BURIED DRUM INVESTIGATION REPORT

Sierra Pacific Industries
Arcata Division Sawmill
2593 New Navy Base Road
Arcata, California

March 15, 2004

G

consulting
scientists and
engineers

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Prepared For:

SIERRA PACIFIC INDUSTRIES

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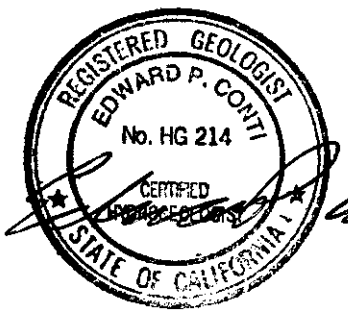
MFG Project No. 030229.15

PROFESSIONAL CERTIFICATION

This report was prepared by MFG, Inc. and Geomatrix Consultants, Inc. under the professional supervision of Edward P. Conti. The findings, recommendations, specifications and/or professional opinions presented in this report were prepared in accordance with generally accepted professional hydrogeologic practice, and within the scope of the project. There is no other warranty, either express or implied.



March 15, 2004

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1.0 INTRODUCTION

MFG, Inc. and Geomatrix Consultants, Inc. have prepared this report on behalf of Sierra Pacific Industries (SPI) to document the investigation for the possible presence of buried drums in the vicinity of the Truck Shop at the SPI Arcata Division Sawmill. This work was performed in response to the discovery of two partially degraded steel drums beneath the former waste oil underground storage tank (UST) removed in April 2003 (MFG, 2003). The Arcata Division Sawmill is located at 2593 New Navy Base Road, Arcata, California (hereinafter "the Site"). The Site location is shown in Figure 1. A Site plan showing features of the mill and the location of the buried drum investigation is presented in Figure 2. An enlargement of this portion of the Site, showing features of the Truck Shop area and the location of the former waste oil UST, is presented in Figure 3.

This work was performed in accordance with the scope of work presented in MFG's *Work Plan for Geophysical Survey*, dated May 23, 2003. The work plan was approved by the California Regional Water Quality Control Board, North Coast Region, (RWQCB) on May 28, 2003. The approved work plan included the following activities: (1) identify potential locations of buried drums using geophysical survey methods; and (2) verify the findings of the geophysical survey using intrusive methods, such as limited excavations (test pits). This report summarizes the methods and results of the implemented work plan.

The remainder of this report is organized as follows. The Site background is provided in Section 2.0. The Site geology and hydrogeology is described in Section 3.0. The geophysical survey methods and results are presented in Section 4.0. The methods and results of the limited excavations (test pits) are presented in Section 5.0. The disposal of investigation-derived waste is discussed in Section 6.0, and references cited in this report are listed in Section 7.0.

2.0 BACKGROUND

2.1 Site Description

The Site is located on the Samoa Peninsula in Arcata, Humboldt County, California (Figure 1). A Site plan showing features of the mill is included in Figure 2. The Site features in the area of the buried drum investigation are shown in Figure 3.

The Site was originally undeveloped land, consisting of sand dunes and mud flats, until approximately 1950 when SPI converted the land into a lumber mill. During conversion, SPI filled in portions of the Site. SPI began operations at this facility before the area was completely filled. The mill has been active from 1950 to present day.

2.2 Buried Drum Investigation Area

On April 7, 2003, MFG investigated an area northwest of the Truck Shop for the presence of waste oil constituents in soil and groundwater pursuant to paragraph 18 of the Consent Decree between Ecological Rights Foundation and Sierra Pacific Industries, Inc. et al (case number C-01-0520-MEJ). The waste oil UST, which was believed to have been removed in the 1970's, was discovered during this investigation (Figure 3). The waste oil UST and hydrocarbon-impacted soil were subsequently removed from the subsurface on April 22, 2003 (MFG, 2003). As soil impacted with petroleum hydrocarbons was removed, one partially degraded 30-gallon steel drum and one partially degraded 55-gallon steel drum were discovered beneath the former location of the waste oil UST. The two drums were removed from the subsurface using the backhoe. The lid on the 30-gallon drum had a bung hole cap labeled "Shell" indicating that the drum possibly originally contained motor oil. The 55-gallon drum did not have any identification labels or markings to indicate its origin or former contents, if any. SPI personnel speculated that the drums may have been used to fill a void beneath the UST prior to its initial installation in the tank pit.

3.0 SITE GEOLOGY AND HYDROGEOLOGY

The subsurface lithology and hydrogeology at the Site was previously investigated and described by Environet Consulting (Environet, 2003). The subsurface lithology consists primarily of fine- to medium-grained sand of apparent sand dune origin to a depth of approximately 22 feet below ground level (bgl), the maximum depth explored during previous drilling activities at the Site. The sand is sporadically interbedded with thin lenses of "bay mud," consisting of a mixture of sand and silt.

In the eastern portion of the Site, groundwater has been measured in existing monitoring wells at depths ranging from approximately 1 to 5 feet bgl and the groundwater flow direction is generally to the east, toward the Mad River Slough (Figure 2) (Geomatrix, 2003). Groundwater was measured at a depth of approximately 1.7 feet bgl in a temporary monitoring well that was installed in April 2003 in the vicinity of the former waste oil UST (MFG, 2003). Based on the proximity of this portion of the Site to Humboldt Bay, the groundwater flow direction in this area is likely to the south-southeast, toward Humboldt Bay.

4.0 GEOPHYSICAL SURVEY METHODS AND RESULTS

4.1 Field Methods

On July 10, 2003, a geophysical survey was conducted by NORCAL Geophysical Consultants, Inc. (NORCAL) of Petaluma, California under the observation of MFG. NORCAL established an unbiased 5-foot grid system in the area northwest of the Truck Shop where the buried drums were discovered in April 2003 (Figure 3). The grid system was approximately 110 feet by 120 feet with the longer axis trending in a northeast direction. Each grid line was established using a transit. Each grid node was established using a surveyor's tape and marked with white spray paint. The initial survey was conducted using a magnetometer. Any magnetic anomalies detected by the magnetometer were re-evaluated using a metal detector. The magnetic anomalies that were identified as metallic objects using the metal detector were then evaluated using ground penetrating radar (GPR). Photographs documenting the buried drum investigation are presented in Appendix A.

4.1.1 Magnetometer

NORCAL performed the initial geophysical survey using a magnetometer. The magnetometer measures variations in the earth's magnetic field caused by geologic units or buried objects comprised of ferrous material, such as underground storage tanks, drums and metal debris. A magnetic reading was obtained at each grid node and recorded on a data logger. The data obtained during this survey was then downloaded to a notebook computer and analyzed using an appropriate software package to produce a vertical magnetic gradient contour map. The vertical magnetic gradient contour map was used to identify the areas where magnetic anomalies were present. Prior to further evaluation, the immediate vicinity of each detected anomaly was inspected for miscellaneous surface features and surface debris that may have generated a false-positive reading. A copy of the contour map is presented in Appendix B.

4.1.2 Metal Detector

The magnetic anomalies that were not attributable to known surface features and surface debris were re-evaluated using a metal detector. The metal detector was used to evaluate whether the anomalies were related to buried metallic objects and assisted in further defining the size and shape of the anomalies. The area encompassing each suspected buried metallic object was identified with pink spray paint for additional evaluation using GPR.

4.1.3 Ground Penetrating Radar

The GPR survey method provides a high resolution, cross-sectional image showing variations in the electrical properties of the subsurface material. GPR operates by repeatedly radiating an electromagnetic pulse into the ground from a transducer (antenna) as it is moved along the surface. Since rock and soil are transparent to electromagnetic energy, the radar signal propagates downward into the ground until it encounters a change in electrical permittivity (ability of a material to hold a charge when an electrical field is applied), such as a metallic object. When the signal encounters a metallic object, the electromagnetic energy is reflected back to the surface and detected by the transducer (antenna). The reflected signal is then printed as a cross-sectional image and interpreted by a geophysicist.

The GPR survey assisted in evaluating the size and shape of each metallic anomaly and provided an approximate depth and profile of each metallic anomaly. The GPR readings were obtained continuously along two selected transects (grid lines) that were centered over each metallic anomaly; one transect was oriented in a northeast-southwest direction and the other transect was oriented in a northwest-southeast direction. The readings were recorded on a data logger and downloaded to a notebook computer and analyzed using an appropriate software package to produce a cross-sectional image of each anomaly. The cross-sectional images for each metallic anomaly are presented in Appendix C.

4.2 Survey Results

The magnetometer survey detected several magnetic anomalies in the investigation area (Appendix B). Anomalies in the southeastern portion of the investigation area were attributable to an underground

water line and a power pole with an associated support cable. The underground water line provides water to the wash rack area located southwest of the investigation area (Figure 2).

Additional anomalies were detected in the vicinity of the concrete pad for the steam cleaning area (Appendix B). These anomalies were attributable to rebar used to reinforce the concrete pad and a metal drop inlet (grate) used to collect wash water runoff from the concrete pad (Figure 3). A partially buried metal pipe was also located along the southern edge of the concrete pad.

