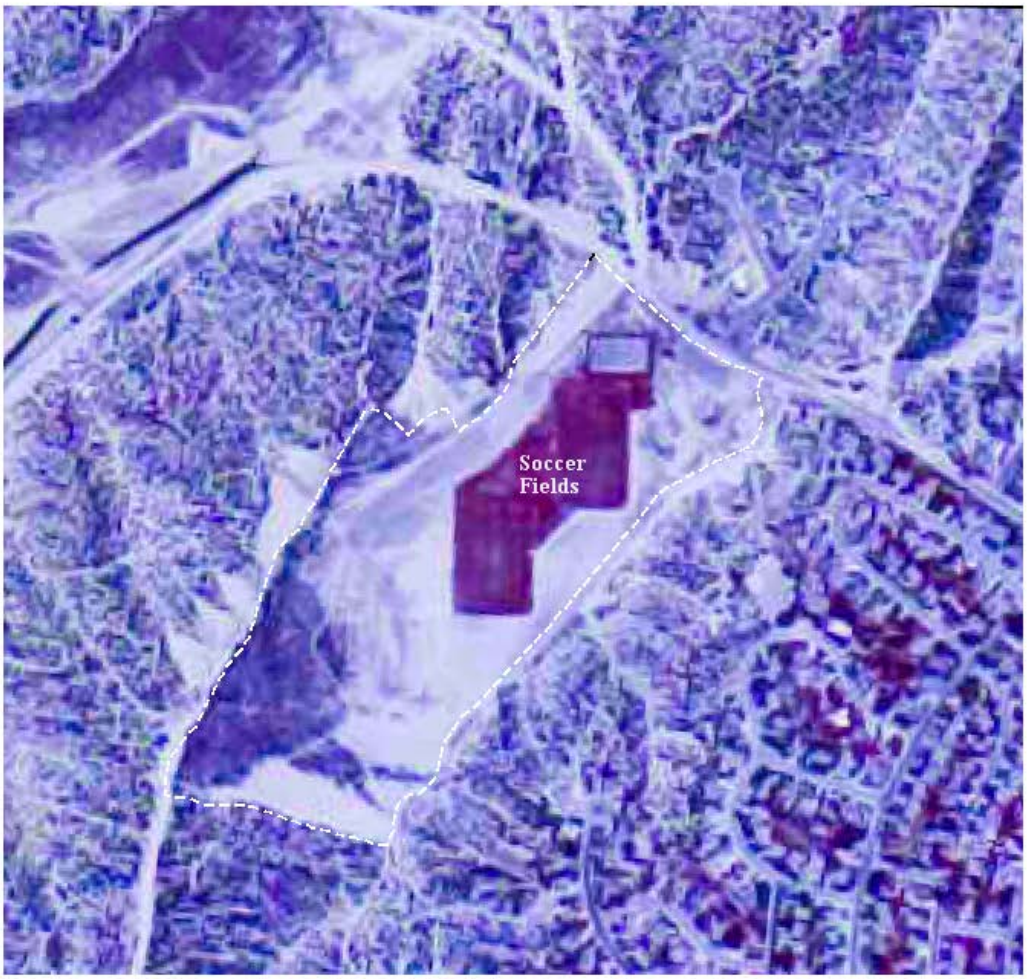

Figure A - 7. Ortiz Park Landfill, Santa Fe, NM

1991 Aerial Image

250 0 250 500

(feet)

