

**Geophysical Investigation at the
Former First Baptist Church
101 Broadway Boulevard NE
Albuquerque, New Mexico**

Prepared for:
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Introduction

A geophysical investigation has been conducted at the former First Baptist Church property located at 101 Broadway Boulevard NE, Albuquerque, New Mexico. The objective of the geophysical investigation was to map subsurface structures remaining from previous land use such as abandoned underground storage tanks (USTs), relic fixtures, and other buried features of potential environmental consequence. The investigation consisted of a high-resolution metal detection survey over approximately 4.5 acres and ground penetrating radar (GPR) surveys over selected portions of the site.

The field survey activities were conducted between 28 February and 12 March 2014. Labor, instrumentation, and technical expertise for the surveys were provided by Sunbelt Geophysics of Socorro, New Mexico. Guidance and coordination were provided by INTERA Incorporated of Albuquerque, New Mexico.

Methods

A spatial control and data acquisition grid was established using a transit and tape. This grid extended 600 ft east – west and 520 ft north – south, covering the paved parking lots and a portion of an enclosed courtyard within the former church facility. The grid established north – south data acquisition lines separated by 5 ft.

A primary survey was conducted using a Geonics EM-61 metal detector with the standard 1-meter antenna set. The EM-61 is a time domain electromagnetic instrument capable of detecting concentrations of buried metal to a depth of approximately 10 ft with this antenna. The EM-61 data were acquired every 0.65 feet along the parallel lines.

A secondary survey was conducted over selected portions of the site using a Sensors & Software 250 MHz GPR system. The penetration of a GPR system is dependent on local soil conditions, and an effective depth of approximately 5 ft was obtained during this survey. GPR traces were acquired every 0.16 ft along parallel lines.

The EM-61 and GPR surveys were supported by qualitative screening using a Schonstedt magnetic locator and a Radiodetection CAT 3+ line tracer.

Data from the EM-61 and GPR were transferred to a computer for analysis and mapping. The DAT61 program (Geonics Ltd.), the Ekko_View Deluxe and Ekko_Interp programs (Sensors & Software Inc.) were used for data processing and the Oasis montaj mapping package (Geosoft Ltd.) was used for image preparation.

Results

The Geonics EM-61 metal detector provides two measurements, a primary response and the so-called “difference” response. The primary response is generated from all nearby metal, both at the surface and buried metal. The difference response has been processed in an attempt to damp the response from surface metal and enhance the response from buried metal.

An image of the primary EM-61 response is provided in Figure 1. This image reveals numerous features (anomalies) as response (green to pink) above background (blue). Some of these features are generated by known, surface objects such as manhole covers, parking bumpers, and landscaping structures as annotated on the figure. Buried pipes are seen as long, linear features. Buried rubble and relic foundation material are seen as relatively low (green to orange) and mottled response in the north central and northeast portions of the survey. Only small and scattered subsurface debris are observed in the courtyard.

An image of the difference response is given in Figure 2. The response of the parking bumpers, some of the landscaping structures, and other surface objects are damped, allowing a modest improvement in the image of some subsurface features.

The primary response is repeated on Figure 3 together with the positions of the GPR surveys and the Barelás Ditch. The different GPR surveys are labeled GPR A, GPR B, GPR C, GPR D, GPR E, and GPR F to facilitate discussion below. The Barelás Ditch was replicated from the 1891 Sanborn map. No concentrations of buried metal are observed in the portions of the Barelás Ditch that were surveyed. Please note Feature A on the western edge of the survey; this feature is discussed below.

14 of the strongest discrete subsurface EM-61 anomalies seen on Figures 1, 2, and 3 were examined with the GPR and/or a Schonstedt magnetic locator to screen for the possibility of abandoned underground storage tanks (USTs). All but Feature A (Figure 3) were found to be shallow or of too limited lateral extent to be consistent with a UST. Feature A provided an EM-61 and magnetic response consistent with a small UST. The GPR indicated that Feature A is at a depth of approximately 4 ft, placing it above the east – west pipe running along 280N. The east – west pipe appears to be a relic storm sewer. The Sanborn maps were examined and only the 1913 and 1919 maps placed this feature near any structures. It seems very unlikely that the east – west pipe was placed before 1913 or 1919. It is deduced that Feature A is related to the east – west pipe and not a UST.

