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August 18, 2009

Ellis Environmental
430 Silver Spur Road, Ste 201
Rancho Palos Verdes, California 90275

Project Number: 09-333

Attn: **Duane Behens**

RE: Geophysical Survey, UST/Excavation search, 1640 Cabrillo Avenue, Torrance, California.

This report is to present the results of our geophysical survey carried out over portions of property located at 1640 Cabrillo Avenue in Torrance, California (Figure 1), on August 10, 2009. Purpose of the survey was to locate and identify, insofar as possible, the existence of any underground storage tanks (USTs), backfilled excavations, piping, conduit, and other buried features that may exist within the survey area.

A combination of electromagnetic induction (EM), magnetometry, and ground penetrating radar (GPR) were applied to the search. A utility locator with line tracing capabilities was also brought to the field and used where risers exist onto which a signal could be impressed and traced.

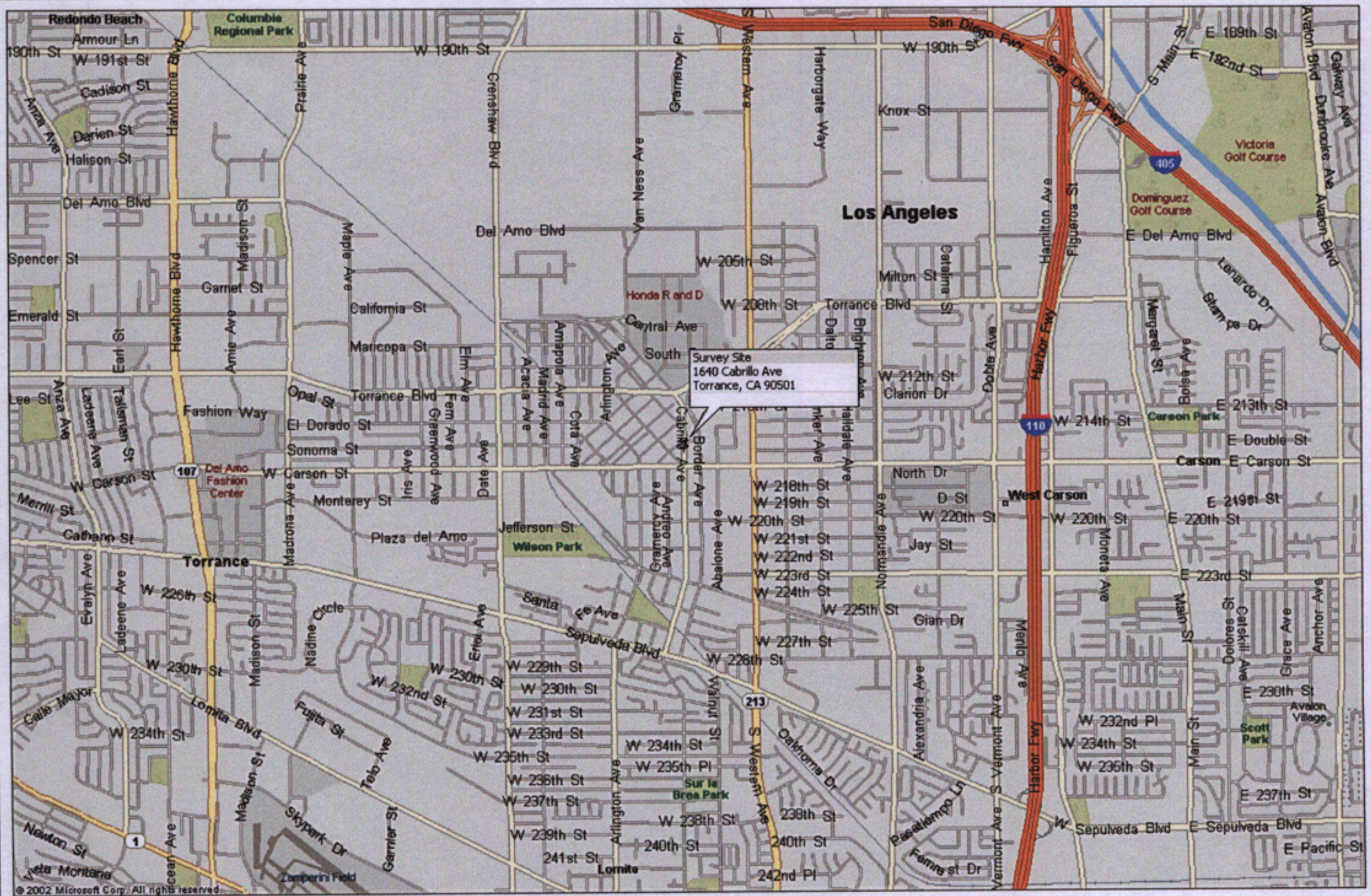

FIGURE 1 –Site Location Map

Multiple methods were utilized because each instrument senses different material properties of the ground and buried objects. At any given site the situation, geologic and cultural, may be such that one or more of the instruments may record excessive "noise", the ground may not provide sufficient contrasts, or there may be overlapping anomalies, for a given instrument to be effective. Summarily stated, there are generally instrumental limits and interpretational impediments.

Survey Design – The areas to be surveyed were indicated in the field by the client. The magnetic gradiometer, line tracer, EM61, M-Scope and GPR were systematically free traversed in many directions over the designated areas. Additional traverses were taken, access permitting, for detailing and confirmation where anomalous conditions were found. Multiple GPR profiles were also collected throughout the area and in specific areas for confirmation where other instruments detected anomalies. The line tracer was also used to trace out all detectable utilities in the area.

Hard copy of the EM and other data was not acquired, that is, discrete readings on the nodes of a grid were not recorded that could be put into a contoured map format. Rather, the instruments' meters were read continuously during traverses to detect excursions of the readouts that might have meaning in terms of buried objects. The lack of hard copy for EM and other data sets does not degrade the quality of the surveys in any way. Hard copy merely provides a basis for report documentation of these geophysical fields, if such documentation is needed.

The EM and magnetic instruments were not used over reinforced concrete. The rebar within the concrete causes substantial distortion to the EM and magnetic readings caused by its metallic content. GPR and the line tracer were the main tools applied within these areas.

