

**Federal Savings and Loan
Insurance Corporation**

Seattle, Washington



**Property Transfer Assessment
Phase II**

**Hayward Hill Subdivision
Soldotna, Alaska**

**ENSR Consulting and Engineering
(Formerly ERT)**

November 1988

Project Number 2627 - 002

ENSR

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Formerly ERT

November 16, 1988

**ENVIRONMENTAL CONSERVATION
SCRO**

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and Engineering**

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Mr. Rick Bell
Asset Manager
Federal Savings and Loan Insurance Corporation
400 S.W. 152nd Street
Seattle, Washington 98148

Reference: Hayward Hill Subdivision
Site Investigation - Final Report
Our File 2627-002

Dear Mr. Bell:

ENSR Consulting and Engineering (formerly ERT) is pleased to submit this final report. This hydrogeological site investigation was performed pursuant to your written authorization of August 23, 1988. We were requested to conduct a geophysical evaluation, collect soil samples, install three monitoring wells, collect water samples, and determine downgradient water uses. We have also evaluated potential off-site contingent liabilities.

We understand that this assessment was performed by the Federal Savings and Loan Insurance Corporation prior to acquiring title to said property. We also understand that the findings of the report will be utilized in making a decision to foreclose.

In summary, there are two distinct areas of potential concern (1) the exposed and abandoned disposal area, and (2) the washdown area disposal pipe leading to the abandoned pit area. Elevated levels of toluene were discovered in the soil samples along with elevated levels of polychlorinated biphenols (PCB). The site is disturbed and will require soils and groundwater remediation. The monitoring wells currently do not indicate contact with the soil contamination, although further investigation would be required to confirm that groundwater exchange is not occurring between the perched waters in the disposal pit area and the unconfined aquifer.

The enclosed report summarizes our initial findings, provides recommendations regarding the need for further investigative/remediation activities, and the regulatory and potential financial risks associated with foreclosure at this time.

ENSR

Mr. Rick Bell
November 16, 1988
Page 2

It has been a pleasure being of service to the Federal Savings and Loan Insurance Corporation. If you have any questions or need additional information, please do not hesitate to call me at (907) 276-4302.

Sincerely,



Anita M. Burke
Manager, Waste Management Services

AMB/rm

Enclosures

cc: Brian McNally - Perkins Coie
File

ACE 431531

FEDERAL SAVINGS AND LOAN INSURANCE CORPORATION

Phase II Property Transfer Assessment

Hayward Hill Subdivision
Soldotna, Alaska

Prepared by

ENSR Consulting and Engineering
(Formerly NORTEC, A Division of ERT, Inc.)
Anchorage, Alaska

November 1988

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1.0 INTRODUCTION

The Federal Savings and Loan Insurance Corporation (FSLIC) contracted ENSR Consulting and Engineering (ERT, Inc.) of Anchorage, Alaska to perform a preliminary hydrogeological site evaluation at the former Coastal Drilling site in Soldotna, Alaska. In general, the scope of work consisted of four elements:

- A. Conduct a site specific geophysical assessment to aid in locating past buried metallic landfill areas.
- B. Based on the information from the geophysical survey, conduct a series of shallow backhoe explorations to define the general locations of the suspected buried landfills and forward select soil samples for chemical analysis.
- C. Install three 2.0-inch polyvinylchloride (PVC) monitoring wells around the largest abandoned landfill, determine the general hydrogeological properties of encountered soils and forward select soil and groundwater samples for chemical analysis.
- D. Determine the general downgradient groundwater uses within a 500-foot radius of the site.

The FSLIC directed their legal counsel, Perkins-Coie of Anchorage to administer ENSR work efforts throughout this phase of site activity. After consultation with both FSLIC and Perkins-Coie, ENSR was directed to cooperate with the Alaska Department of Environmental Conversation (ADEC), as required.

Written authorization to proceed with the hydrogeological evaluation was granted by Mr. Rick Bell of FSLIC on August 23, 1988. This evaluation has been completed in general accordance with our proposal dated July 11, 1988 to Mr. Brian McNally of Perkins-Coie. This document has been prepared for the exclusive use of FSLIC and their agents for specific application to this site in accordance with generally accepted hydrogeological evaluation practices.

2.0 SITE AND PROJECT DESCRIPTION

The proposed site is located along the Kenai Spur Highway, approximately 0.75 miles north of the Sterling Highway intersection in Soldotna, Alaska. The study area is recorded as Tract 4, Hayward Hill Subdivision, Kenai Recording District 78-23. The study area is roughly "L" shaped covering approximately seven acres, Site and Exploration Plan, Figure 1 (Map Pocket).

The site is generally level with localized relief of two to five feet. A prominent soil mound of unclassified fill is located toward the center rear of the property. A noted exposed surface disposal pit is prominent near the center of the site. Exposed within the pit area are abandoned 55-gallon drums, miscellaneous metallic and wood debris, and other metallic objects, Aerial Photographs, Plates A, B, C (Appendix C).

The front portion of the study area is characterized by several standing buildings and two concrete pads, apparently sites of former or proposed buildings. The site surface soils are characterized by unclassified granular fill grading to silty granular fill towards property edges. Relic metallic objects, mostly related to former oil and gas drilling operations, were observed throughout the study area.

Geomorphically, the site is located within the Nikishka Lowland Subprovince within the larger Kenai Lowland Province. The Nikishka Lowland is characterized by a complex, largely modified morainal topography, extensive areas of muskeg and swamp, and a unique braided pattern of broad-floored, mostly abandoned, drainages (Karlstrom, 1964). Geologically, the Nikishka Lowland is characterized by glaciolacustrine deposits, principally deltaic complexes associated with several strandline levels or deposited at the mouth of streams draining into proglacial lakes of the most recent glacial episodes.

The present day, undisturbed shallow subsurface soils and topography at the study area are primarily products of at least five major Pleistocene glaciations. The latest of the glaciations, the Knik and younger Naptowne, had the greatest impact on the study area. Generally, the soils observed in the study area were glacial outwash silts, sands and gravels with random sorting of grain particles.

The proposed project consisted of determining the general aerial limits of the unregulated disposal area and conduct a preliminary assessment of soil and unconfined groundwater for possible organic products. Of particular concern, was the possible adverse environmental impact associated with the suspected rig washdown and equipment cleaning area. A steel grate approximately three feet square is located near the property boundary between the existing Arctic Oilfield Services building and the concrete pad immediately behind the building. This grate is a suspected drain for washdown runoff.

The location of the backhoe exploration and soil borings are presented on the Site and Exploration Plan, Figure 1. Subsurface explorations were placed to determine the general subsurface conditions from which preliminary hydrogeological site characteristics could be evaluated. Conclusions and recommendations based on this information should be considered preliminary and as such, may warrant additional site evaluation. If additional site analysis is conducted, the conclusions and recommendations presented in this report should be reviewed and modified or verified by an experienced ENSR representative.

3.0 GEOPHYSICAL EVALUATION AND SUBSURFACE EXPLORATION

3.1 Magnetometer and EM Survey Program

A geophysical evaluation consisting of an electromagnetic (EM) and a magnetometer survey was conducted on September 15 and 16, 1988. All geophysical data acquisition, reduction, and interpretation were performed under subcontract to WGM, Inc. of Anchorage, an internationally recognized leader in mining and geophysical assessments. A representative of ENSR was present during the geophysical field, data reduction and interpretation phases. Two phases of geophysical assessment were undertaken to further define the aerial, and to the extent feasible, vertical profiles of potential buried metallic debris. The first phase consisted of an electromagnetic (EM) survey using a Fisher TW-5 instrument. This instrument is sensitive to metallic objects and is capable of determining the approximate burial depth of isolated metallic objects. The instrument measures the relative flux in an electromagnetic field between a hand carried transmitter and receiver. Buried metallic objects act as antennae which are changed by induction and distort the ambient field. From the known transmitter-receiver separation distance and the relative magnitude of electromagnetic field distortion, approximate burial depths may be determined, particularly for linear features.