Example profiles from GPR A, GPR B, and GPR C are given on Figure 4. These profiles indicated an effective GPR penetration to approximately 5 ft. Multiple soil fill layers to a depth of approximately 4 ft and rubble are observed. A faint image of the Barelás Ditch can be seen on GPR B. Example profiles from GPR D, GPR E and GPR F are provided on Figure 5. A relatively large excavation is observed on GPR D and the perpendicular GPR E. The combination of these two images indicates an excavation with dimensions of approximately 100 ft by 100 ft to a depth of at least 5 ft. GPR F was acquired in the courtyard. There is a faint indication of the Barelás Ditch and multiple fill layer to approximately 4 ft.

Interpretations and Conclusions

Interpretations of the subsurface features are compiled on Figure 6. The know active lines are annotated as such; the other buried lines are assumed to be relic and most can be correlated to water lines on the Sanborn maps. The excavated area correlates to a former Albuquerque Water Works building. The buried rubble near the center of the survey correlates to Water Works buildings dating to at least 1919. The rubble in the northeast corner of the survey correlates to buildings dating to 1942. The relic pipes near 550E, 375N can be found on the 1913 to 1924 and on the 1957 to 1970 Sanborn maps.

There is no indication that the Barelax Ditch is filled with debris or other buried waste, although only small sections of the ditch were surveyed.

Much of the site has been excavated in the past and layers of fill material are observed to depths of approximately 4 ft.

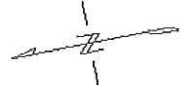
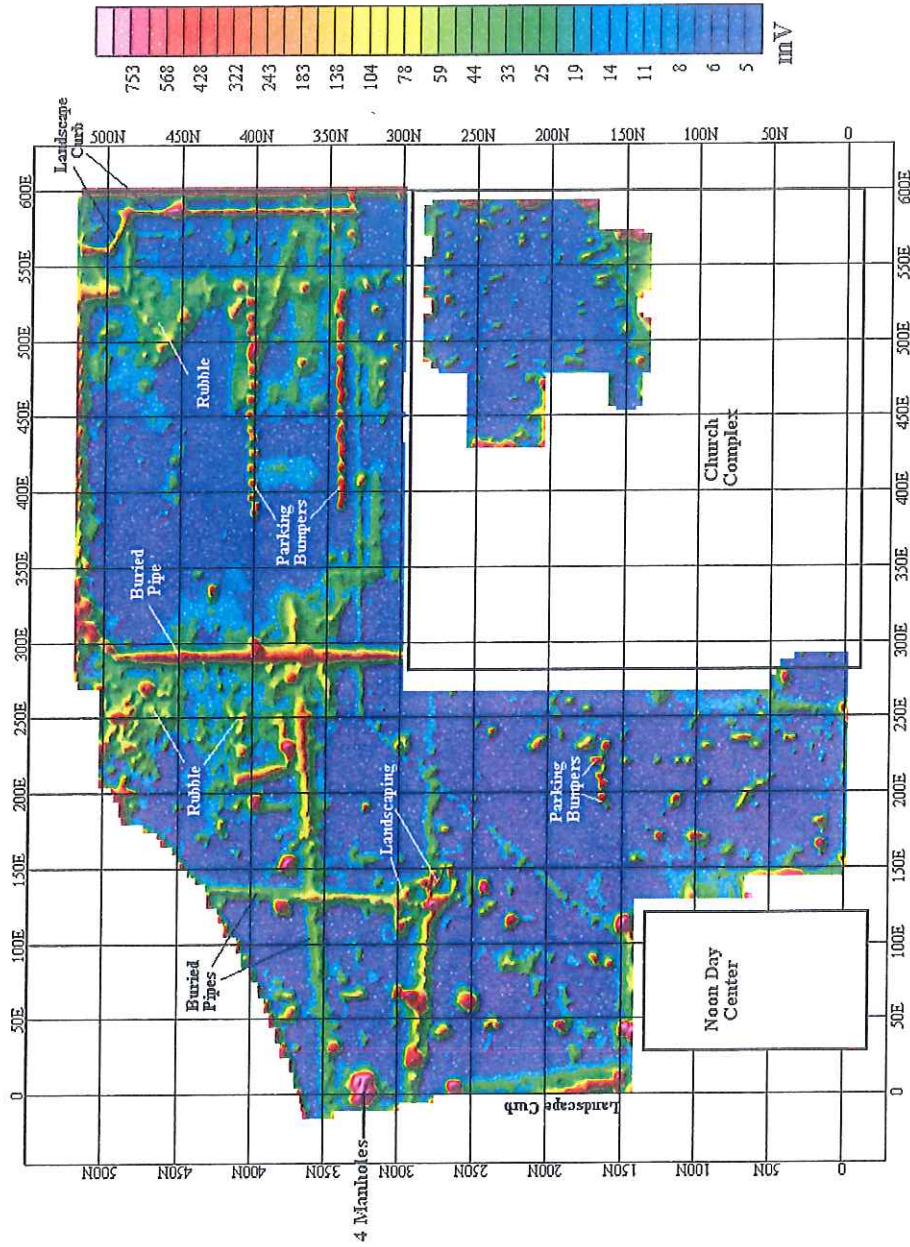