A Geonic's model EM61 and a Fischer M-Scope was used for the EM sampling. A Sensors and Software Noggin Ground Penetrating Radar unit with a 500 MHz antenna produced the radar images. The magnetic gradiometer was a Schonstedt GA-52 and a Metrotech 9890 utility locator rounded out the tools applied.

Brief Description of the Geophysical Methods Applied - The magnetic gradiometer has two flux gate magnetic fixed sensors that are passed closely to and over the ground. When not in close proximity to a magnetic object, that is, only in the earth's field, the instrument emits a sound signal at a low frequency. When the instrument passes over a buried iron or steel object, so that locally there is a high magnetic gradient, the frequency of the emitted sound increases. The frequency is a function of the gradient between the two sensors.

The EM61 instrument is a high resolution, time-domain device for detecting buried conductive objects. It consists of a powerful transmitter that generates a pulsed primary magnetic field when its coils are energized, which induces eddy currents in nearby conductive objects. The decay of the eddy currents, following the input pulse, is measured by the coils, which in turn serve as receiver coils. The decay rate is measured for two coils, mounted concentrically, one above the other. By making the measurements at a relatively long time interval (measured in milliseconds) after termination of the primary pulse, the response is nearly independent of the electrical conductivity of the ground. Thus, the instrument is a super-sensitive metal detector. Due to its unique coil arrangement, the response curve is a single well-defined positive peak directly over a buried conductive object. This facilitates quick and accurate location of targets.

The GPR instrument beams energy into the ground from its transducer/antenna, in the form of electromagnetic waves. A portion of this energy is reflected back to the antenna at a boundary in the subsurface across which there is an electrical contrast. The instrument produces a continuous record of the reflected energy as the antenna is traversed across the ground surface. The greater the electrical contrast, the higher the amplitude of the returned energy. The radar wave travels at a velocity unique to the material properties of the ground being investigated, and when these velocities are known, the two-way travel times can be converted to depth. The depth of penetration and image resolution produced are a function of ground electrical conductivity and dielectric constant.

The line locator is used to passively detect energized high voltage electric lines and electrical conduit (50-60 Hz), VLF signals (14-22 kHz), as well as to actively trace other utilities. Where risers are present, the utility locator transmitter can be connected directly to the object, and a signal (9.8-82 kHz) is sent traveling along the conductor, pipe, conduit, etc. In the absence of a riser, the transmitter can be used to impress an input signal on the utility by induction. In either case, the receiver unit is tuned to the input signal, and is used to actively trace the signal along the pipe's surface projection.