Four anomalies were detected in the northwestern portion of the investigation area. These anomalies could not be attributed to known surface or subsurface features. The four anomalies were screened with a metal detector and determined to be metallic objects. The approximate size and shape of the four metallic anomalies are illustrated on the vertical magnetic gradient contour map provided in Appendix B. These anomalies were identified as A, B, C and D.

The GPR survey was performed along perpendicular transects centered over each metallic anomaly. The GPR transects at Anomaly A were approximately 25 and 30 feet in length. The GPR transects at Anomalies B, C and D were approximately 10 feet in length in both directions. The locations of GPR transects are illustrated on the magnetic gradient contour map in Appendix B and on Figure 4. The GPR images obtained along the transects are provided in Appendix C.

Upon review of the GPR images obtained at each anomaly, the following observations were noted by NORCAL:

- Anomaly A – suspected to be a single massive object or multiple smaller objects located close together. The top of the object(s) was estimated to be approximately 3 to 4 feet bgl. The width of the object(s) was estimated to be approximately 4 feet.

- Anomaly B – suspected to be a small object. The width of the object was estimated to be approximately 2 feet and was visible in the GPR image obtained along the northeast-southwest transect. The object was not visible along the northwest-southeast transect suggesting that the object was linear. The top of the object was estimated to be 2 to 3 feet bgl.

- Anomaly C – the top of the object was estimated to be approximately 4 feet bgl; the signal was faint along both the northeast-southwest and northwest-southeast transects.

- Anomaly D – suspected to be a small object at a shallow depth, likely immediately beneath the asphalt pavement.

Limited excavations (test pits) were performed at each of the four metallic anomalies listed above.

5.0 LIMITED EXCAVATION METHODS AND RESULTS

5.1 Field Methods

On July 22, 2003, limited excavations (test pits) were conducted at Anomalies A, B, C and D to investigate these areas for the possible presence of buried drums. The limited excavation activities were performed by Foss Environmental Services Company (Foss) of Alameda, California under the observation of MFG. Dean Prat of the RWQCB was also at the Site to observe some of the excavation activities. The limited excavations were performed using a backhoe. The location and size of each limited excavation are shown in Figure 4. At the conclusion of the investigation activities, the excavations had the following dimensions: the excavation at Anomaly A measured approximately 6 feet by 19 feet with a total depth of approximately 6 feet bgl; the excavation at Anomaly B measured approximately 4 feet by 5 feet with a total depth of approximately 4 feet bgl; the excavation at Anomaly C measured approximately 5 feet by 5 feet with a total depth of approximately 5 feet bgl; and the excavation at Anomaly D measured approximately 3 feet by 4 feet with a total depth of approximately 2 feet bgl. The limited excavation at Anomaly A could not be increased to encompass the entire area of the metallic anomaly because of the presence of a PVC sewer line that extends to the southwest along the front edge of the stream cleaning area concrete pad.

5.2 Field Observations

The soil encountered during excavation activities consisted of compact fill material to a depth of approximately 3 feet bgl underlain by fine- to medium-grained sand to a depth of approximately 6 feet bgl, the maximum depth explored in the excavations (Anomaly A). The compact fill material consisted of subrounded, fine to coarse gravel in a matrix of sand, silt and clay. Groundwater was observed seeping into the excavation at Anomaly A at approximately 5.5 feet bgl and was not encountered in the excavations at Anomalies B, C and D.

The following observations and findings were noted at the limited excavations for the four anomalies:

- Anomaly A – several sections of degraded, corrugated sheet metal of varying size were removed from the excavation along with lesser amounts of other miscellaneous metal debris, such as wiring, metal cables and tin cans. No other metal debris was visible in the excavation.

- Anomaly B – two pieces of narrow angle iron of unknown length and a degraded saw blade were uncovered; however, the objects were left in place because they extended beyond the excavation sidewalls and could not be removed with the backhoe bucket. No other metal debris was visible in the excavation.

- Anomaly C – miscellaneous metal debris, including steel plates, piping, metal cables, wiring and a truck axle, was removed from the excavation. No other metal debris was visible in the excavation.

- Anomaly D – a single steel plate was discovered at shallow depth and was removed from the excavation. No other metal debris was visible in the excavation.

After removing the accessible visible metal debris, each excavation was inspected for the possible presence of buried drums. No evidence of buried drums was observed in any of the limited excavations. No odors or staining were noted in the soil removed from the excavations or in the soil along the sidewalls and floors of the excavations. Photographs showing the limited excavations and the metal debris removed from each excavation are provided in Appendix A.

5.3 Site Restoration

Immediately following the completion of investigation activities on July 22, 2003, Foss backfilled the excavations to surrounding grade with soil that was removed from each location. The backfilled soil was compacted in-place using the backhoe bucket. SPI personnel will complete the site restoration activities by capping each excavation with asphalt pavement.

6.0 DISPOSAL OF INVESTIGATION-DERIVED WASTE

The metal debris removed from the excavations was placed on the concrete pad in the steam cleaning area. SPI personnel steam cleaned the metal debris prior to placing it in the scrap metal bin. The metal debris was transported to North State Recycling in Redding, California, as part of SPI's periodic shipments.

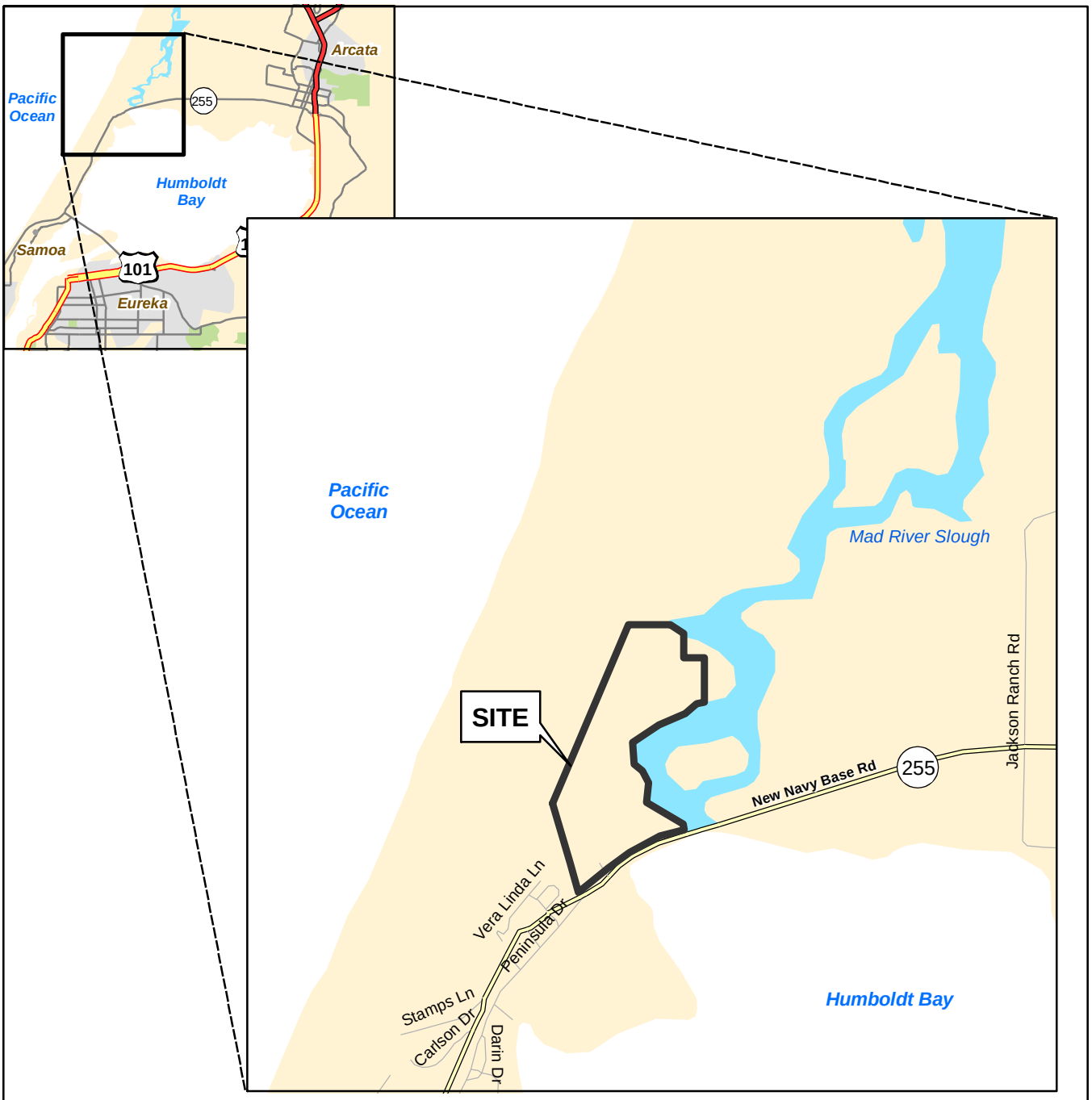
7.0 REFERENCES

Environet Consulting (Environet), 2003, *Results of the Remedial Investigation for Sierra Pacific Industries - Arcata Division Sawmills, Arcata, California*: January 30.

Geomatrix Consultants, Inc., 2003, *Final Feasibility Study for the Remediation of Wood Surface Treatment Chemicals, Sierra Pacific Industries, Arcata Division Sawmill, 2593 New Navy Base Road, Arcata, California*: December 1.