N

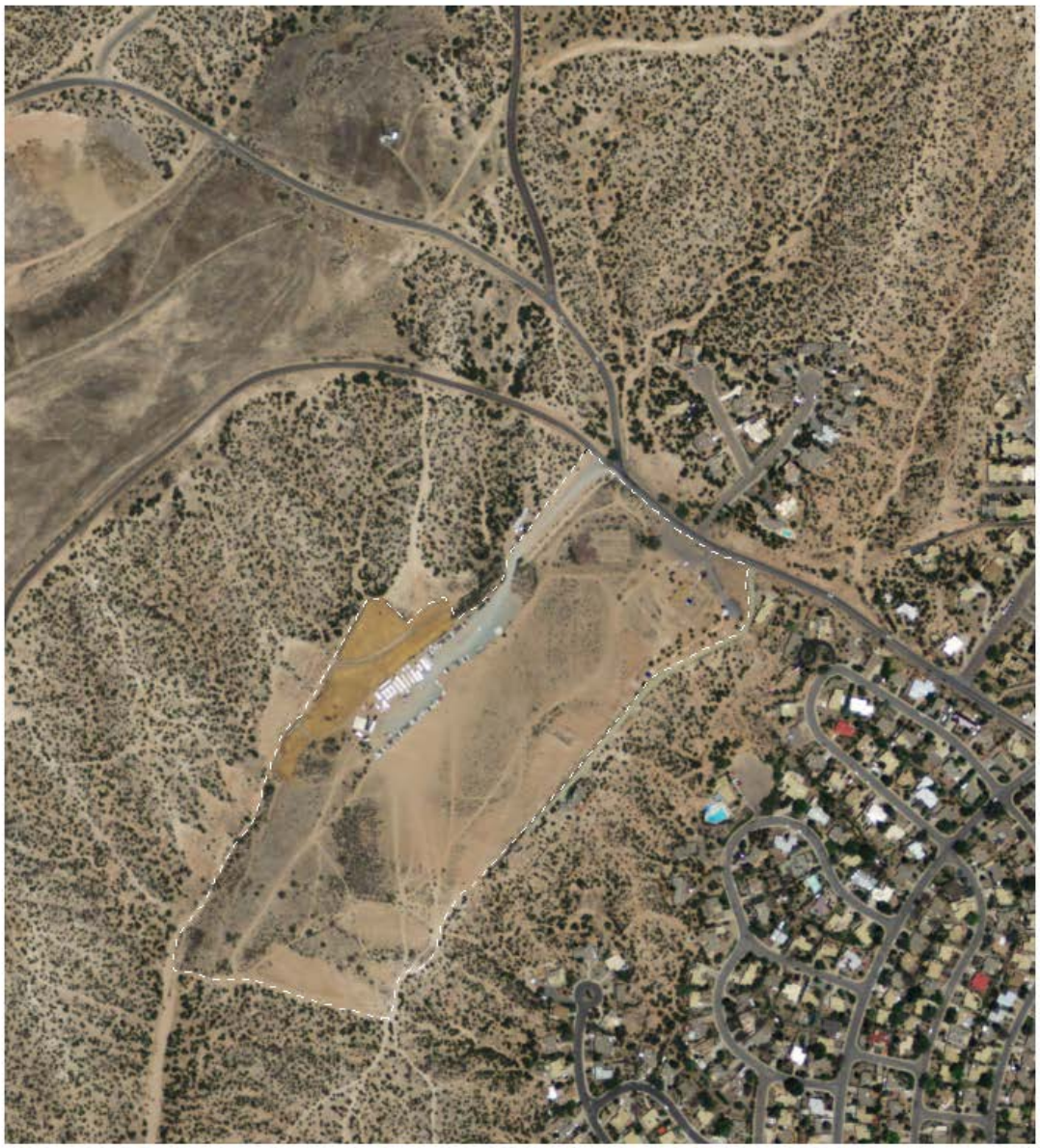

Figure A - 8. Ortiz Park Landfill, Santa Fe, NM

2011 Aerial Image

250 0 250 500

(feet)