The M-Scope device energizes the ground by producing an alternating primary magnetic field with AC current in a transmitting coil. If conducting materials are within the area of influence of the primary field, AC eddy currents are induced to flow in the conductors. A receiving coil senses the secondary magnetic field produced by these eddy currents, and outputs the response as anomalous conditions. The strength of the secondary field is a function of the conductivity of the object, say a pipe, tank or cluster of drums, its size, and its depth and position relative to the instrument's two coils. Conductive objects, to a depth of approximately 7 feet below ground surface (bgs) for the M-Scope are sensed. The device is also somewhat focused; that is, it is more sensitive to conductors below the instrument than they are to conductors off to the side.

Interpretations and Conclusions - The interpretation took place in real time as the survey progressed, and accordingly, the findings of our investigation were marked on the ground cover with spray chalk paint at the site, and further documented with site photographs (Figures 2-8) and radar images (Figures 9-14).

The EM and magnetic instruments were effective at locating and delineating metallic objects and utilities over the search area. Most obstructions were removed from the site; however, there were still some areas of the survey site that were in close proximity to building structures, reinforced concrete or other aboveground metallic objects. In these areas the GPR and the line tracer were the main tools applied to the search, due to the substantial distortion to the EM and magnetic readings caused by the high concentration of metal.

GPR was useful at detecting both metallic and non-metallic lines and utilities. According to principles of physics, radar penetration is a function of soil conductivity and dielectric constant. At this site, local conditions were favorable for radar penetration due to the nature of the soil and materials covering the survey areas. This resulted in radar penetration down to approximately 3.0 to 3.5 feet bgs.

Piping and utilities detected during the survey were marked with spray chalk paint on the ground cover, using blue for water, red for electric, green for sanitary sewer/storm drain, yellow for vent lines, pink and white for unknown.

There are two anomalies of an unknown origin detected within the surveyed areas. The first anomaly is located between multiple buildings over reinforced concrete (Figures 2-5), while the second anomaly is located in the asphalt parking lot (Figures 6-8).

The first anomaly measures approximately 29 feet long and 6 feet wide (Figures 2-4). This anomaly can be seen approximately 3 feet below the ground's surface (see radar images, Figures 9-12). These radar images have very similar characteristics to an underground storage tank. Vent lines were visually observed behind the building (Figure 4), and there is a linear underground object leading to these risers. It is very likely this underground object is the existing vent lines. In addition to these supporting factors for an underground storage tank, there was also a fill port observed in the center of this marked out anomaly. Although it cannot be definitively determined this is an underground storage tank, this is the best candidate within the first area of a UST. This anomaly was marked and delineated on the ground cover in pink marking paint.

The second area was located within the asphalt where another fill port was observed. In addition to this fill port, there were nearby vent risers along the corner of the building (Figure 7). Multiple traverses were taken within this area and a few radar images were viewed and saved (Figures 13 and 14). These images also have similar characteristics to an underground storage tank. This second anomaly measures approximately 7 feet long and 6 feet wide and is approximately 2 feet below the ground's surface. With the nearby vent risers, the fill port and the radar data, this is the best candidate anomaly for an existing underground storage tank. Its boundaries were marked on the ground cover in pink marking paint.

Although these two anomalies are the best candidate anomalies for the existence of underground storage tanks, it is recommended that further investigation and sampling be performed by Ellis Environmental to definitively determine each anomaly's source.

Although there were no USTs detected within close proximity to any structures, caution should still be used when excavating in the vicinity of foundations. It is still possible, although unlikely, for a UST to be sitting beneath any structure, essentially masking the response of a possible UST.

Where obstructions from adjacent cultural objects limited passes in at least one direction, or a resolute image of the subsurface was partially drowned out by localized non-target anomalies, certainty was compromised. All detected utilities were marked out and it was left up to the client to determine if drilling activities should proceed there in the future.

Subsurface Survey's and Associates professional personnel are trained and experienced and have completed thousands of projects since the company's inception in 1988. It is our policy to work diligently to bring this training and experience to bear to acquire quality data sets, which in turn, can provide clues useful in formulating our interpretations. Still, non-uniqueness of interpretations, methodological limitations, and non-target interferences are prevailing problems. Subsurface Surveys and Associates makes no guarantee either expressed or implied regarding the accuracy of the interpretations presented. And, in no event will Subsurface Surveys and Associates be liable for any direct, indirect, special, incidental, or consequential damages resulting from interpretations and opinions presented herewith.

All data acquired in these surveys are in confidential file in this office, and are available for review by your staff, or by us at your request, at any time. We appreciate the opportunity to participate in this project. Please call, if there are questions.