The site was covered with relic metallic debris. Hence, precise evaluation using the EM was found to be ineffective. Metallic objects such as abandoned strapping, machine bolts and similar objects were found to electrically interfere with larger buried metallic objects such as drums, wire rope and machine parts. Since a clear distinction between surface and shallow buried debris and deeper buried objects could not be made, the results of the EM survey were considered unreliable and were used only as first order confirmation to the magnetometer results.

A magnetometer survey was performed over the project area using a Scintrex MP-2 proton precession magnetometer which has a resolution of 1 gamma. The instrument measures the intensity of the earth's magnetic field. The probe consists of a coil surrounding a vessel of hydrocarbon fluid. The protons in this fluid are polarized when a current is passed through the coil. When the current is removed, the protons precess to the ambient field inducing a current in the coil. The frequency of this current is proportional to magnetic field strength.

The proton precession magnetometer provides a rapid means of measuring total magnetic field strength. However, the unit is limited in that the precision of the signal can be degraded in the presence of large magnetic field gradients on the order of 200 gammas per foot. Such conditions were suspected in several areas due to the suspected presence of large metallic objects in the disposal pit area (scrap metal, engines, etc.). The magnetometer survey was conducted on a grid with measurements taken at intervals of 15 feet along lines spaced 30 feet apart. A total of some 640 readings were taken over the course of the two-day field program, Magnetometer Survey Plan, Figure 2 (Map Pocket). The results of the magnetometer survey confirmed the findings of a previous U.S. Environmental Protection Agency Preliminary Site Investigation Report (USEPA, Tryck, Nyman and Hayes, 1987).

3.2 Shallow Trench and Soil Boring Program

The subsurface exploration program was conducted in two phases based primarily on the findings of the geophysical evaluation. These investigations initially consisted of a series of shallow backhoe explorations to field truth the geophysical results. The second phase of the subsurface exploration program included three soil borings extended to initial groundwater which were terminated as monitoring wells. The boring locations were based on the results of the geophysical and backhoe exploration

program. The monitoring wells were placed for preliminary assessment of the general soil and groundwater conditions, establishing general hydrologic direction and relative gradient. By placing one monitoring well upgradient and two monitoring wells downgradient from the observed buried disposal area, relative gradient and the potential for subsurface migration of the disposal pit contents could be evaluated.

The location of the trenches, monitoring wells and other pertinent site landmarks are presented on the Site and Exploration Plan, Figure 1. Location of site landmarks were established from aerial photographs while trench and monitoring well locations were established by theodolite measurement from temporary benchmarks (T.B.M.) established from surveyed lot corners. Horizontal distances to trenches and monitoring wells was determined by cloth tape or by EDM, depending upon distance. Vertical control was established from arbitrary T.B.M. established at a timber power pole midway along the eastern property line, Site and Exploration Plan, Figure 1. T.B.M. arbitrary elevation was set at 100.00 ft. This evaluation is not adjusted to surveyed local control or to established sea level.

The test pits were excavated on September 20, 1988, with a track mounted Mitsubishi Model M-128S excavator using a 24-inch wide bucket. All test excavations were continuously observed and logged by a geologist from ENSR, Inc. Disturbed but representative samples of the soils and fill materials encountered in the trenches were retrieved, classified in the field, and select samples were taken utilizing established QA/QC procedures for further laboratory testing. The test excavation logs are presented in Appendix A and are based, in part, on the observed field conditions, field logs, samples and analytical laboratory results. The relative soil moisture and densities indicated on the test excavation logs are interpretative descriptions based on the conditions observed during the excavations. All excavated soils and debris were

replaced into the trenches to approximately surrounding grade upon completion using both the excavator and a John Deere 450 dozer.

The soil borings were drilled from September 21 through September 23, inclusive, under subcontract to a local soils exploration drilling firm experienced in hazardous materials site investigations. The same firm installed the monitoring wells; including well development, decontamination and borehole annulus backfill. The borings, monitoring well placement, backfill and development were conducted under the direct supervision of an experienced geologist from ENSR.

The borings consisted of advancing decontaminated 4.25-inch inside diameter (I.D.) hollow stem auger with a truck mounted CME-75 drill rig. Throughout the drilling process, disturbed but representative samples were generally obtained at 2.5 foot depth intervals. The disturbed but representative samples were taken by using a modified Standard Penetration Test procedure. This procedure consisted of advancing a 2.5-inch I.D. split barrel sampler a distance of 18 inches beyond the auger bit into relatively undisturbed soils. A 340-pound drop hammer free falling a 30-inch distance provided drive impact energy. The number of blows for each 6-inch interval is recorded; the number of blows required to advance the last 12 inches is considered the modified standard penetration resistance. This value provides an indication of the relative density or consistency of the retrieved soils. The soil samples obtained from the split barrel samples were visually classified in the field. Select portions were placed in laboratory supplied glass jars under pre-established QA/QC procedures. All soil samples were transported to the laboratory under chain-of-custody procedures, with selected samples identified for chemical analysis.

3.3 Monitoring Well Program

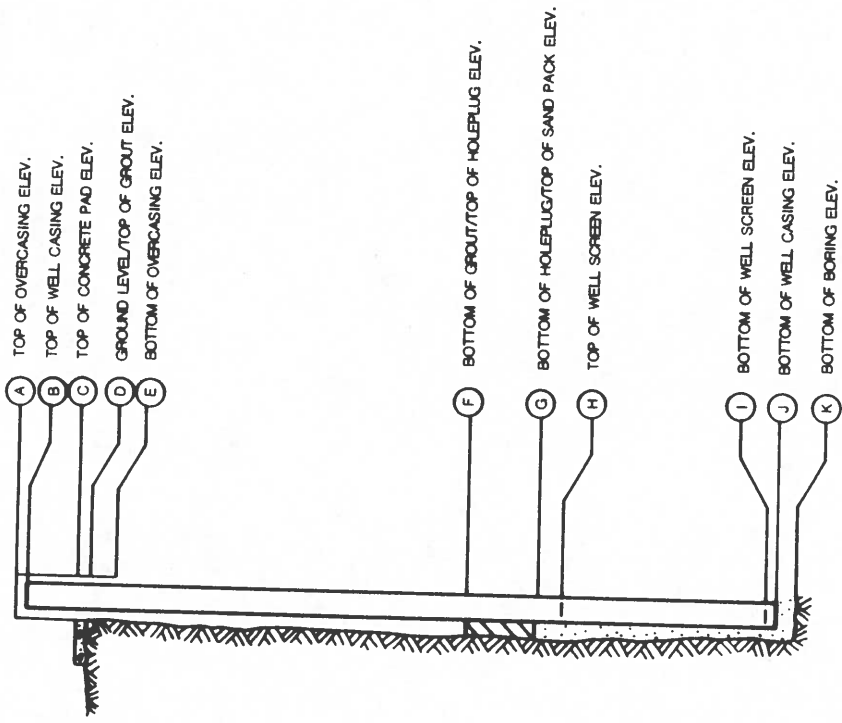
The borings were completed as monitoring wells using nominal 2-inch outside diameter (O.D.) polyvinylchloride (PVC) well materials. All wells used 0.020-inch machine slotted well casing and solid riser sections. Also, all well sections were flushed with internal O-ring seals. The well materials arrived on-site in factory-sealed polyethylene. The well screen interval annulus was backfilled with Number 8 washed silica sand by simultaneously extracting the auger flights and filling the annulus with a sand filter pack. Each well received a 1.5 to 2.5 foot section of HOLEPLUG, a pelletized bentonite clay product. After hydration with five gallons of distilled water, the remainder of each boring annulus was backfilled with a bentonite grout slurry. Surface terminations included a 6-inch locking steel overcasing and a surface concrete casing base. The auger cuttings for each well were containerized on-site in 85-gallon overpack drums, Monitoring Well As-Built Data, Table 1. All monitoring wells were secured with keyed alike padlocks. ENSR will retain padlock key custody until directed otherwise by FSLIC.