MFG, Inc., 2003, *Waste Oil Underground Storage Tank Investigation and Closure Report, Sierra Pacific Industries, Arcata Division Sawmill, 2593 New Navy Base Road, Arcata California*: June 10.

FIGURES



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GEOMATRIX

SITE LOCATION MAP
Sierra Pacific Industries
Arcata Division Sawmill
Arcata, California

Project No.
9329

Figure No.
1

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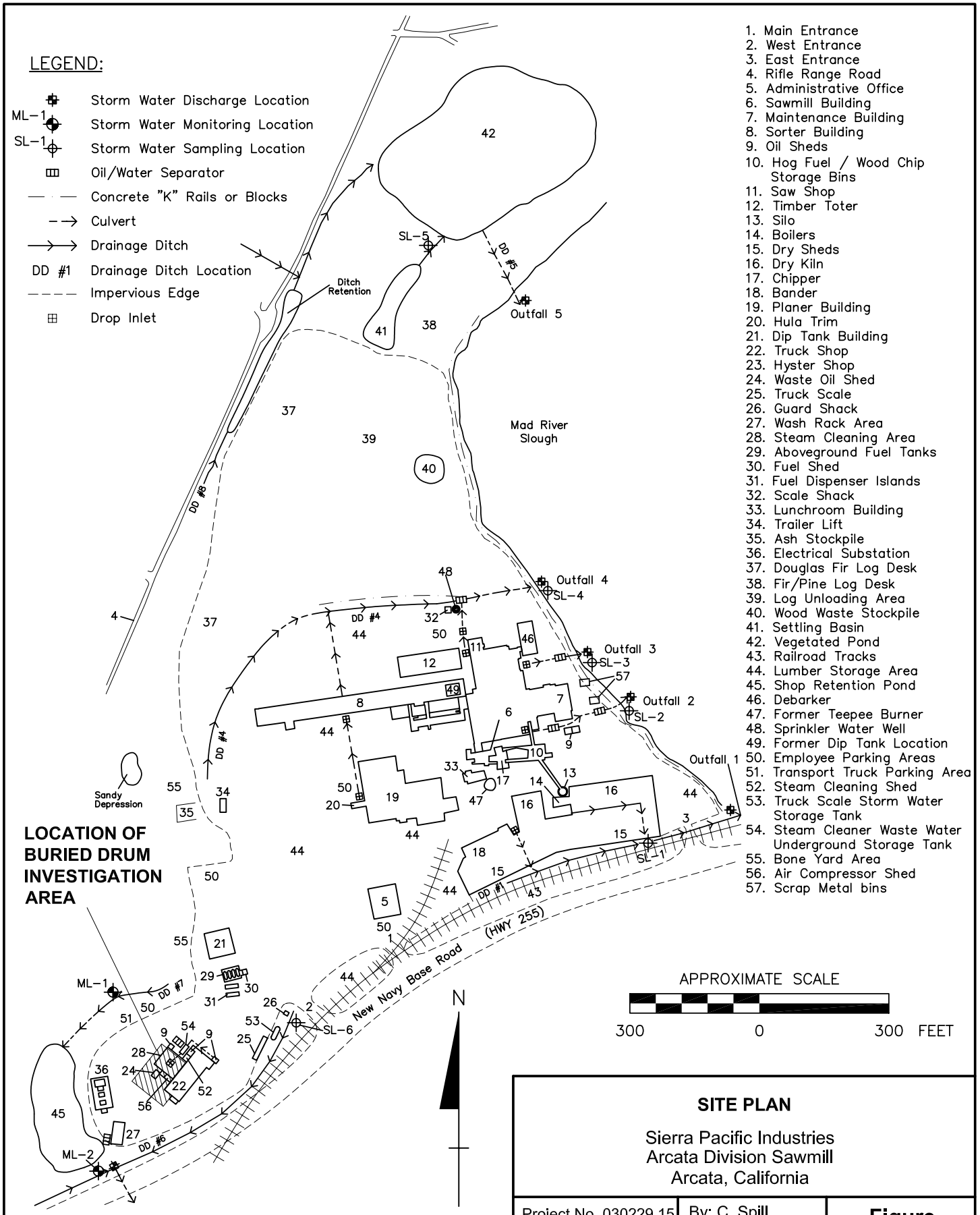

NOTES:
Site plan modified from Plate 2B in *Results of the Remedial Investigation for Sierra Pacific Industries - Arcata Division Sawmills, Arcata, California*, dated January 30, 2003, prepared by Environet Consulting.
Building dimensions and locations are approximate.

SITE PLAN

Sierra Pacific Industries
Arcata Division Sawmill
Arcata, California

Project No. 030229.15	By: C. Spill	**Figure 2**
Date: Nov. 18, 2003	Checked: CGS	

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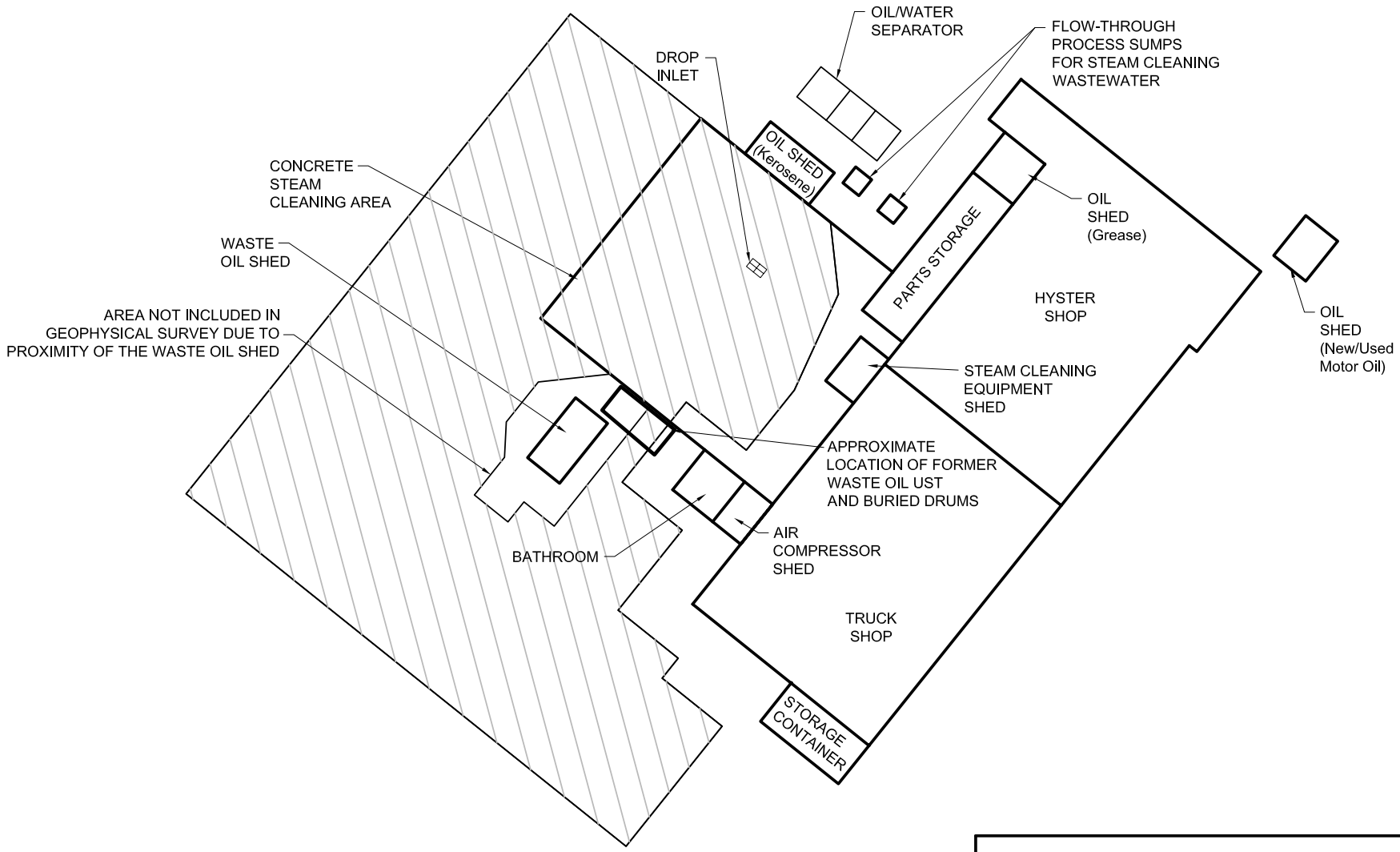

LEGEND

APPROXIMATE LOCATION OF THE GEOPHYSICAL SURVEY CONDUCTED ON JULY 10, 2003

N

0 15 30 FEET

APPROXIMATE SCALE

NOTE:
Site plan modified from *Results of the Remedial Investigation for Sierra Pacific Industries - Arcata Division Sawmills, Arcata, California*, dated January 30, 2003, prepared by Environet Consulting.