Bret Herman
Staff Geophysicist

Travis Crosby, GP# 1044
Senior Geophysicist

SITE PHOTOGRAPHS

1640 Cabrillo Avenue
Torrance, California

FIGURE 2

FIGURE 3

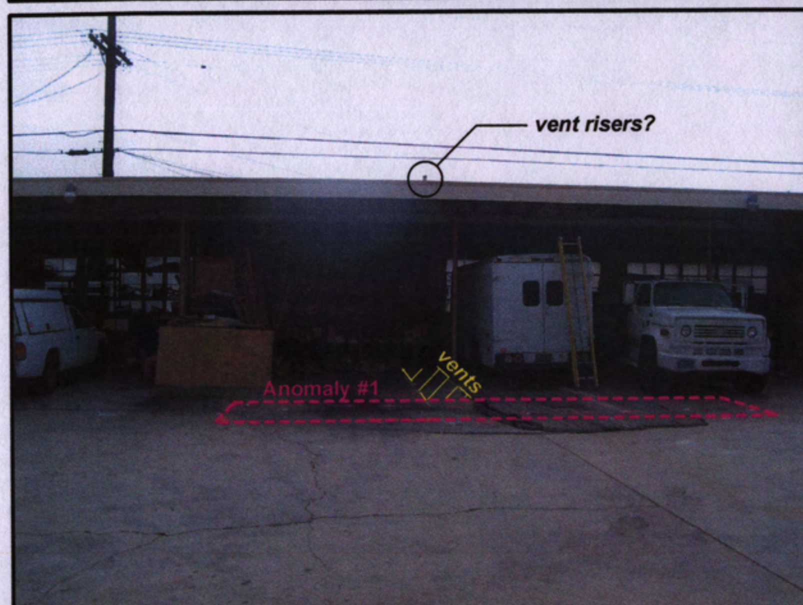

FIGURE 4

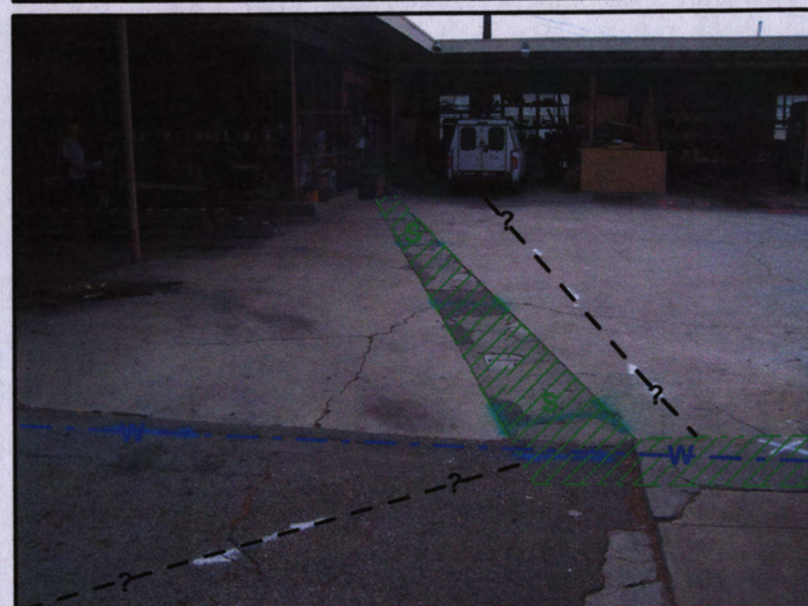

FIGURE 5

SITE PHOTOGRAPHS

1640 Cabrillo Avenue