N

Appendix B
High Resolution Surveys

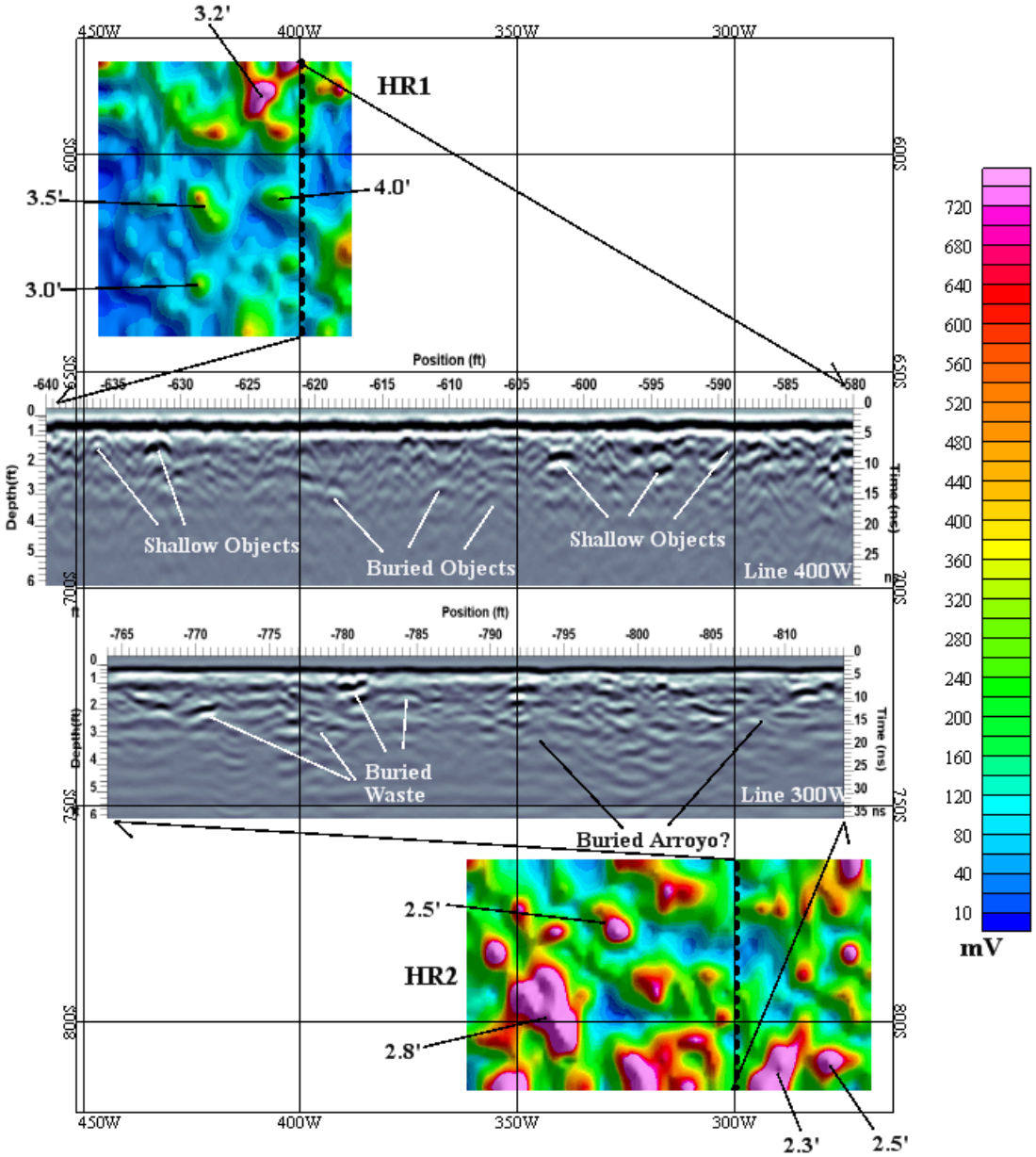

Figure B - 1. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 1 (HR1) and High Resolution Survey 2 (HR2)

25 0 25

(feet)