Figure 1. First Baptist Church Site, Albuquerque, NM
EM-61 Primary Response



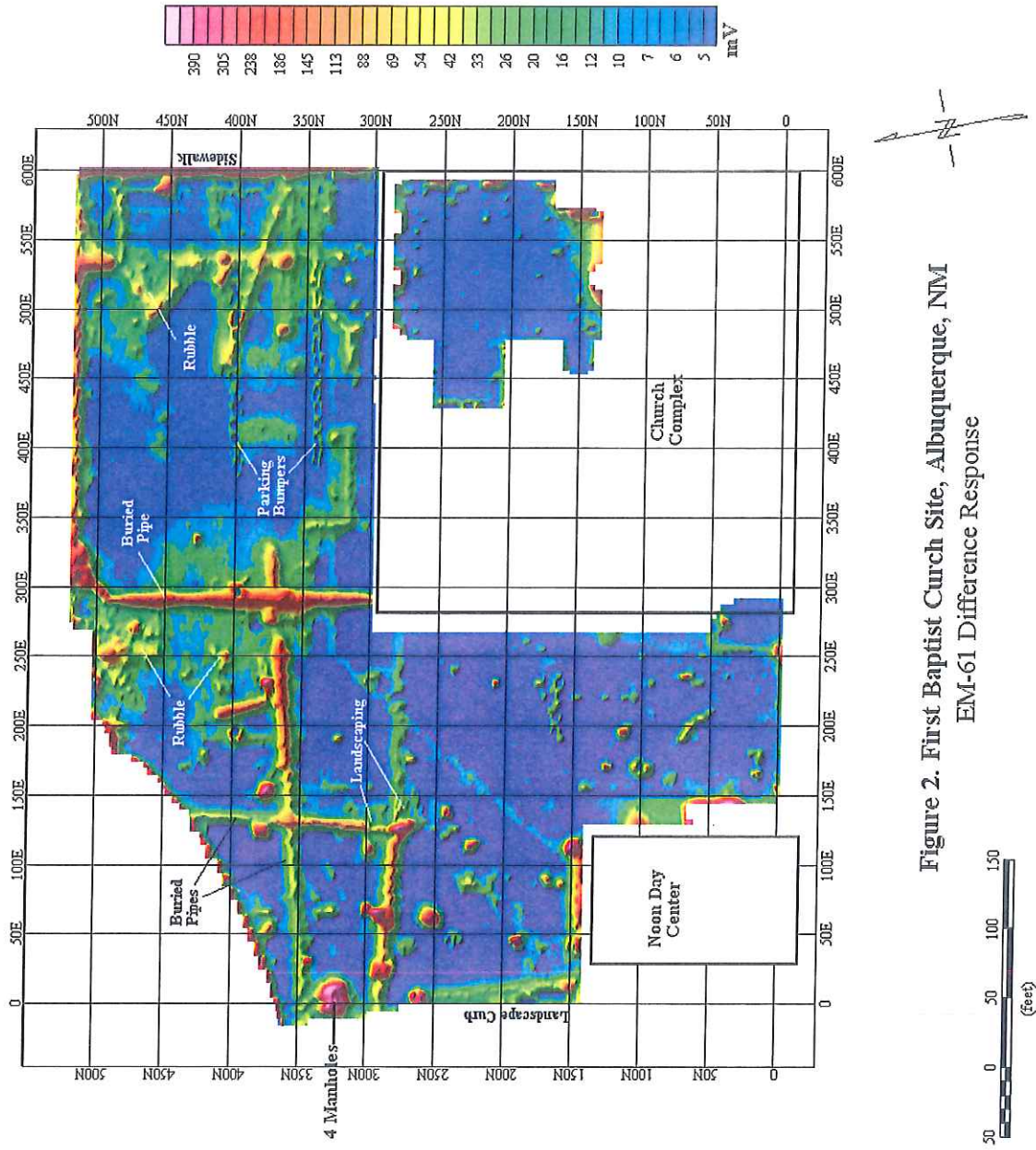
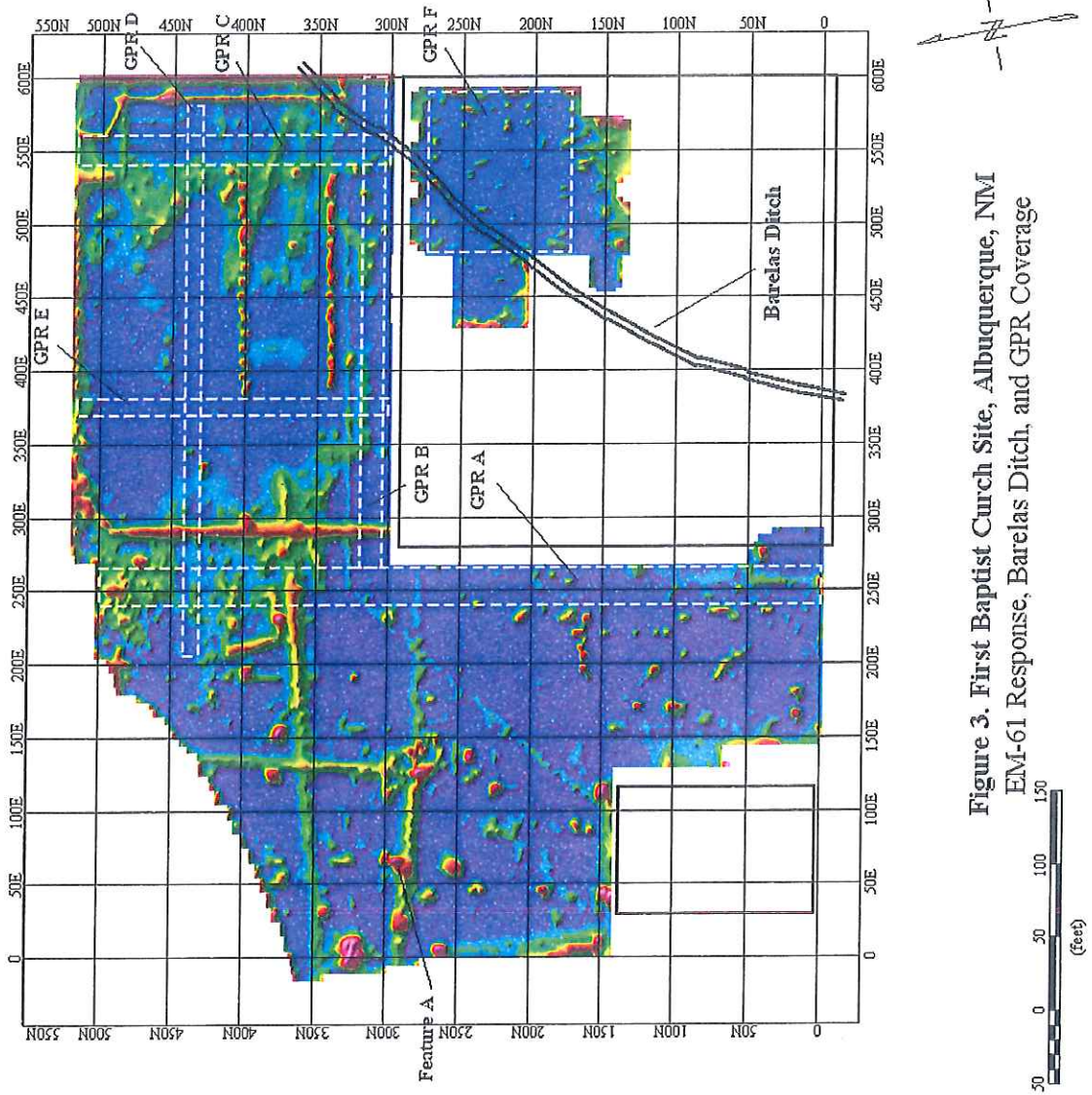
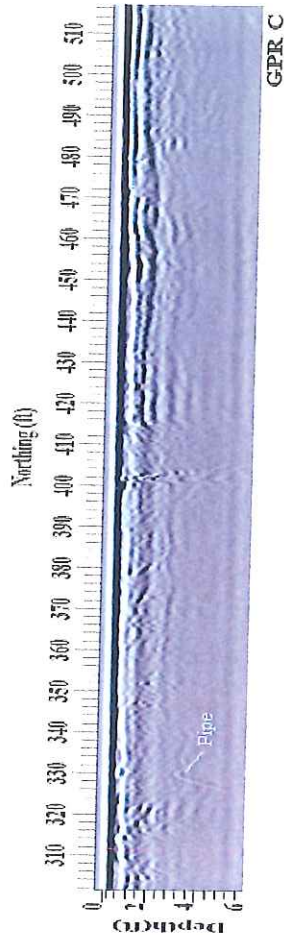