Decontamination procedures used in the field were described in detail in ENSR's previously submitted Sampling Plan. To highlight, all drilling tools were decontaminated using steam cleaning with a municipal supplied water source. Sampling tools were decontaminated by hand washing them with an anionic soap and double rinse in municipal supplied tap water, a rinse with distilled water, methanol rinse and a final rinse with distilled water. All sample handling and installation of monitoring wells was conducted under direct supervision of ENSR's field geologist using new, disposable NITRILE gloves.

The groundwater conditions observed during the exploration program are indicated on the respective test excavation and boring logs by symbol, Exploration Logs, Appendices A and B.

TABLE 1
MONITORING WELL AS-BUILT

PROJECT # : 2827-002
PROJECT NAME : FSLJC: HAYWARD HILL



| WELL # | A | B | C | D | E | F | G | H | I | J | K |
|--------|--------|--------|--------|-------|------|------|------|-------|-------|-------|------|
| CD-1 | 101.91 | 101.81 | 99.13 | 98.7 | 96.9 | 74.4 | 71.2 | 69.88 | 60.88 | 60.33 | 59.2 |
| CD-2-A | - | - | - | 98 | - | 95 | 94 | - | - | - | 92.5 |
| CD-2-B | 100.19 | 100.09 | 98.75 | 98.3 | 96.2 | 74.8 | 72.7 | 69.29 | 60.32 | 59.74 | 59.1 |
| CD-3 | 103.06 | 102.89 | 100.60 | 100.2 | 98.1 | 77.7 | 76.2 | 75.82 | 66.60 | 66.05 | 64.0 |
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NOTES:

- 1.) ALL ELEVATIONS SET TO COMMON ARBITRARY DATUM ESTABLISHED ON-SITE, T.B.M. ELEV. = 100.00 FT.
- 2.) ALL ELEVATIONS IN FEET

Also, groundwater levels were measured in completed monitoring wells from an established arbitrary vertical T.B.M. A common vertical control among monitoring wells established a local direction and gradient for groundwater, Groundwater Level Record, Tables 2, 3 and 4.

Each monitoring well was developed in similar fashion, first using a stainless steel 1-liter hand bailer to surge the filter pack and remove the infiltrated fines. Further well development was conducted using hand-operated, single-stage PVC pumps to extract water and minor amounts of fines. Hand pumping was performed until clear or near-clear groundwater was consistently purged from the wellbore. No attempts were made to determine the precise hydrogeological parameters of the aquifers such as specific yield, transmissibility, permeability, etc..

Established decontamination methods were followed during well development and groundwater sampling. It should be noted that fluctuations in the groundwater levels reported here may occur due to variations in rainfall, snowmelt, temperature, etc., particularly for the shallow confined aquifers encountered at this site. Groundwater samples were collected using a decontaminated Teflon hand bailer.

The exploration logs presented in Appendices A and B are based on the excavation and drilling action, inspection of the samples obtained, analytical laboratory analyses and field logs. The various types of soils encountered are indicated as well as depths where the soils or characteristics of the soils changed. Intervals where olfactory or visual indications of hydrocarbon products were encountered were noted. Many of these changes may have been gradual, and if the changes occurred between sample intervals, these contacts were interpreted.

TABLE 2

Groundwater Level Record

Project No.: 2627-002

Project Name: FSLIC - Hayward Hill

Monitoring Well I.D.: CD-01

| Date | Time | Top of Well Casing Elev. ¹ | Ground Level Elev. ¹ | Depth to Groundwater ¹ | Groundwater Elev. ¹ |
|--------------|-------|--|------------------------------------|--------------------------------------|-----------------------------------|
| 24 Sept 1988 | 18:40 | 101.81 | 98.7 | 37.57 | 64.24 |

¹ All elevations in feet, based on arbitrary T.B.M. elev. = 100.00

TABLE 3

Groundwater Level Record

Project No.: 2627-002

Project Name: FSLIC - Hayward Hill

Monitoring Well I.D.: CD-02-B

| Date | Time | Top of Well, Casing Elev. ¹ | Ground Level Elev. ¹ | Depth to Groundwater ¹ | Groundwater Elev. ¹ |
|--------------|-------|---|------------------------------------|--------------------------------------|-----------------------------------|
| 24 Sept 1988 | 17:45 | 100.09 | 98.3 | 35.83 | 64.26 |

¹ All elevations in feet, based on arbitrary T.B.M. elev. = 100.00

TABLE 4

Groundwater Level Record

Project No.: 2627-002

Project Name: FSLIC - Hayward Hill

Monitoring Well I.D.: CD-03

| Date | Time | Top of Well Casing Elev. ¹ | Ground Level Elev. ¹ | Depth to Groundwater ¹ | Groundwater Elev. ¹ |
|--------------|-------|--|------------------------------------|--------------------------------------|-----------------------------------|
| 24 Sept 1988 | 16:45 | 102.89 | 100.17 | 32.92 | 69.97 |

¹ All elevations in feet, based on arbitrary T.B.M. elev. = 100.00

4.0 SUBSURFACE CONDITIONS

The subsurface conditions section is subdivided into two portions; 1) trench excavation, and 2) soil boring interpretations. The trench excavations primarily defined the general subsurface conditions within the buried disposal area while the soil borings were conducted outside the limits of the disposal area. The soil borings primarily defined the local soil and hydrogeological conditions observed in non-disturbed soils.

4.1 Trench Excavations

The trench excavation sites were selected to better define the general aerial extent of the buried disposal area and further define the suspected debris. Also, other anomaly areas determined from magnetometer surveys were examined for potential buried debris. A total of ten shallow trenches were excavated. Five trenches, TR-01, -02, -03, -05 and -09, penetrated the major disposal area and generally confirmed the shallow aerial extent observed in sequential aerial photographs 1963, 1971 and 1986, Plates A, B, C (Appendix C). The excavations found that the disposal area consisted of a wide variety of metallic debris such as pipe sections, steel beams, wire rope, metal lathe cuttings, in addition to relic drums and unmarked canisters and timbers. Various amounts of soils were intermixed with the debris. The soils immediately surrounding the disposal area were primarily sandy silts, with no noticeable amounts of buried metallic debris.

These five trench excavations revealed two additional features. First, free groundwater was observed at approximately 5.5 to 6 feet below ground level within the buried disposal pit area. This level roughly coincides with the water level observed in the exposed disposal pit. Secondly, a strong odor of petroleum product was present in all excavated materials from the pit area. Where free water was encountered in the trenches, floating

petroleum products were consistently observed. The buried disposal pit may be connected laterally with the existing, exposed disposal area to the east, but additional evaluation would be necessary for confirmation. In effect, the entire disposal area, due to its relatively higher permeability, is acting as a drainfield, perching groundwater within the general limits of the disposal area. Therefore, it was important not to penetrate the apparent aquitard. Hence, the vertical extent of the disposal pit was not determined. The remaining five trenches were excavated in areas of suspected magnetic anomalies. Significant amounts of metallic or other unclassified debris were not encountered in these areas.