LOCATION OF THE GEOPHYSICAL SURVEY

Sierra Pacific Industries
Arcata Division Sawmill
Arcata, California

Project No. 030229.15	By: JCH	**Figure 3**
Date: Feb. 12, 2004	Checked: CGS	

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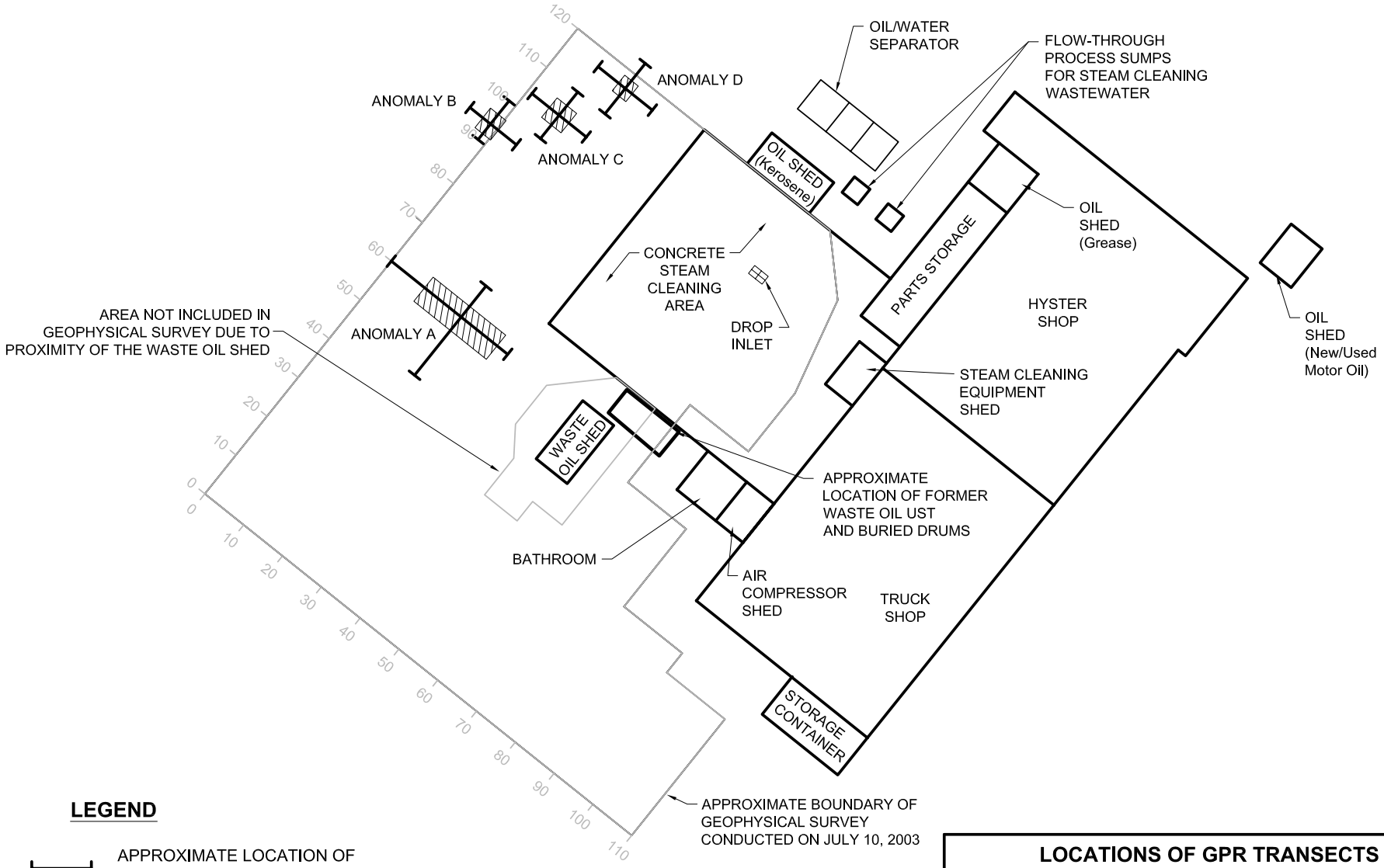

LEGEND

APPROXIMATE LOCATION OF GROUND PENETRATING RADAR (GPR) TRANSECT

APPROXIMATE LOCATION OF LIMITED EXCAVATION

N

0 15 30 FEET

APPROXIMATE SCALE

NOTE:
Site plan modified from *Results of the Remedial Investigation for Sierra Pacific Industries - Arcata Division Sawmills, Arcata, California*, dated January 30, 2003, prepared by Environet Consulting.

LOCATIONS OF GPR TRANSECTS AND LIMITED EXCAVATIONS
Sierra Pacific Industries
Arcata Division Sawmill
Arcata, California

Project No. 030229.15	By: JCH	**Figure 4**
Date: Feb. 12, 2004	Checked: CGS	

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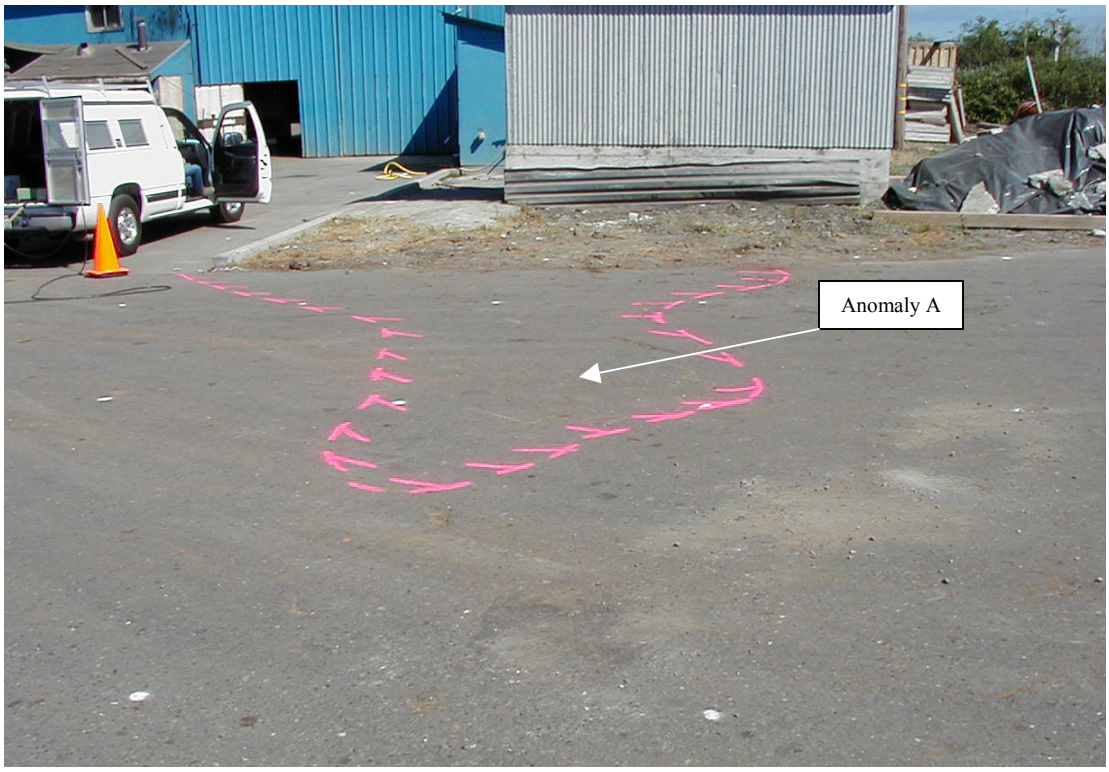
APPENDIX A

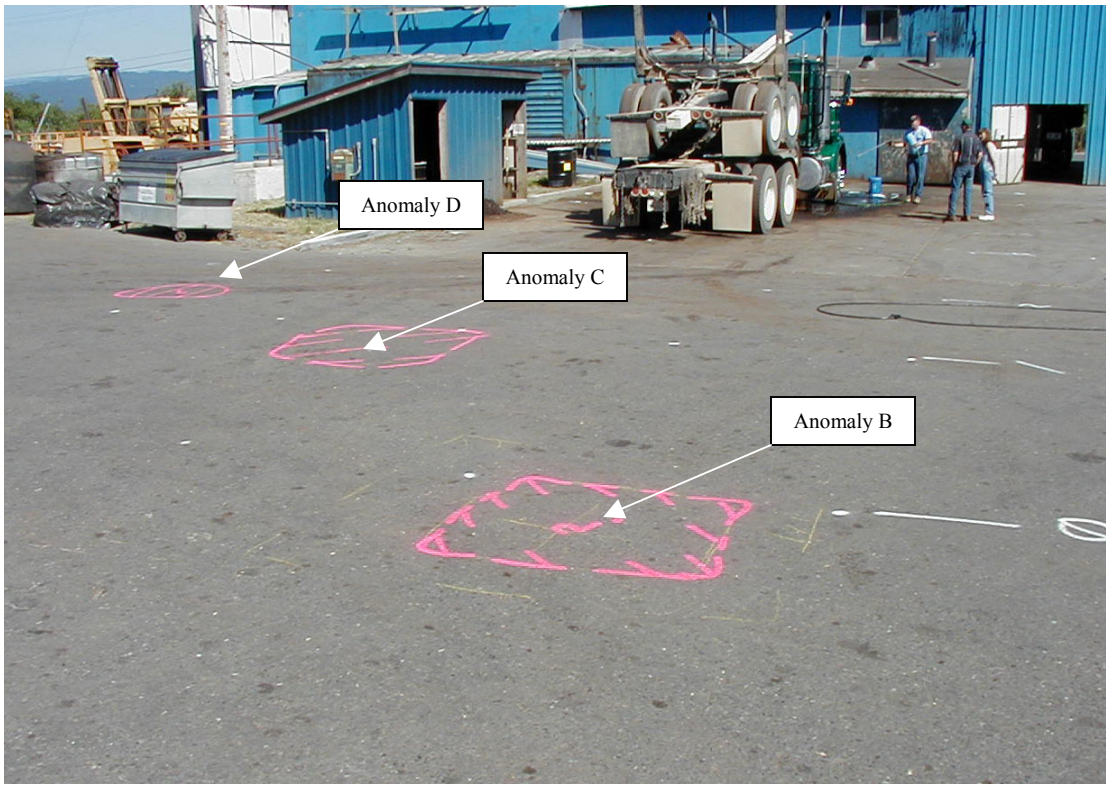
Photographs

Photograph 1 – Magnetometer Survey.