Torrance, California

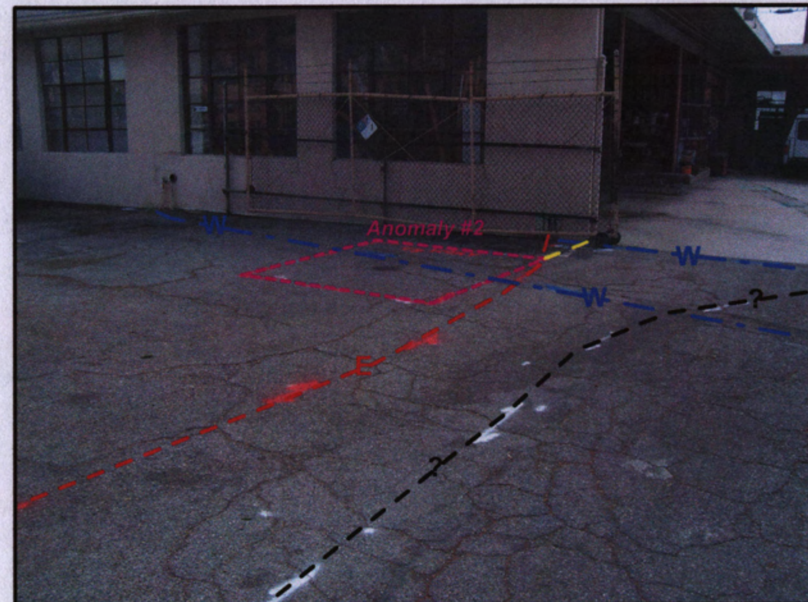

FIGURE 6

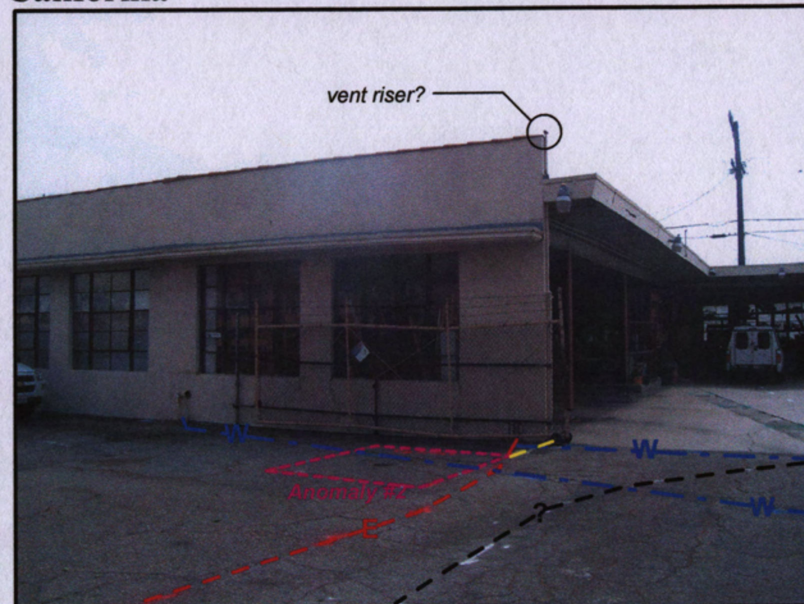

FIGURE 7

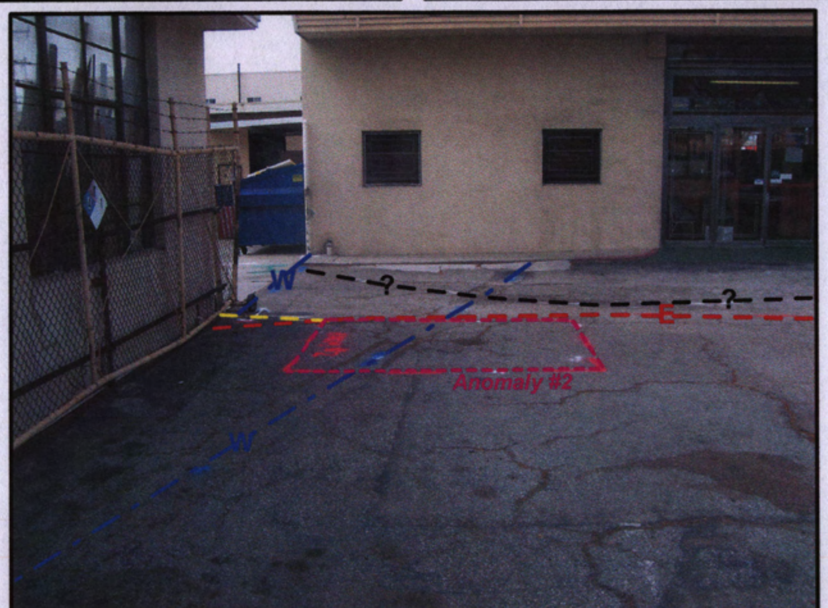

FIGURE 8

RADAR IMAGES

1640 Cabrillo Avenue
Torrance, California

ANOMALY #1

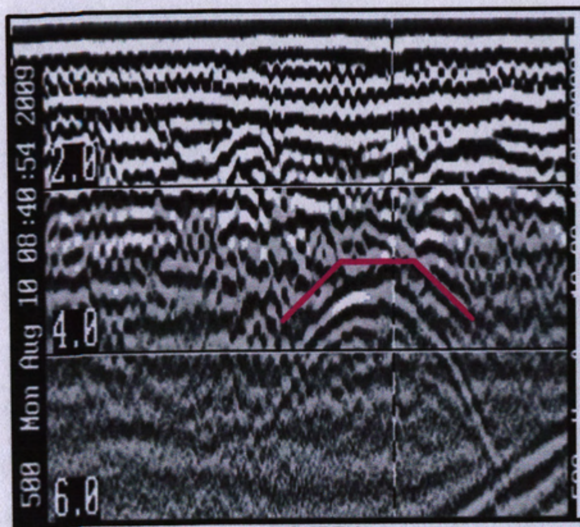