4.2 Soil Boring

The soil borings encountered generally uniform subsurface soil conditions among all three explorations. In general, a thin mantle of 2 to 3 feet of granular fill covered each site. Beneath this fill section, variable sequences of silty, gravelly sands; fine to medium grained sands; and gravelly sands above a well-defined very dense gravelly, silty sand were encountered. The surficial fill material is silty, gravelly sand which is relatively low permeability as evidenced by several shallow surface water ponds. The soils beneath the fill section were variable sequences of well graded gravelly sands with distinct variations in silt content. These silts tend to retard vertical soil water migration. Also, the increased soil particle surface area associated with siltier horizons interacts with petroleum products altering vertical and horizontal migrations relative to free draining soils. This is evident in CD-01 where a distinct petroleum odor zone was isolated above the observed groundwater level.

Groundwater was observed as an unconfined aquifer in all three monitoring wells atop a very dense, dark grey till-like confining layer. Monitoring wells were installed through the apparent

unconfined aquifer using a nominal ten-foot screened interval. The ten-foot screened interval should intersect the seasonal groundwater surface during periods of maximum seasonal fluctuations. After installation and developing of monitoring wells, a series of groundwater samples were obtained for analytical testing in accordance with the previously submitted sampling plan, Detailed Site Plan, Figure 3 (Map Pocket).

5.0 DOWNGRADIENT POTABLE WATER WELL SCREENING

Screening for potential downgradient domestic water wells was conducted at both 500 and 1,000 lineal foot radii from the property boundary on October 12, 1988. In general, the screening process included:

- ° field truthing and land use classification of registered plat maps within the study area,
- ° cross reference field-truthed residential lots with municipal water utility records,
- ° cross reference field-truthed residential lots with available water well records at city, borough, state and federal services,
- ° conduct similar evaluations for commercial lots, and
- ° visual reconnaissance of suspect private water wells.

It is important to note that the City of Soldotna has experienced a rapid growth during the past seven years and in many instances, detailed records of private water wells were difficult to obtain and some records proved to be inaccurate. For report purposes, individual lots which were suspect water well users were included along with confirmed water well users. Detailed information regarding private water well completion data such as casing size, termination depth and well construction procedures was generally not available. Based on our experience, private water wells can be assumed to be nominal 6-inch diameter steel casing without screened intervals. Termination depths are unknown.

Also, community water supply wells provide the City of Soldotna with public use water. These wells are generally deeper wells extended into underlying confined aquifers. Municipal Well "A" is located just outside a 1,000 foot radius, Water Well Screen Plan, Figure 4. Finally, notable facilities such as schools and public buildings are designated on the plan. Photo documentation is provided in Appendix E for suspected or identified private or municipal water wells.

Confirmed and suspect private water well locations are:

- 1) Aspen Flats Subdivision, Block 4, Lot A
At the corner of Corral Street and Kenai Spur Highway,
same block as Soldotna Elementary School
- 2) Hayward Hill Subdivision, TR3
West corner off Kenai Spur Highway
- 3) Hayward Hill Subdivision
Unmarked corner bordering TR4 Hayward Hill Subdivision
and Kenai Spur Highway
- 4) Lee Subdivision, Block 9, Lot 10
Lot is on the corner of Kenai Avenue and Farnsworth
Boulevard
- 5) Hayward Hill Subdivision, TR4
Abandoned water well in a wooden well house,
immediately west of the existing Arctic Oilfield
Services building

These suspected lots are identified on Figure 4. Attempts were not made to directly contact the individual property owners on these lots to confirm status of domestic use water wells.

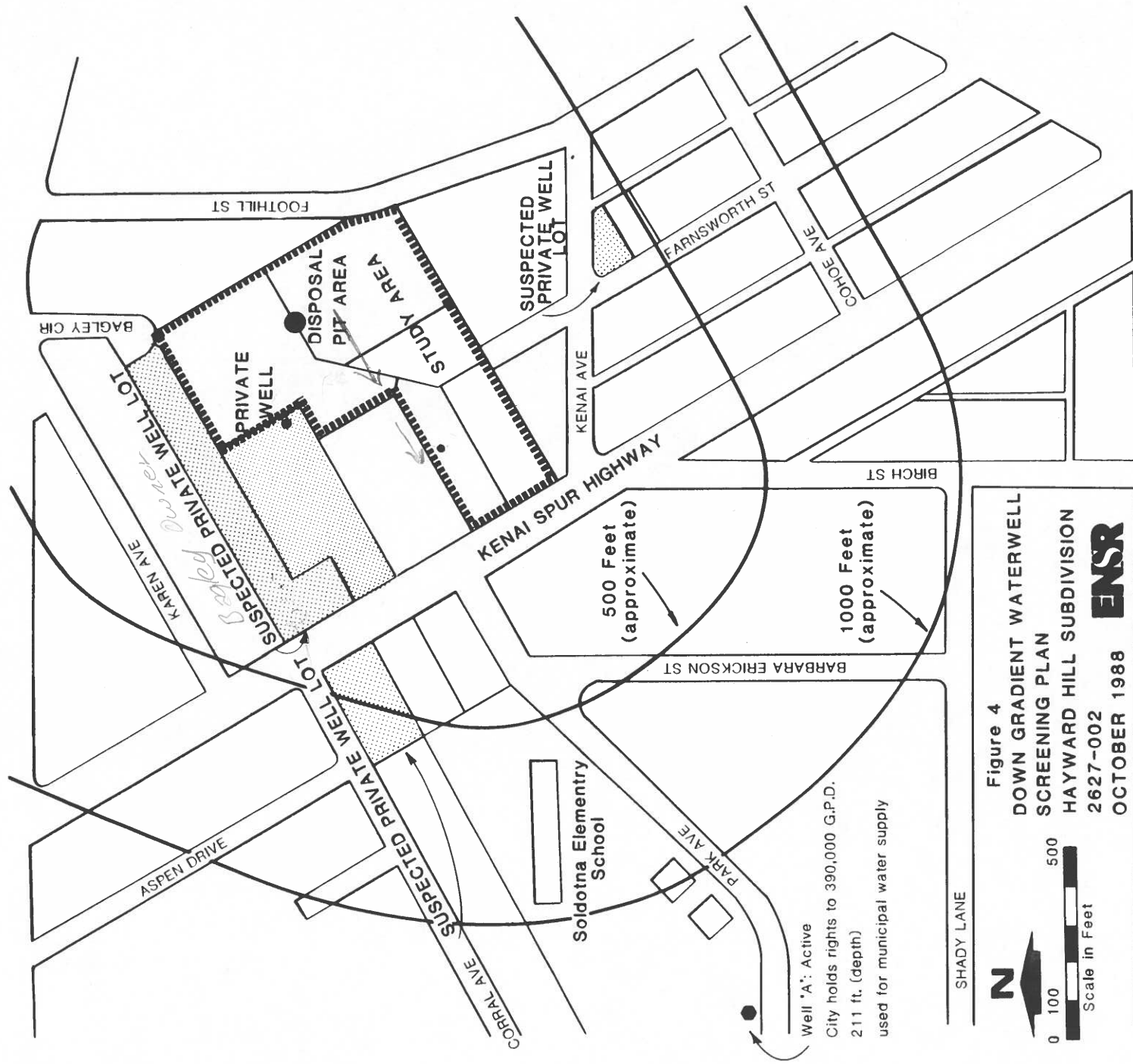


Figure 4
 DOWN GRADIENT WATERWELL
 SCREENING PLAN
 HAYWARD HILL SUBDIVISION
 2627-002
 OCTOBER 1988
ENSR

6.0 ANALYTICAL LABORATORY RESULTS

Laboratory analyses were conducted on selected groundwater and soil samples from both the monitoring wells and the test excavations. All laboratory analyses were conducted by Northern Testing Laboratories, Inc. in Anchorage, Alaska. The following chemical analyses were conducted:

| <u>Test Excavation</u> | <u>Monitoring Wells</u> | |
|-----------------------------|-----------------------------|---------|
| Total Petroleum Hydrocarbon | Total Petroleum Hydrocarbon | |
| | Soil 3 | Soil 3 |
| | Water 0 | Water 3 |
| BTEX | BTEX | |
| (8020) Soil 3 | (8020) Soil 7 | |
| (602) Water 0 | (602) Water 3 | |
| PCB | PCB | |
| | Soil 1 | Soil 0 |
| | Water 0 | Water 0 |

A total of 27 separate analyses were conducted, plus an additional two duplicate sample analyses. Samples for analyses were selected in accordance with the proposed sampling plan and upon the judgement of the field geologist in consultation with the project manager. It is important to note that the objectives of the sampling and laboratory analyses program were to determine the general subsurface hydrogeological properties of the study area and conduct a preliminary assessment of possible product occurrences or migrations. Accordingly, the analytical laboratory program was established to evaluate selected soil and groundwater samples for suspected petroleum hydrocarbons, benzene, toluene, ethylbenzene, dichlorobenzene and xylenes (BTEX) and polychlorinated biphenols (PCBs). For presentation purposes, soil and groundwater samples are separated into samples collected under the Test Excavation and the Soil Boring/Monitoring Well Program.