Photograph 2 – Ground Penetrating Radar Survey.



Photograph 3 – Shows Anomaly A outlined in pink spray paint.

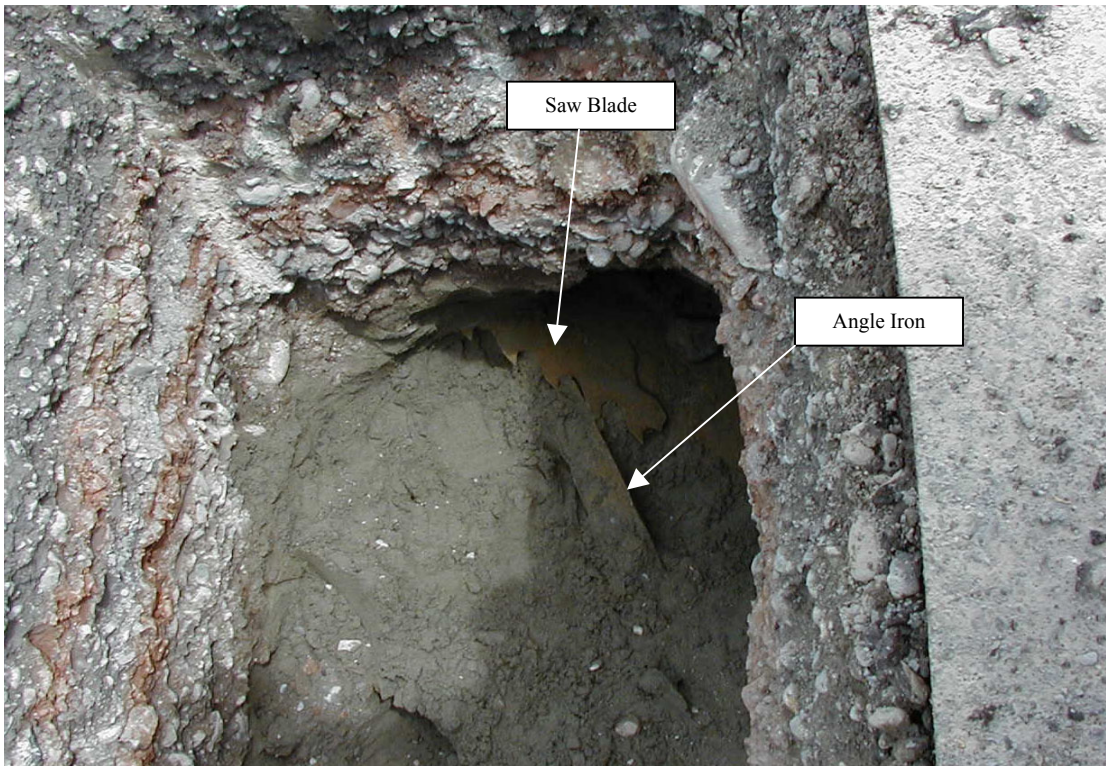


Photograph 4 – Shows Anomalies B, C and D outlined in pink spray paint.

Photograph 5 – Shows the limited excavation at Anomaly A.

Photograph 6 – Shows sheet metal removed from the excavation at Anomaly A.

Photograph 7 – Shows angle iron along north (top) side of the excavation at Anomaly B.



Photograph 8 – Shows angle iron and saw blade along north (top) side of the excavation at Anomaly B.

Photograph 9 – Shows the limited excavation at Anomaly C.

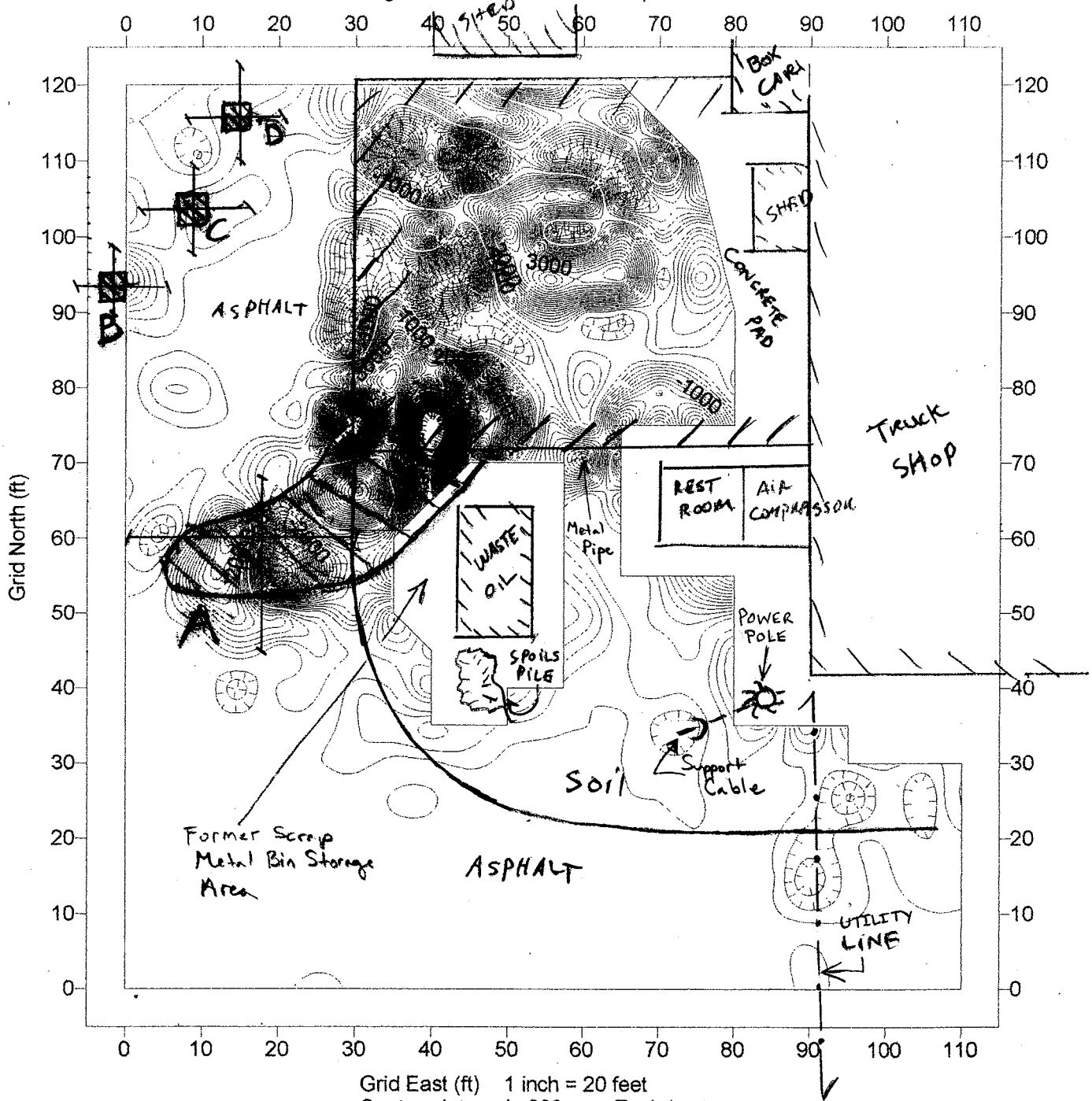

Photograph 10 – Shows miscellaneous metal debris removed from the excavation at Anomaly C.

Photograph 11 – Shows the limited excavation at Anomaly D and the steel plate removed from the excavation.