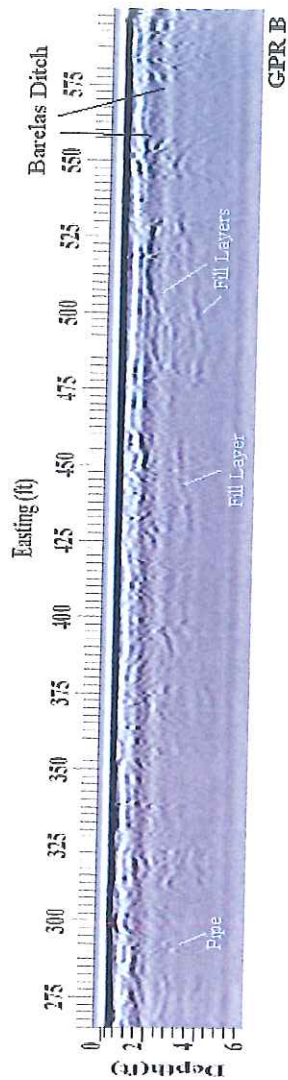
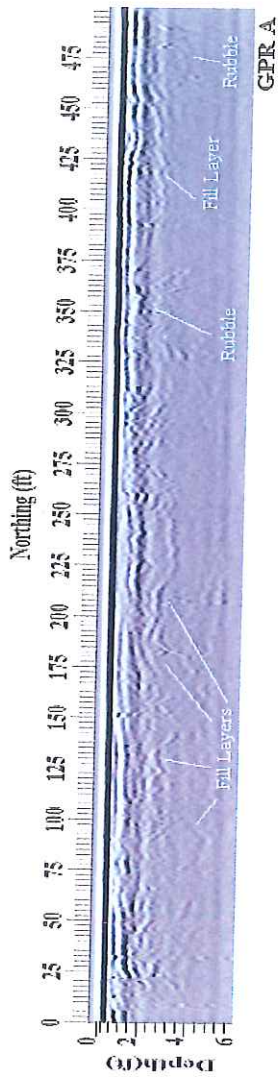