The test excavation program encountered the highest concentrations of total petroleum hydrocarbons, BTEX and PCB, Appendix D, Laboratory Results. Briefly, test excavation within the abandoned disposal area found total petroleum hydrocarbon concentrations up to 138,000 mg/dry kg near the terminus of the suspected disposal pipe from the washdown area. Concentrations of 2,740 mg/dry kg of total petroleum hydrocarbons were present in samples from Trench 9 and also within the abandoned disposal area.

BTEX analysis in these samples revealed a marked low concentration of the "lighter" faction aromatics (benzene family and toluene), while the "heavier" aromatic compounds (xylenes) were found in concentrations up to 370 mg/dry kg. This trend may be supported through various mechanisms, including the volatilization of "lighter" aromatics over time or the initial absence of such lighter compounds. The soils within the abandoned disposal area reflected consistently higher concentrations of all tested parameters than did the surrounding, undisturbed soils. Finally, the soils at the terminus of the disposal pipe from the washdown area were found to contain 33 mg/dry kg Aroclor 1242, a PCB.

Compared to the Test Exploration Program, the Soil Boring Monitoring Well Program encountered dramatically different concentrations of similar compounds. In general, all groundwater samples for total petroleum hydrocarbons and BTEX had less than detectable limits, Appendix D, Laboratory Results.

Selected soil samples revealed very minor concentrations of BTEX compounds with the CD-1 soil, samples all below detection limits. CD-2-B soil samples revealed a single occurrence of toluene at the detection limit of 0.1 mg/dry kg. All other compounds were below detection limits. CD-3 soil samples were below detection

limits, except for a single occurrence of toluene at the detection limit of 0.1 mg/dry kg: These slightly elevated levels of toluene were discovered at approximately the 25 foot subsurface level.

Selected soil samples analyzed for total petroleum hydrocarbons revealed concentrations slightly above the detection limits for CD-1 near surface soil samples. All CD-2-B and CD-3 soil samples revealed concentrations below detection limits. Soil samples from borings were taken at the contact between surficial fill and undisturbed soils, at the initial groundwater contact, and at selected intervals of noted hydrocarbon concentrations.

Additional groundwater samples beyond the initial scope of services were obtained at the request of the Alaska Department of Environmental Conservation (ADEC). These samples, along with all other ENSR obtained samples, were transported under chain-of-custody procedures to Northern Testing Laboratories, Inc., Anchorage, Alaska. In accordance with the provisions of correspondence among ENSR, Perkins-Coie and ADEC, ADEC has been permitted access to the samples for their specific use. To date, we understand the ADEC has not exercised this option.

7.0 DISCUSSION OF FINDINGS

Based on the observed site conditions, the study area has two distinct features, (1) the exposed and abandoned disposal area and (2) the surrounding, relatively undisturbed soils. Each will be addressed separately.

The exposed and abandoned disposal area is considered the most significant feature on the site. Generally, the feature consists of an exposed, unregulated and non-permitted disposal pit with abandoned drums, metal scraps, timbers and a variety of miscellaneous materials observed. Standing water was observed in this pit, approximately five to six feet below existing grade.

As noted earlier, a distinct hydrocarbon sheen was detected on the exposed subsurface waters. Oil sheen was not observed on the surface waters in the disposal pit area.

The abandoned portion of the disposal pit has been filled and graded to surrounding ground level and is not readily observable without excavating the site. Review of past aerial photographs and the test excavations conducted for this project provided a general horizontal definition of the disposal area, Figure 3, Detailed Exploration Plan. The test explorations in this feature revealed remnants of buried metal, unidentified drums, and a variety of miscellaneous metallic debris. A relatively shallow groundwater level was observed during excavations at approximately five to six feet. Water within the test excavations at this elevation had a pronounced visual oil sheen and globules of apparent petroleum hydrocarbon product. A strong odor of petroleum hydrocarbon was constantly sensed in the test explorations which penetrated this area.

The abandoned and exposed disposal areas to the east appeared horizontally connected. However, this connection was not clearly established by test excavations. The geological conditions observed in the test excavations and surrounding test borings indicate the disposal area is generally contained by the existing geological strata. This is based upon the defined contacts observed between debris fill and the surrounding soils. Special containment features such as clay or synthetic liners were not observed.

The groundwater observed in the disposal pit area is considered a localized perched aquifer based primarily on the soil geology and the variation in groundwater levels observed between test excavations and soil borings. Accordingly, the depth of unclassified debris fill was not determined since extreme caution was used to not penetrate the underlying, confining layer of this

perched aquifer. Penetrating the aquitard would increase the potential for the leaching of confined water and product from the disposal area into other soil and groundwater systems.

Communication or migration of water from this perched environment to the surrounding undisturbed soils could not be confirmed at this time. However, there exists a strong likelihood some groundwater communication among water table aquifers is occurring. This is supported by at least two observed conditions. First, laboratory analyses on selected soil samples in downgradient borings and the disposal area found elevated concentrations of petroleum products relative to the upgradient boring. Second, boring CD-1 encountered a defined petroleum odor in selected samples above a weak aquitard of approximately 12 to 20 feet below existing ground level. These two factors, although not conclusive, provide evidence for product migration.

Groundwater samples in CD-1 and CD-2-B were found to have very low to non-detectable concentrations of aromatic hydrocarbons. Based on this information, product migration from the site to nearby domestic water wells appears to have not occurred. However, additional screening and laboratory analyses would be required for confirmation. Finally, the disposal area soils were found to have elevated levels of polychlorinated biphenols (PCB). Although the single sample was below the 50 part per million action level, further site evaluation would be required to assess the PCB concentrations throughout the site.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our preliminary site evaluation, the following general conclusions are presented:

- ° A substantial section of visible and buried unregulated, non-permitted fill has occurred on the site.

- The type of unregulated fill appears to consist of metallic debris, abandoned drums, timbers and machine parts.
- A restricted perched water table aquifer was observed in the fill area; the nature and content of the confining layer is undetermined.
- Petroleum hydrocarbon product was observed in the perched water table aquifer, some leaching of this aquifer is expected, although not confirmed.
- Soil borings, trench excavation, and monitoring well information indicate defined contacts between the fill section and surrounding undisturbed soils.
- Water table aquifer gradient flow is in a southwesterly direction, aquifer characteristics such as permeability, transmissivity, storage capacity, etc. are undetermined.
- The metal grate surface drainage area appears to discharge via a 6-inch steel pipeline into the unregulated fill area.
- Polychlorinated biphenols were found in the unregulated fill area near the pipeline discharge at levels below the 50 ppm action level.
- Acquisition of the property will require a complete analytical and subsequent full scale remediation effort prior to resale of the property.