APPENDIX B

Vertical Magnetic Gradient Contour Map from Magnetometer Survey with Detected Anomalies and Ground Penetrating Radar (GPR) Transect Locations

MFG, Inc. / Sierra Pacific Acata Sawmill Truck Shop Area
Vertical Magnetic Gradient Contour Map



APPENDIX C

Ground Penetrating Radar (GPR) Survey Images

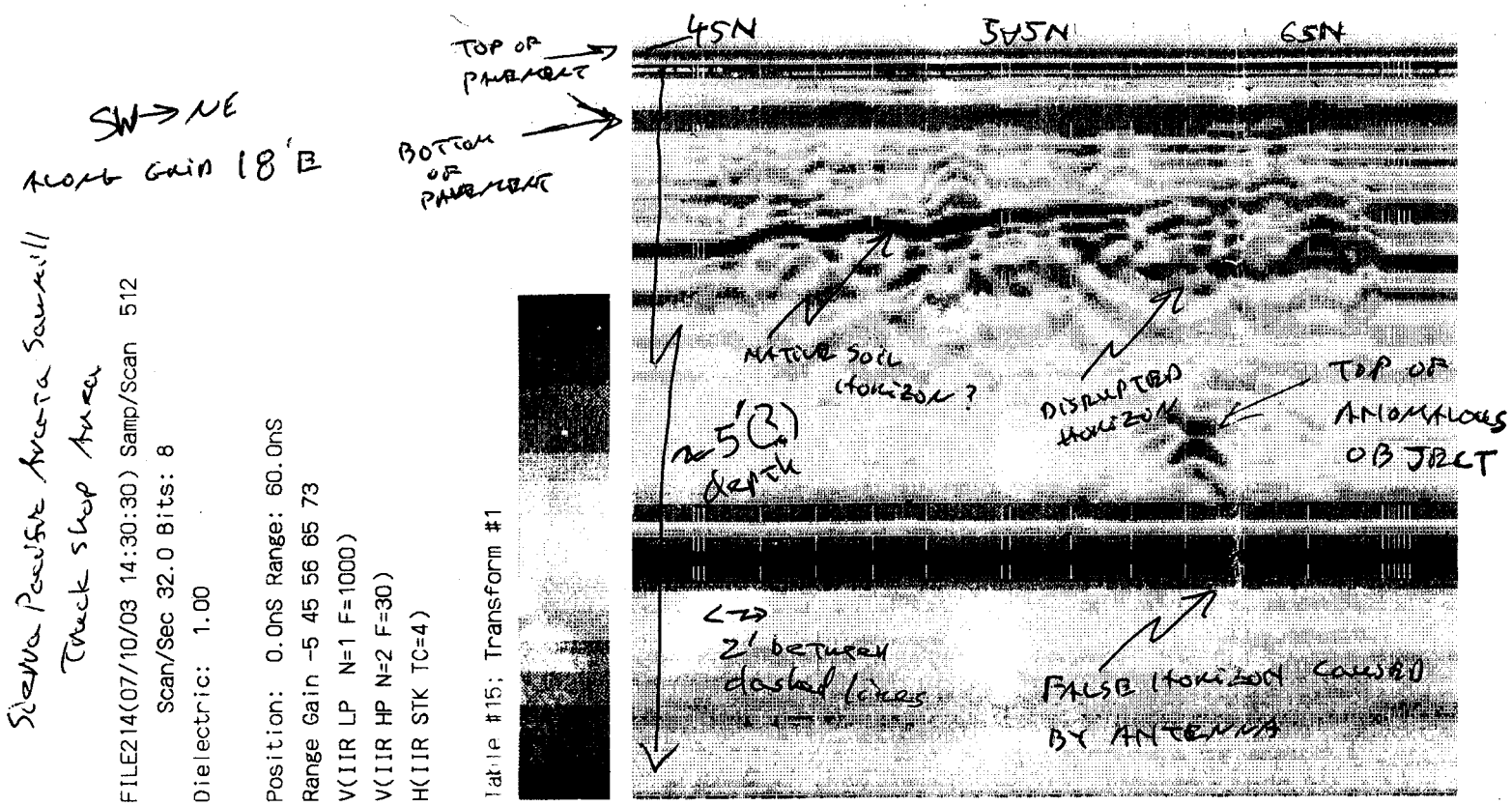


Image 1 – Northeast-southwest GPR transect at Anomaly A.

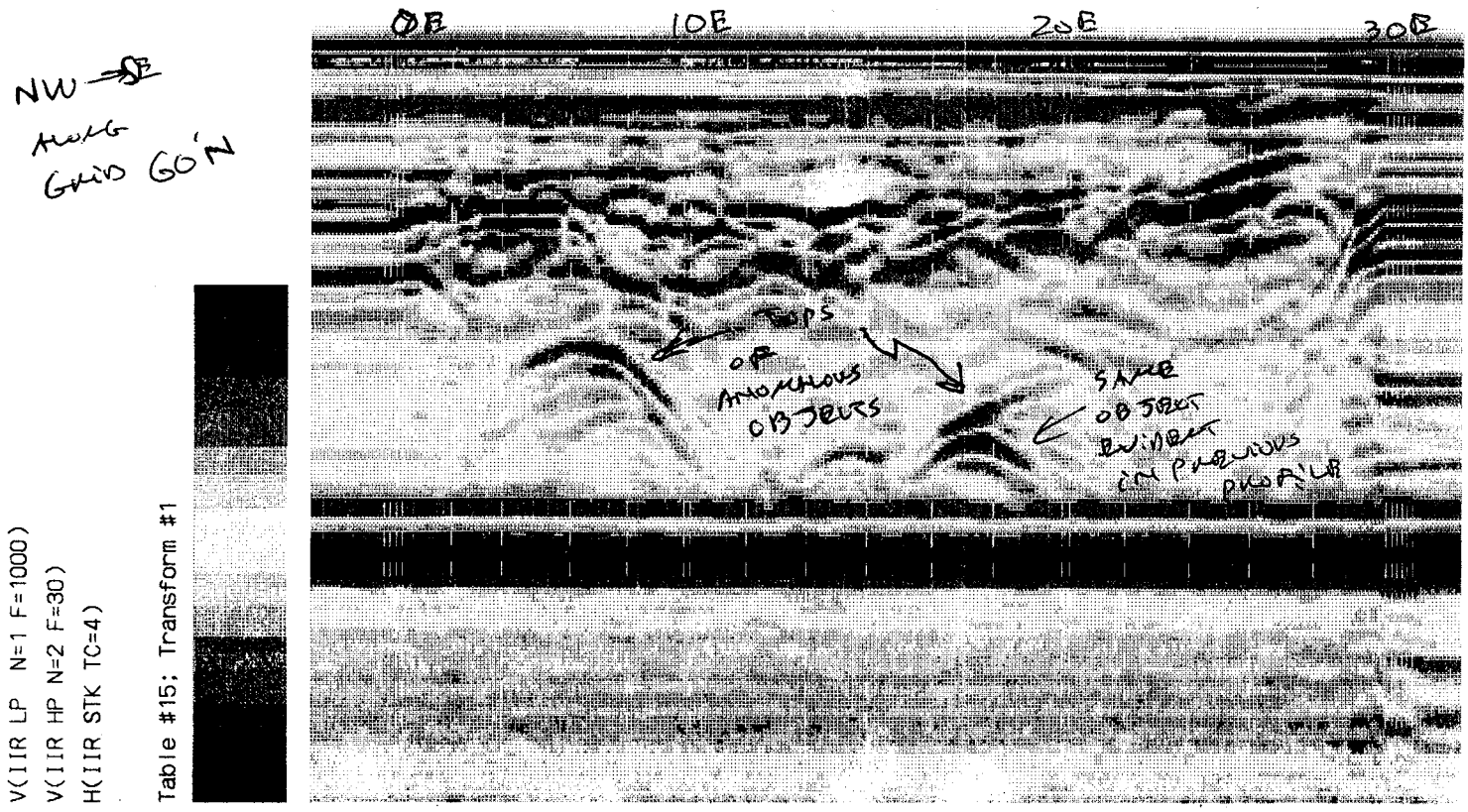


Image 2 – Northwest-southeast GPR transect at Anomaly A.