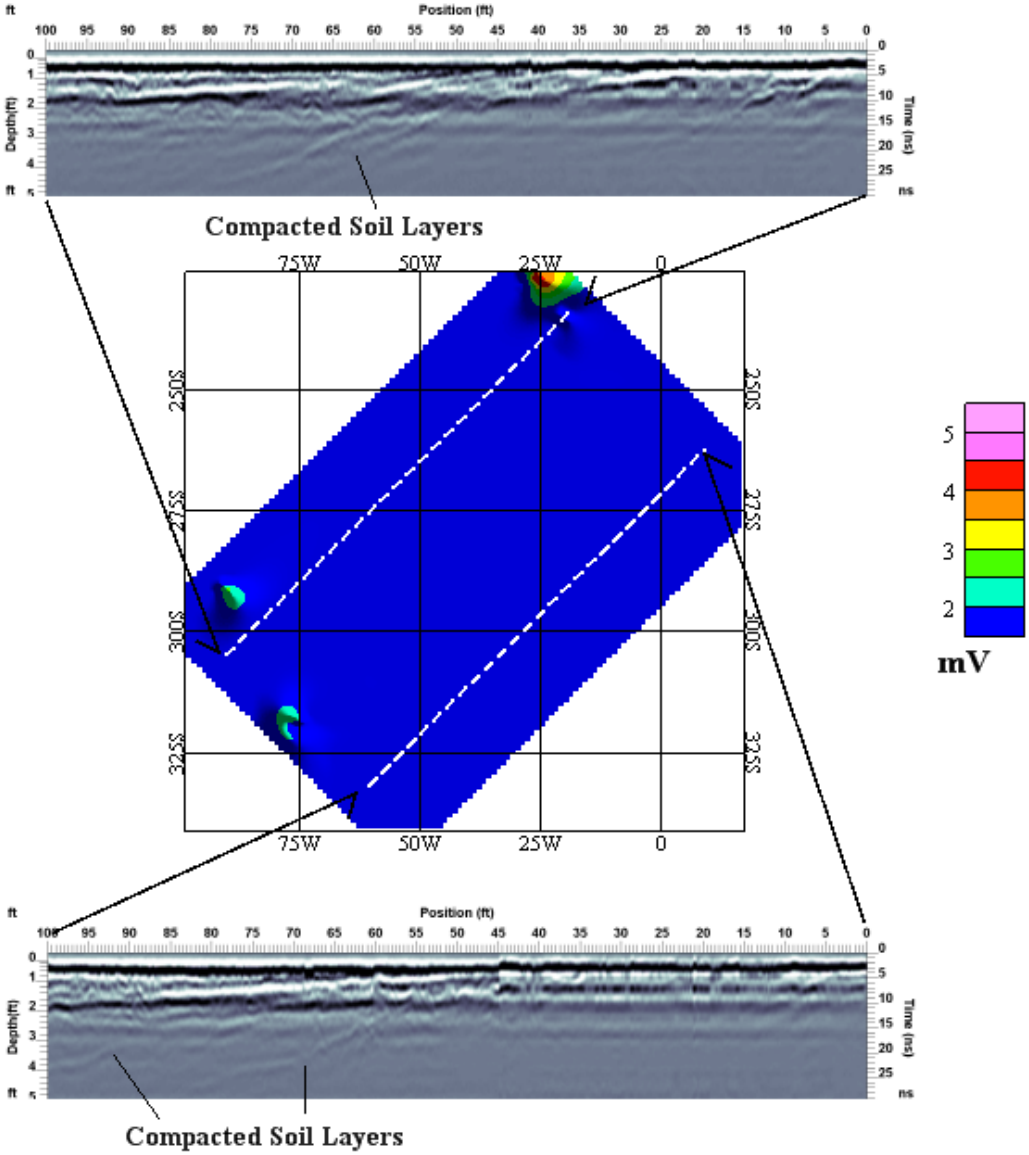

Figure B - 2. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 3 (HR3)

25 0 25 50

(feet)