It is our understanding that FSLIC is not an owner of this property and that ENSR's activities would, in part, further define potential site liabilities, if property ownership should change. Accordingly, ENSR has proposed the following recommendations specific to site characterization:

- Conduct scheduled groundwater sampling at monthly intervals for total petroleum hydrocarbon, EPA 602 (aromatic hydrocarbons) and PCB's.
- Determine downgradient potable water well status, define well characteristics, and conduct water quality analysis on suspected downgradient water wells, including the abandoned water well on-site.

- ° Further define the horizontal and vertical extent of observed plume migration from the disposal area with either soil gas analysis, soil boring or monitoring wells.
- ° Define the hydrogeologic properties of the apparent confining layer under the perched water table aquifer.
- ° Conducted water quality analysis on the perched water table aquifer for PCB and petroleum products by installation of a shallow monitoring well.

Based on these findings, and if FSLIC considers property ownership liabilities:

- ° Conduct a site specific risk assessment to define the potential environmental and health impacts.
- ° Prepare remediation and restoration plans in accordance with agency requirements.

In the event of property acquisition by FSLIC, ENSR recommends that FSLIC instigate the aforementioned site characterization work and develop a remediation plan to be submitted to ADEC officials. The site is currently under close scrutiny by ADEC and reportedly, a consent order is pending. The site will require a remediation effort prior to its resale.

Also observed on this site were two open concrete pits in the exposed concrete pad along the south property line. Apparently, the pits were designed as access areas for automotive repair facilities planned in the new building. These pits hold standing water and may present a hazard, particularly at night time. The current property owner should attend to this hazard. Finally, during our site activity, several children were observed playing near the existing open disposal pit. Although ENSR made efforts to keep personnel away from this area, the site is unsupervised most of the time. Since the potential health hazards associated with this area are unknown, the area should be secured and posted in a permanent manner to reduce the likelihood of playing in this area.

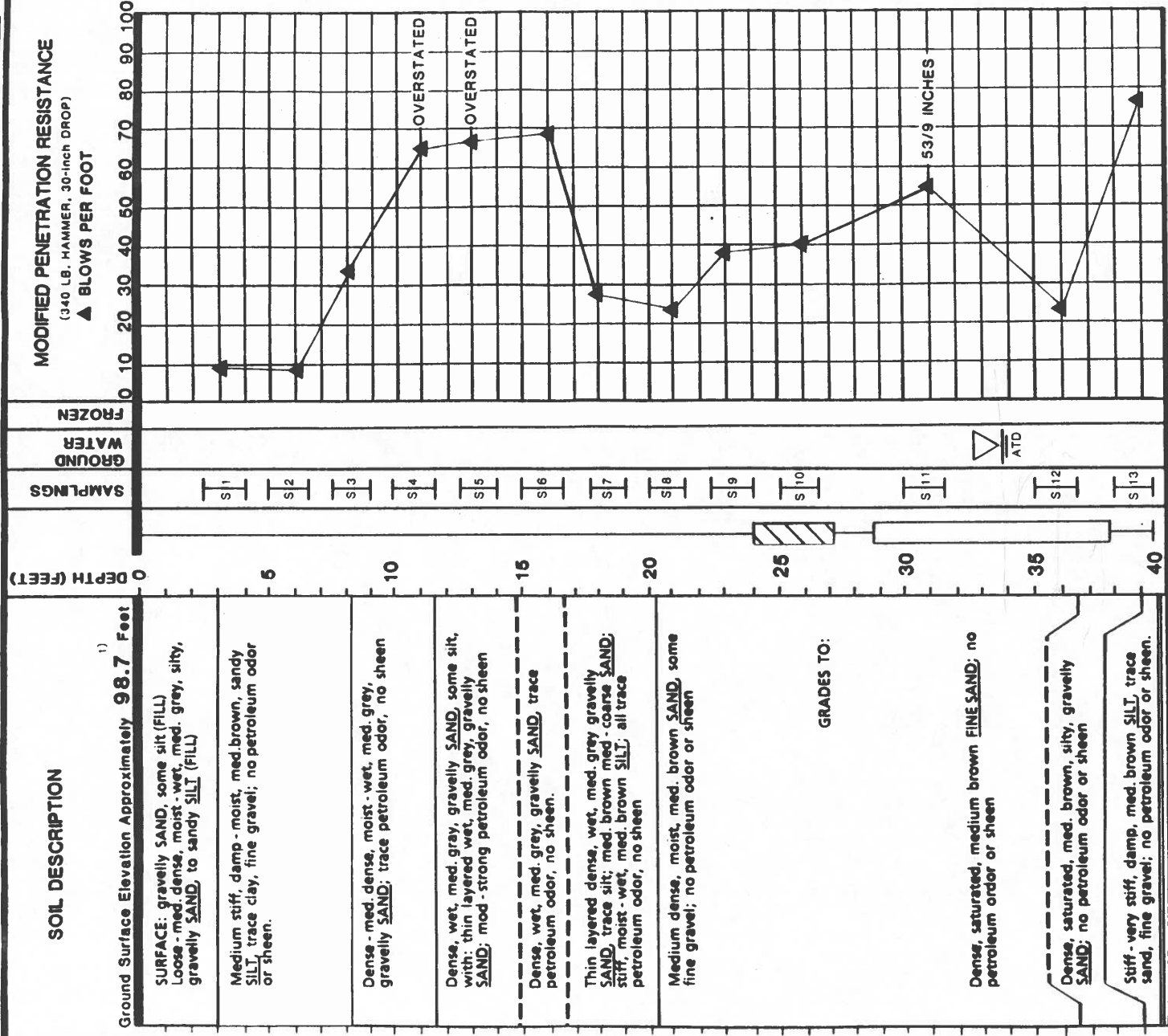
9.0 REFERENCES

Karlstrom, Thor N.U., 1964. Quaternary Geology of the Kenai Lowland and Glacial History of the Cook Inlet Region, Alaska. Geological Survey Professional Paper 443, Washington, D.C. pp. 9-32.

USEPA, 1987. Potential Hazardous Waste Site Preliminary Assessment, Coastal Drilling, Track 4B, Hayward Hills Subdivision; Site ID: AK 980988273, by Tryck, Nyman and Hayes, Inc., Anchorage, Alaska.

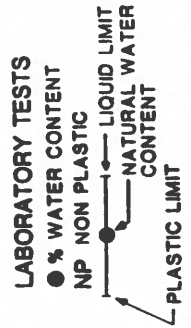
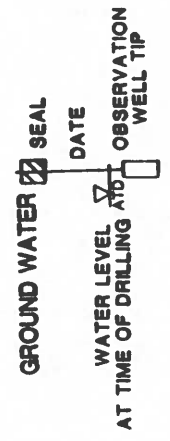
APPENDIX A