Figure 2. First Baptist Church Site, Albuquerque, NM
EM-61 Difference Response



**Figure 3. First Baptist Church Site, Albuquerque, NM
EM-61 Response, Barelas Ditch, and GPR Coverage**



**Figure 4. First Baptist Church Site, Albuquerque, NM
Example GPR Profiles, Surveys A, B, C**

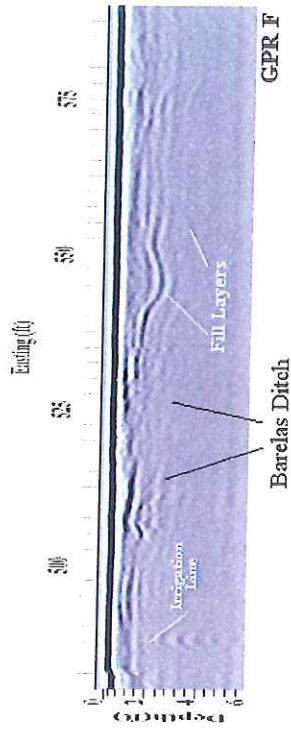
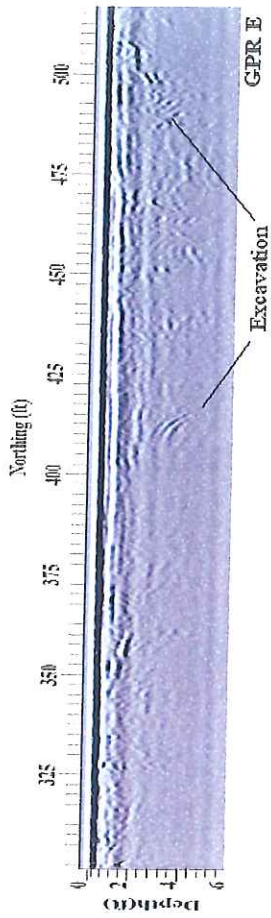
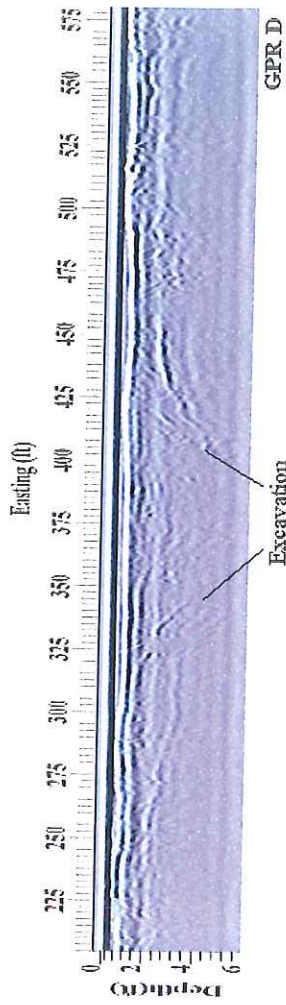


Figure 5. First Baptist Church Site, Albuquerque, NM
Example GPR Profiles, Surveys D, E, F