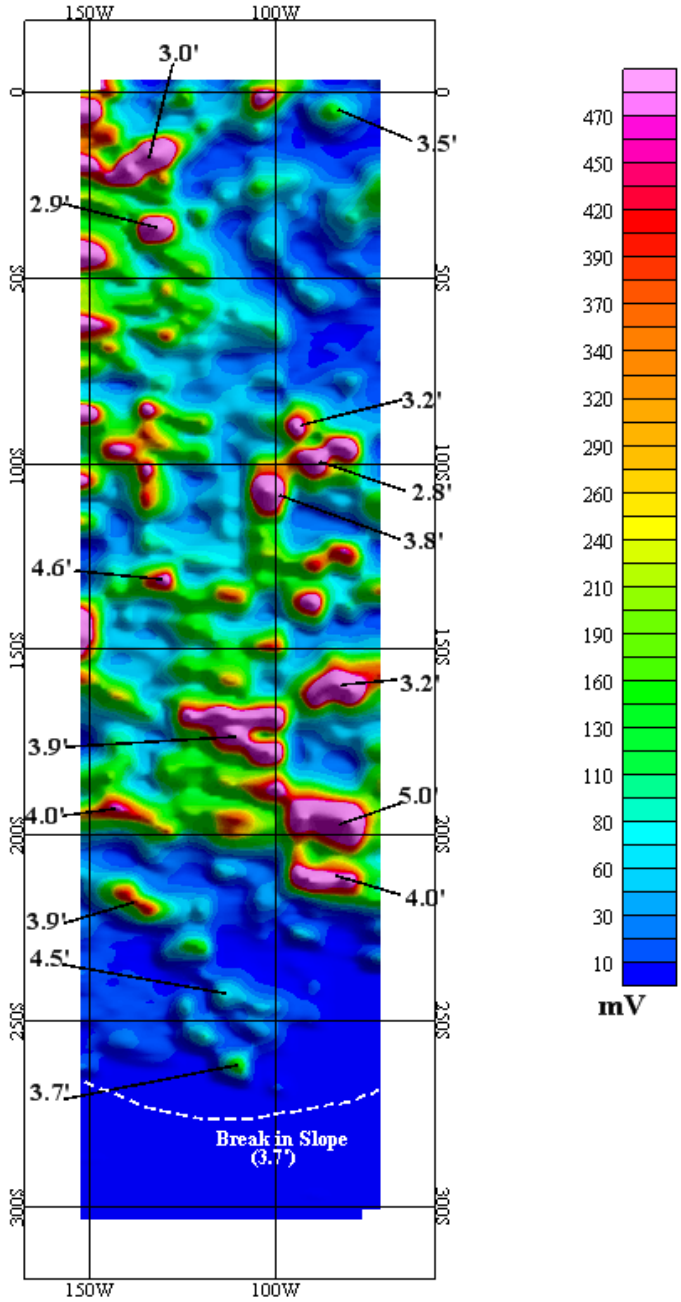

Figure B - 3. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 4 (HR4)

25 0 25 50

(feet)