EXPLORATION BORING LOGS

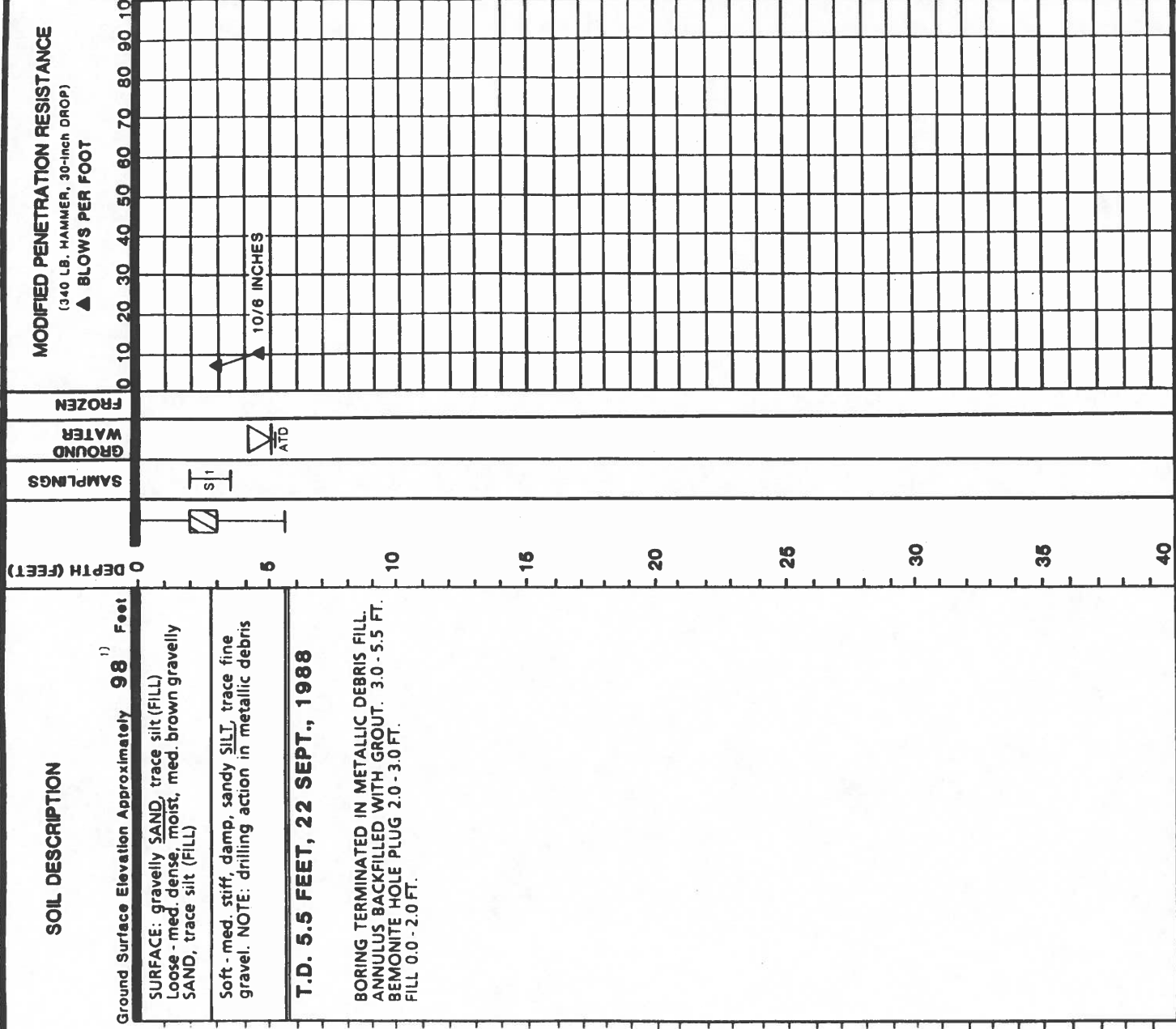


T.D. 39.5 FEET, 23 SEPT., 1988



- SAMPLING**
- I 3" OD SPLIT SPOON SAMPLE
 - II 3" OD SHELBY SAMPLE
 - ☒ 2.5" ID RING SAMPLE
 - B BULK SAMPLE
 - * SAMPLE NOT RECOVERED



1) ARBITRARY DATUM, TBM ELEVATION 100.00 FEET

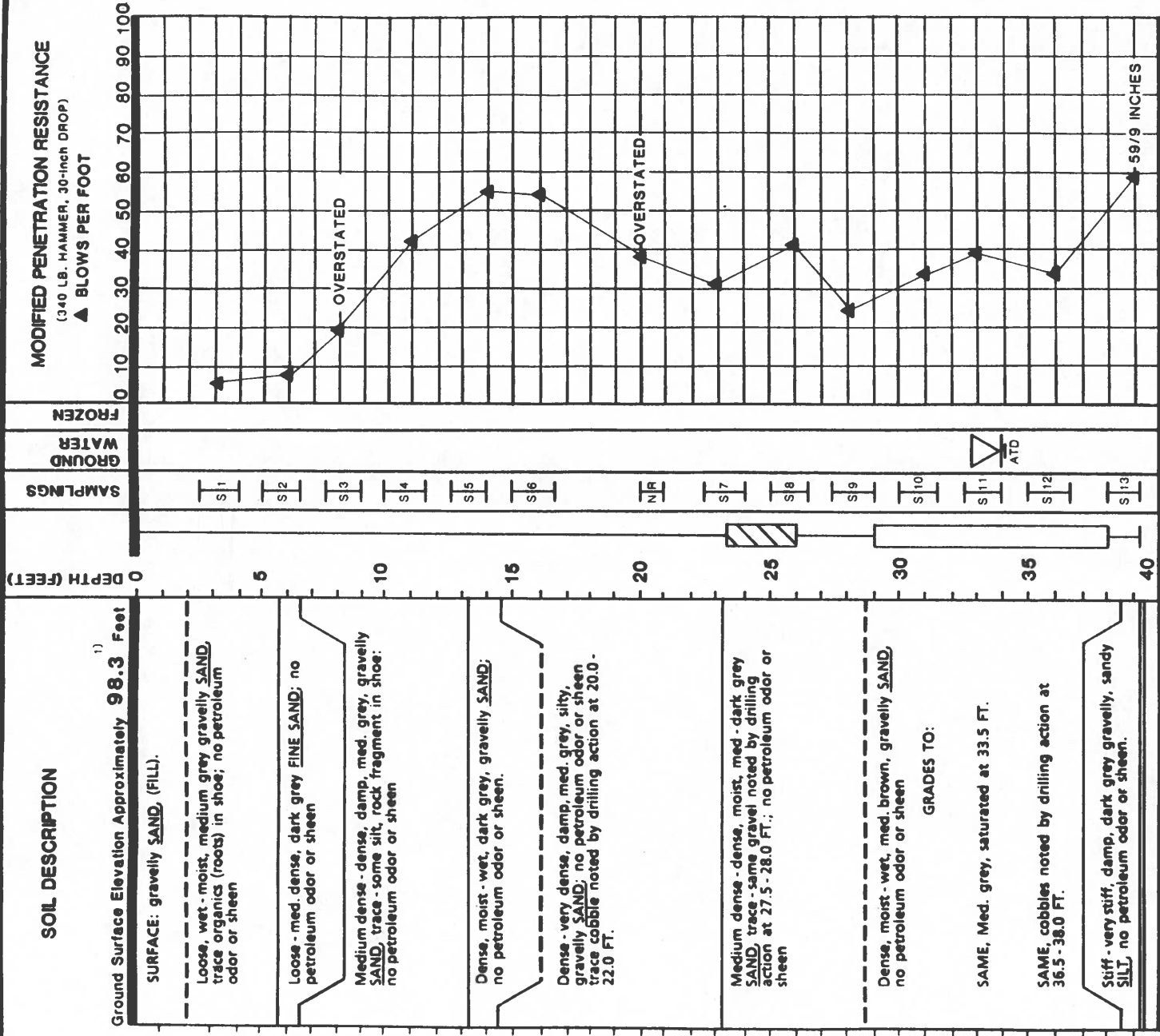


SAMPLING
 I 3" OD SPLIT SPOON SAMPLE
 II 3" OD SHELBY SAMPLE
 III 2.5" ID RING SAMPLE
 B BULK SAMPLE
 * SAMPLE NOT RECOVERED

GROUND WATER SEAL
 DATE
 WATER LEVEL  AT TIME OF DRILLING  OBSERVATION WELL TIP

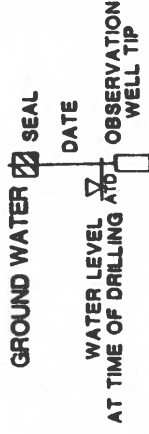
LABORATORY TESTS
 ● % WATER CONTENT
 NP NON PLASTIC
 ○ LIQUID LIMIT
 ○ NATURAL WATER CONTENT