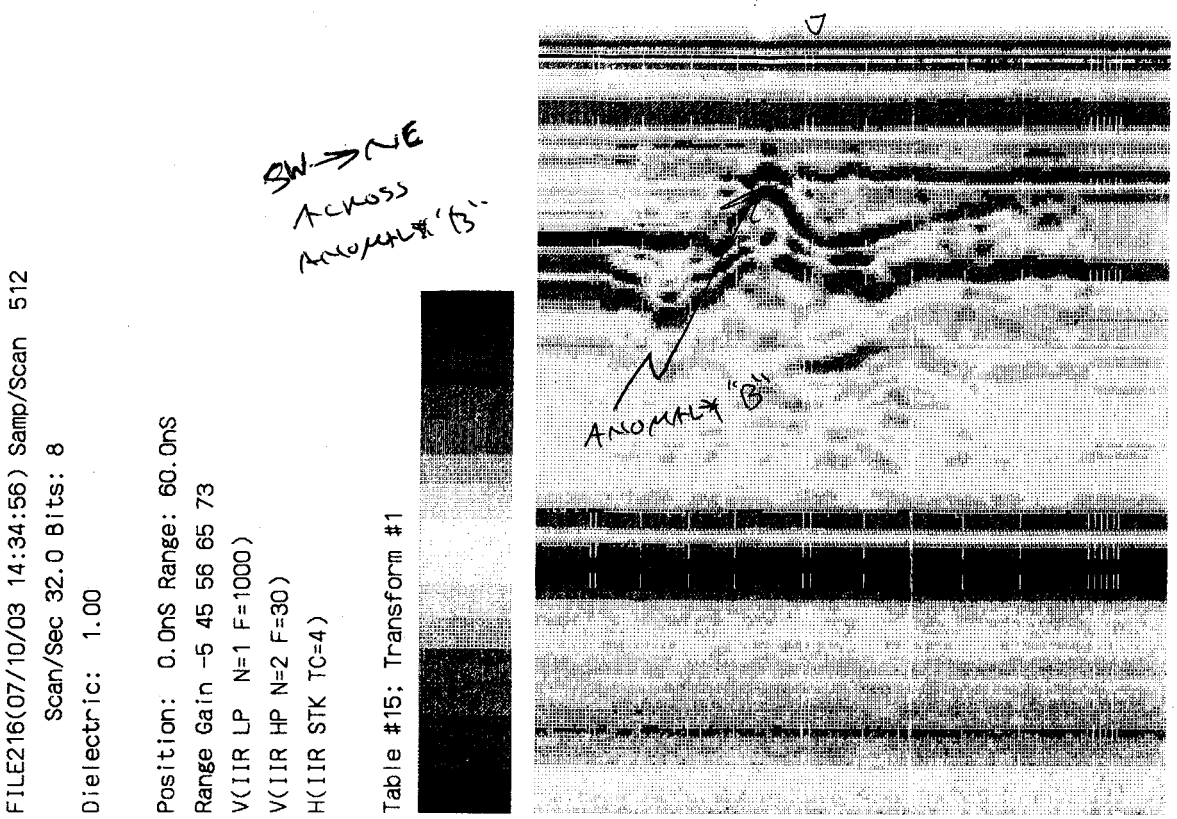


Image 3 – Northeast-southwest GPR transect at Anomaly B.

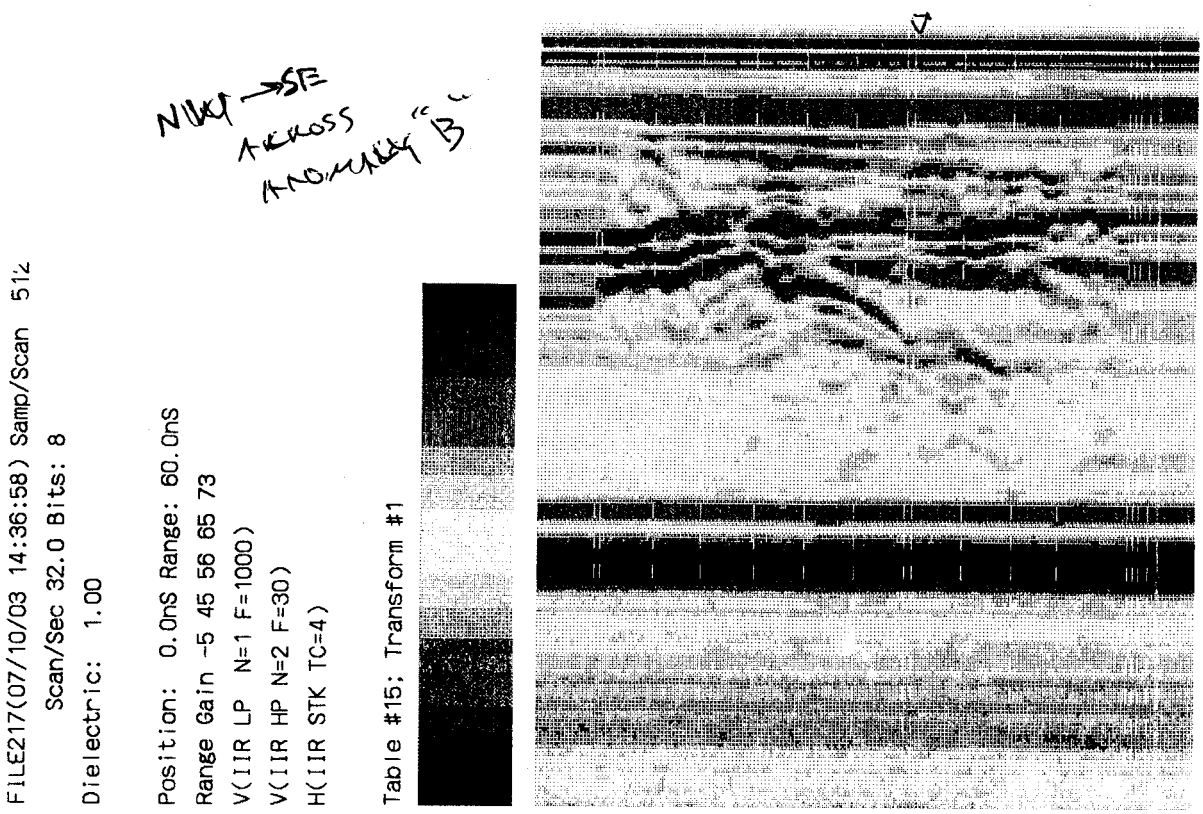


Image 4 – Northwest-southeast GPR transect at Anomaly B.

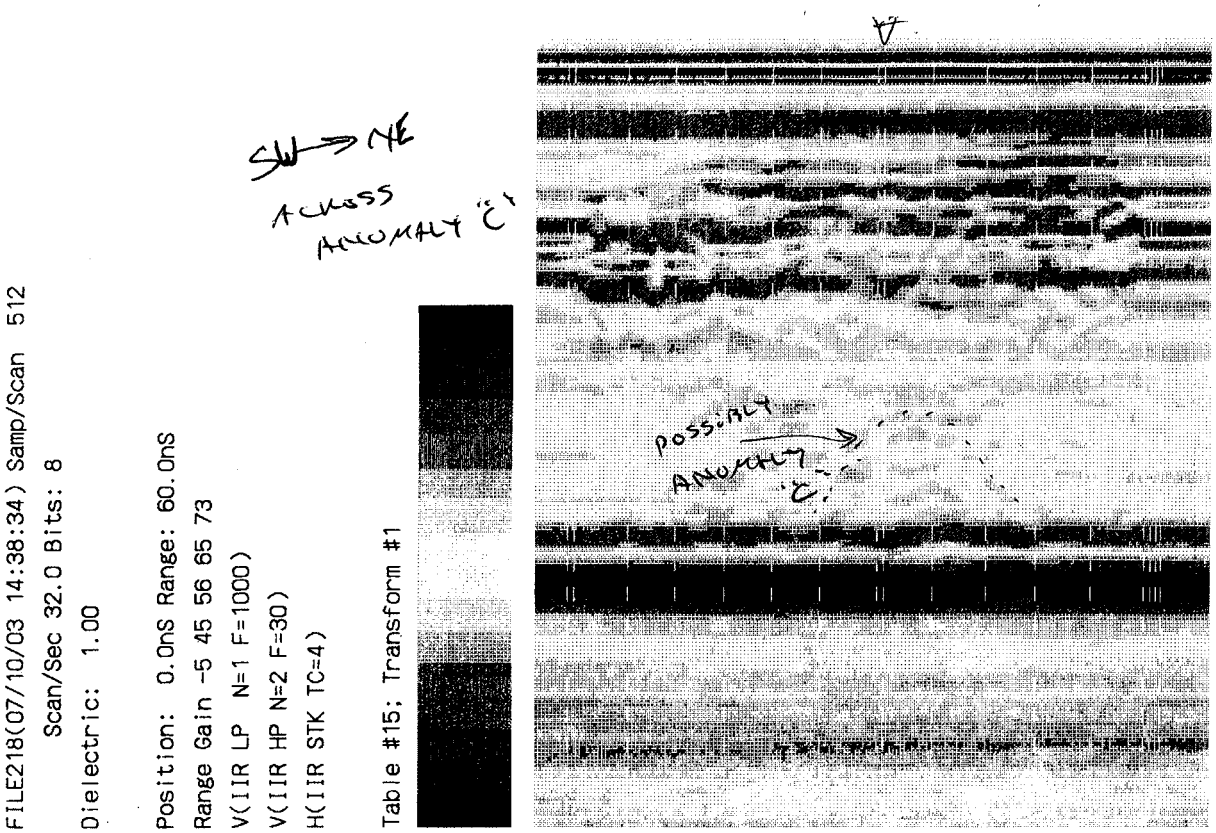


Image 5 – Northeast-southwest GPR transect at Anomaly C.