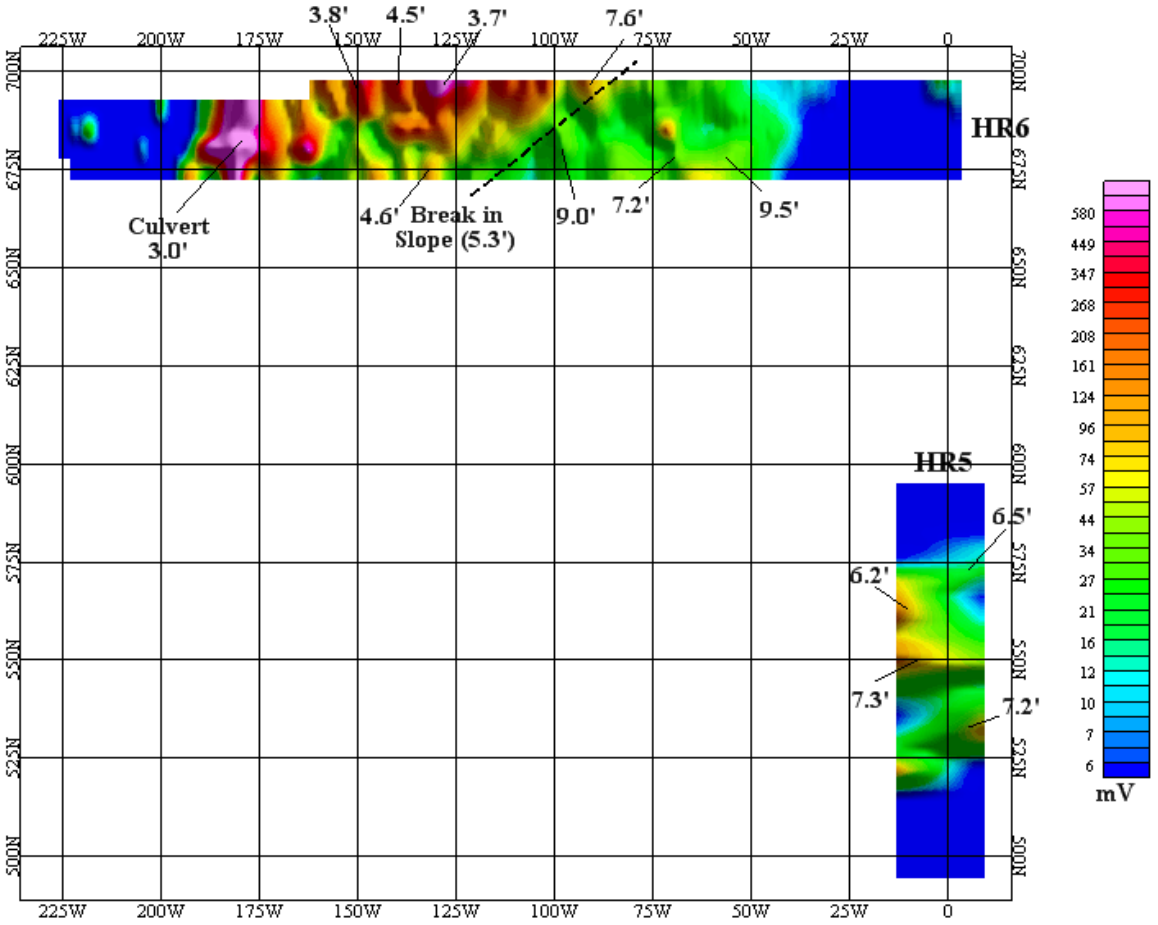

Figure B - 4. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 5 (HR5) and High Resolution Survey 6 (HR6)

25 0 25 50

(feet)