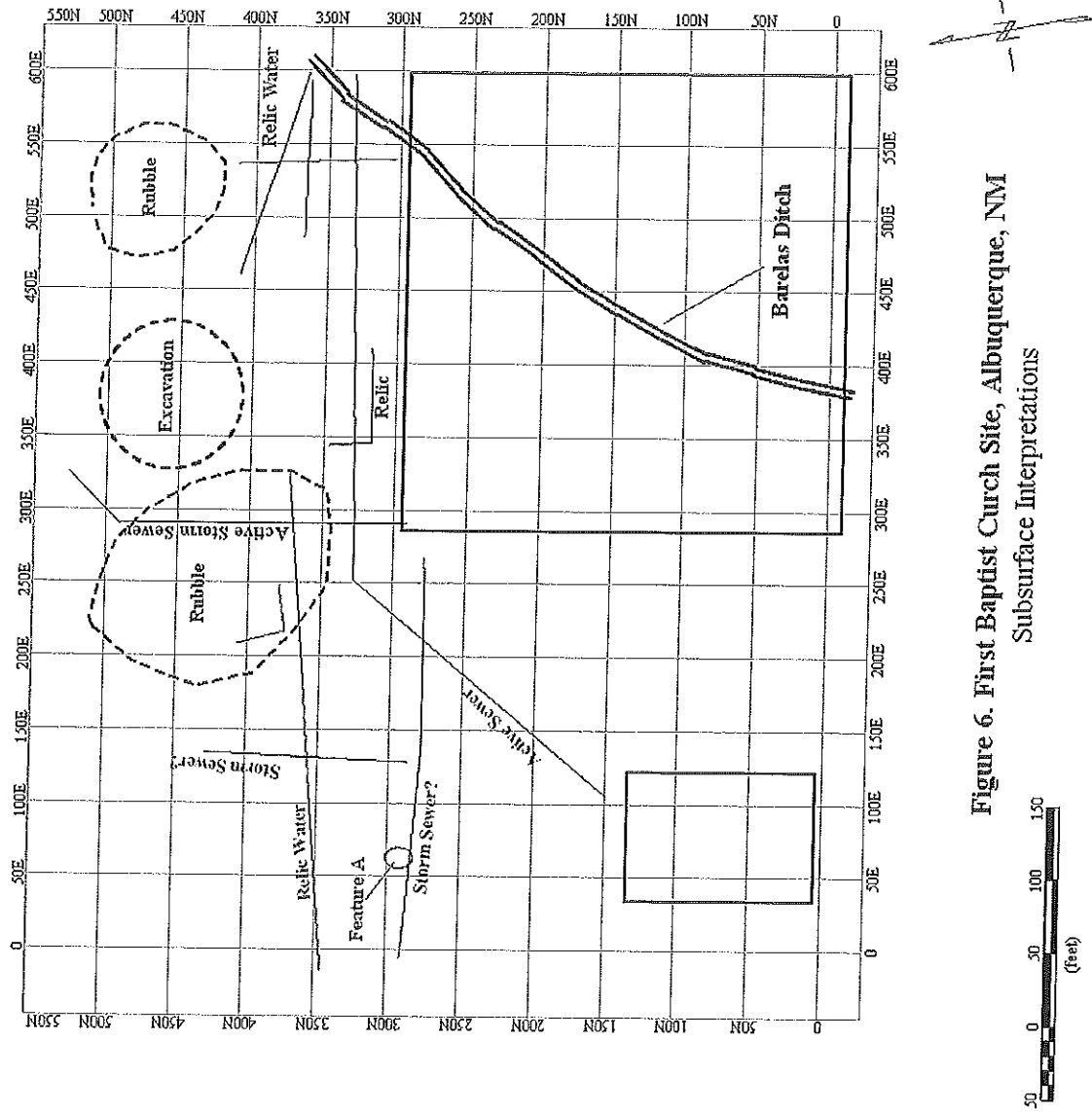


Figure 6. First Baptist Church Site, Albuquerque, NM
Subsurface Interpretations