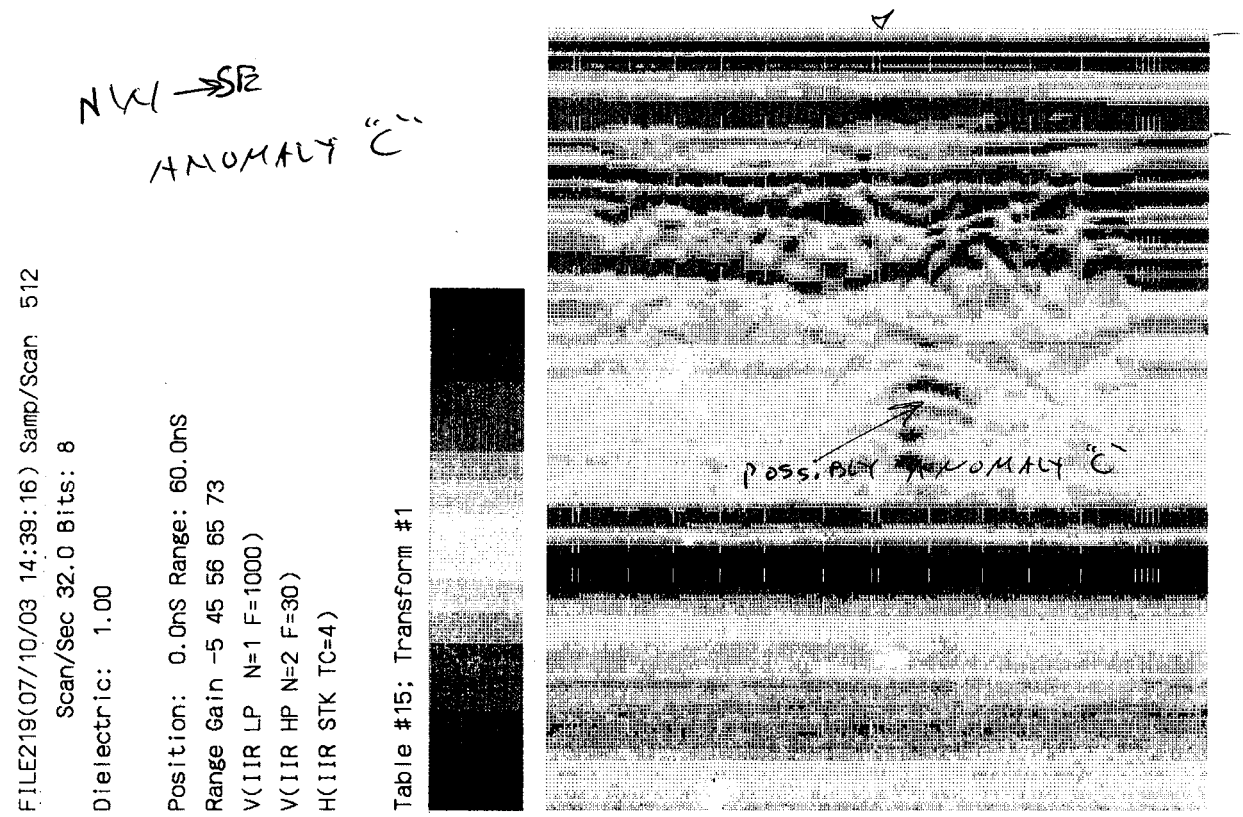


Image 6 – Northwest-southeast GPR transect at Anomaly C.

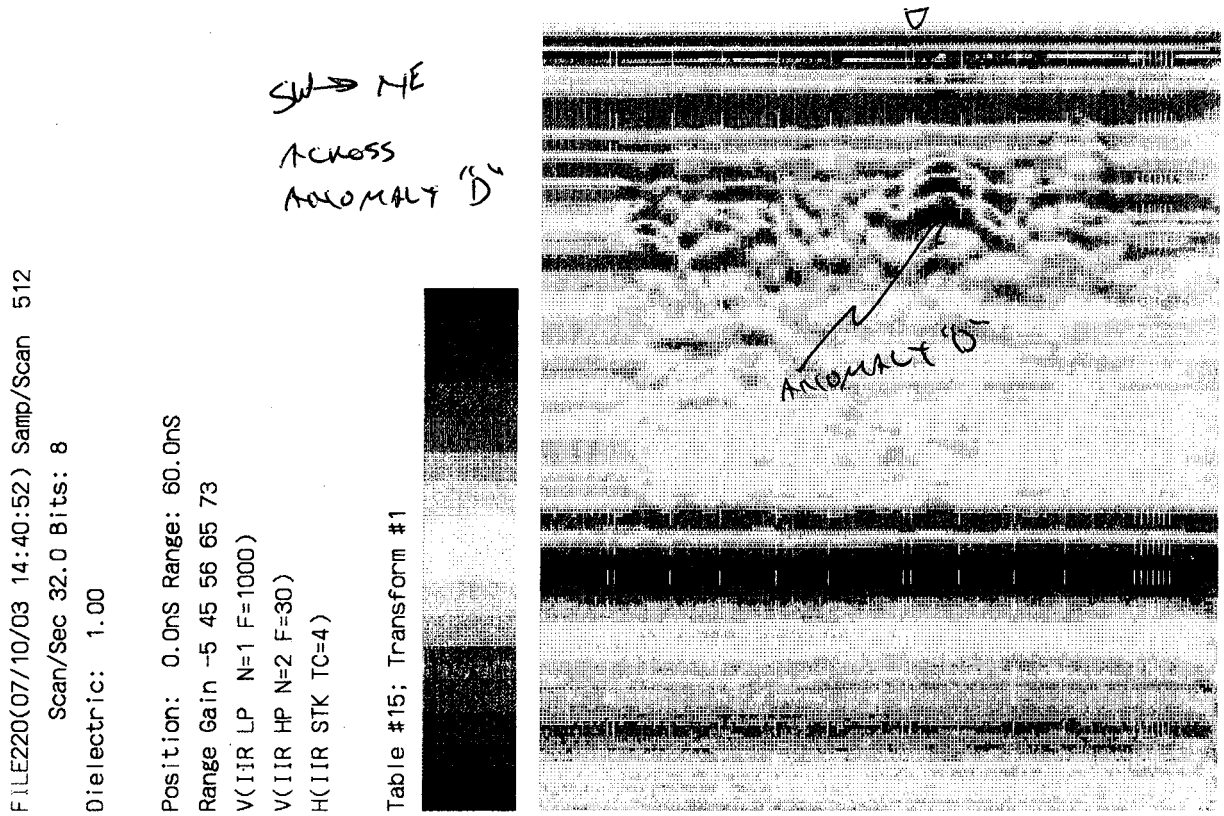


Image 7 – Northeast-southwest GPR transect at Anomaly D.

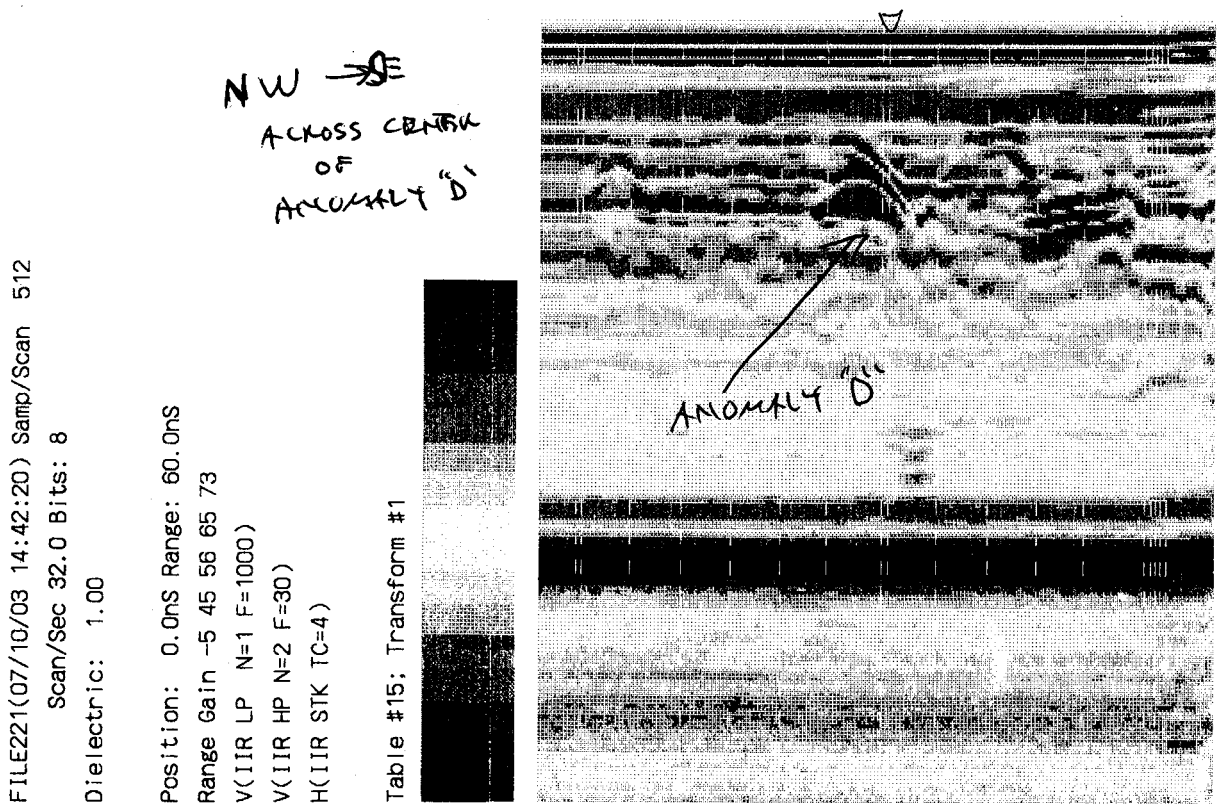


Image 8 – Northwest-southeast GPR transect at Anomaly D.