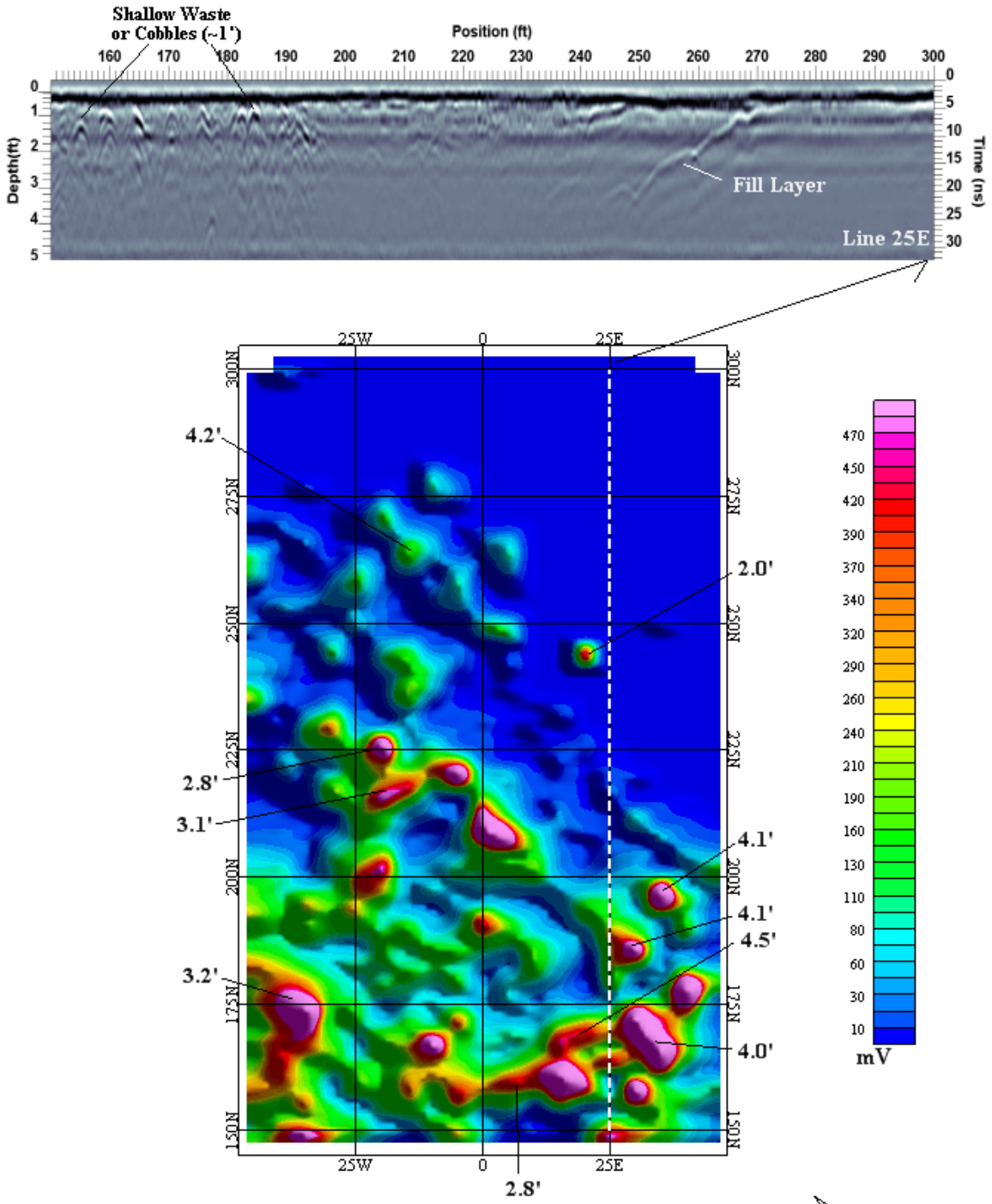

Figure B - 5. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 7 (HR7)