FIGURE 9

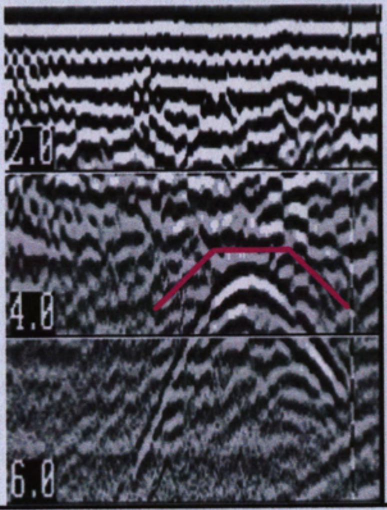

FIGURE 10

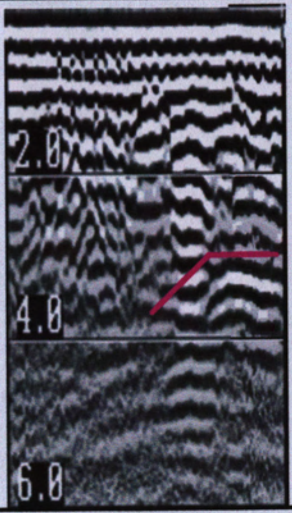

FIGURE 11

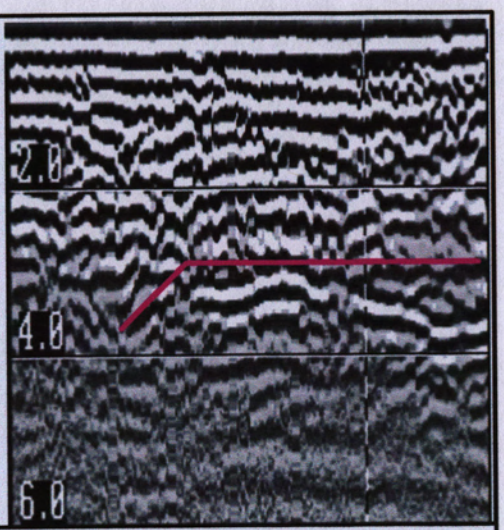

FIGURE 12

ANOMALY #2

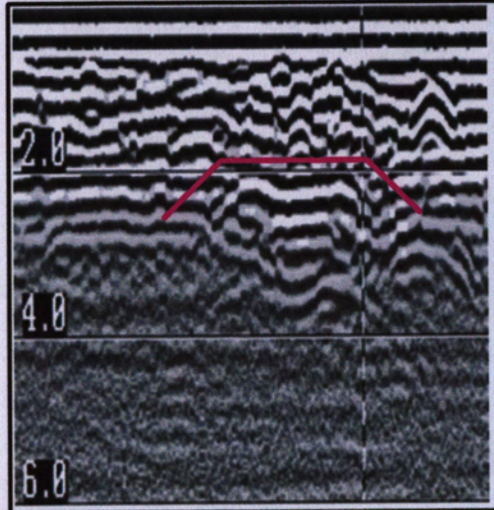

FIGURE 13

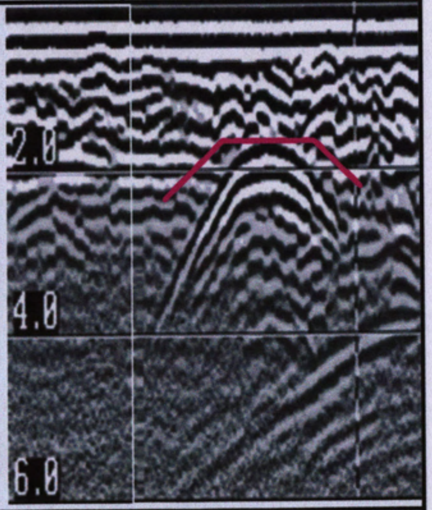

FIGURE 14