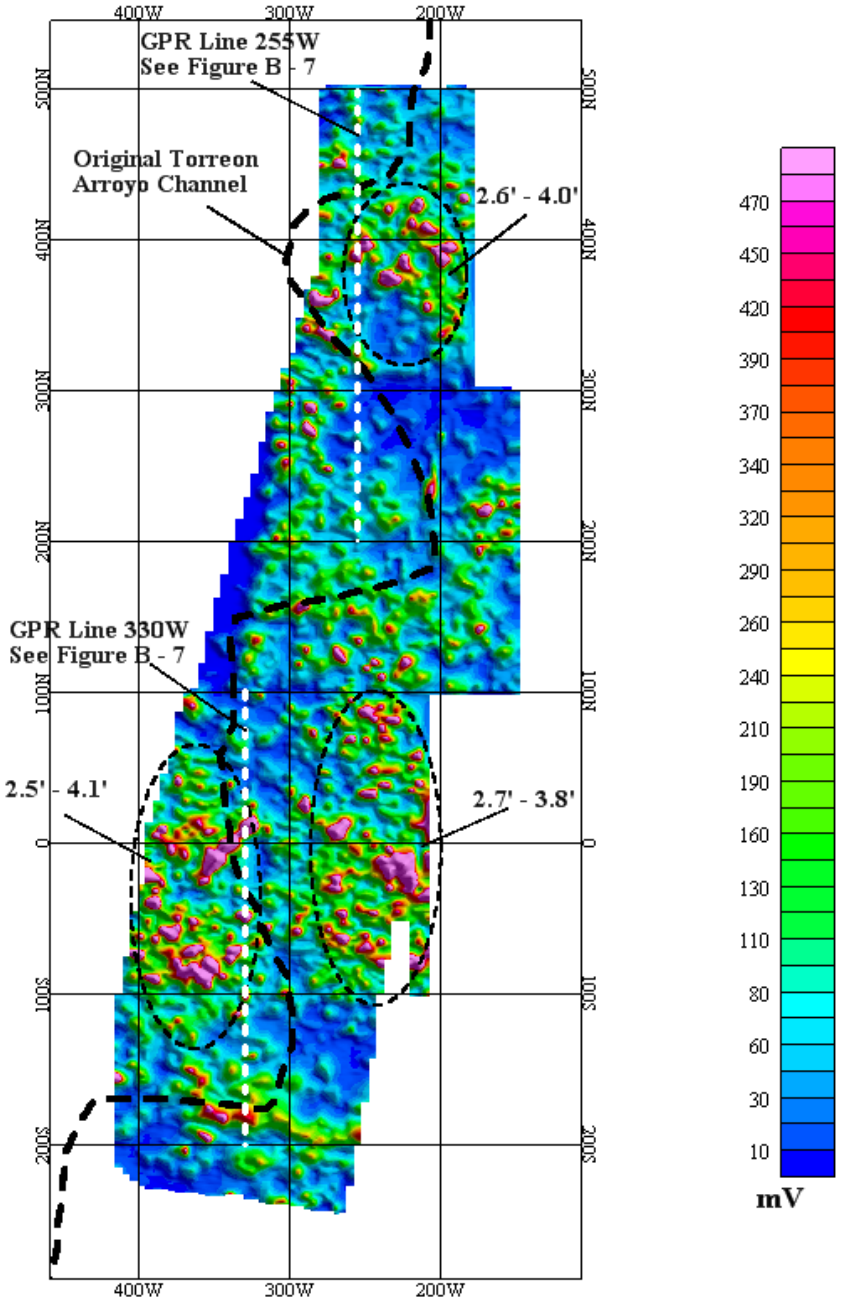

Figure B - 6. Ortiz Park Landfill, Santa Fe, NM

High Resolution Survey 8 (HR8)

50 0 50 100 150

(feet)

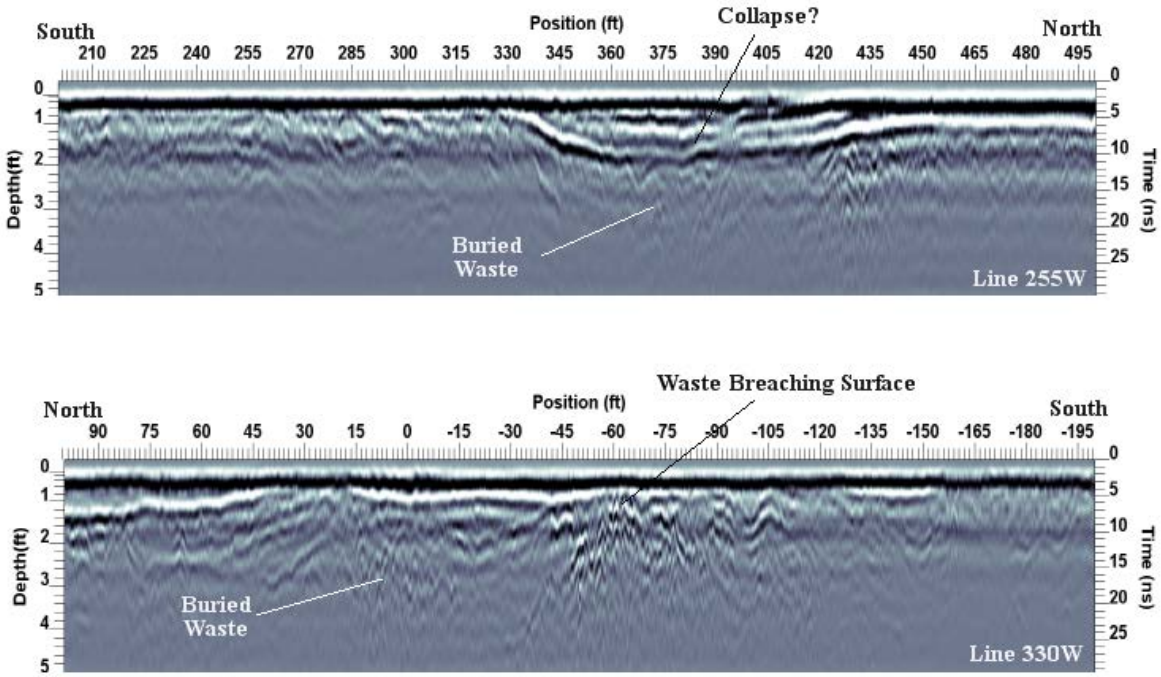

Figure B - 7. Ortiz Park Landfill, Santa Fe, NM
High Resolution Survey 8 (HR8) GPR Profiles