¹⁾ **ARBITRARY DATUM, TBM ELEVATION 100.00 FEET**

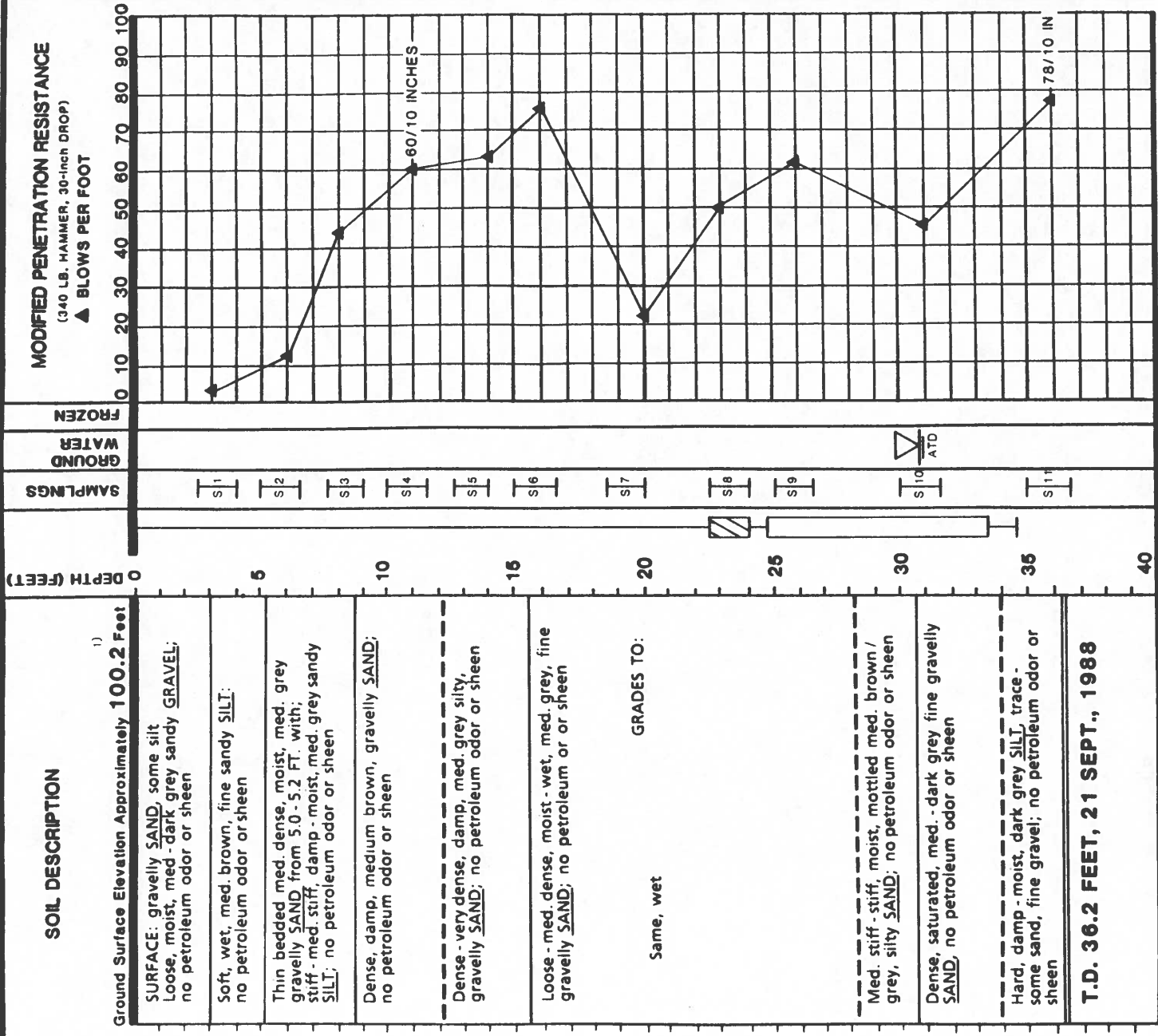


T.D. 39.2 FEET, 22 SEPT., 1988

- SAMPLING**
- I 3" OD SPLIT SPOON SAMPLE
 - II 3" OD SHELBY SAMPLE
 - III 2.5" ID RING SAMPLE
 - B BULK SAMPLE
 - * SAMPLE NOT RECOVERED



1) ARBITRARY DATUM, TBM ELEVATION 100.00 FEET



- SAMPLING**
- I 3" OD SPLIT SPOON SAMPLE
 - II 3" OD SHELBY SAMPLE
 - ☒ 2.5" ID RING SAMPLE
 - B BULK SAMPLE
 - * SAMPLE NOT RECOVERED

GROUND WATER SEAL
 WATER LEVEL AT TIME OF DRILLING
 DATE OBSERVATION WELL TIP

LABORATORY TESTS

- % WATER CONTENT
- NP NON PLASTIC
- LIQUID LIMIT
- NATURAL WATER CONTENT
- PLASTIC LIMIT

¹⁾ **ARBITRARY DATUM, TBM ELEVATION 100.00 FEET**

APPENDIX B

EXPLORATION TEST PIT LOGS

TEST PIT LOG

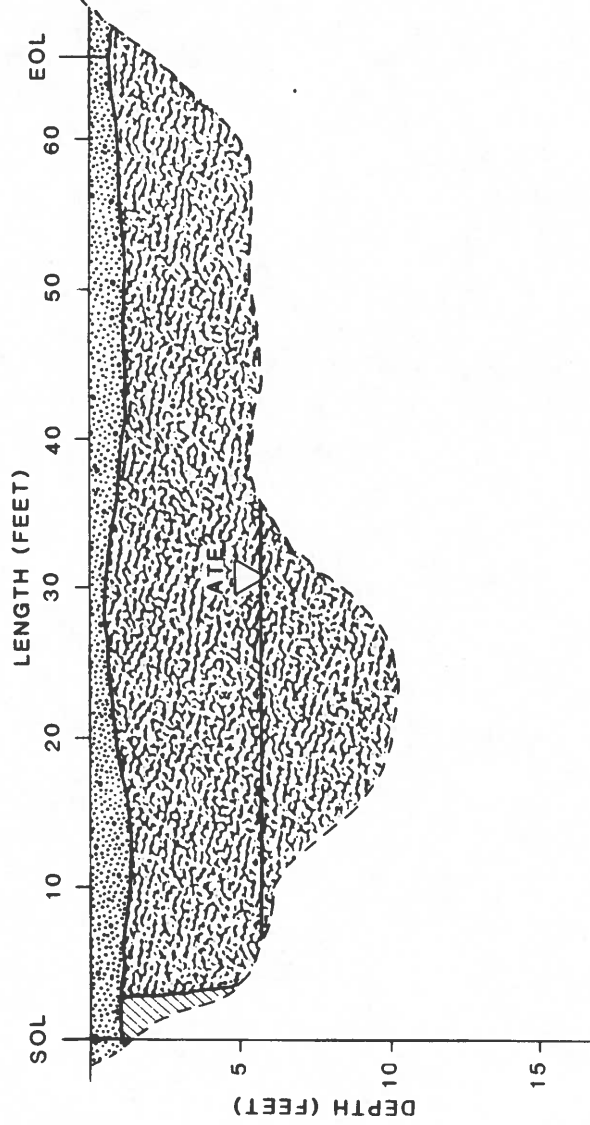
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 01

EXCAVATED 20 SEPT 1988



damp, medium grey silty, gravelly SAND, fill

moist, medium brown sandy SILT, in - situ

miscellaneous metallic debris with random soil backfill

ATE - at time of excavation

NOTES: In debris area, noted strong petroleum odor, product sheen and globules floating on water.

TEST PIT LOG

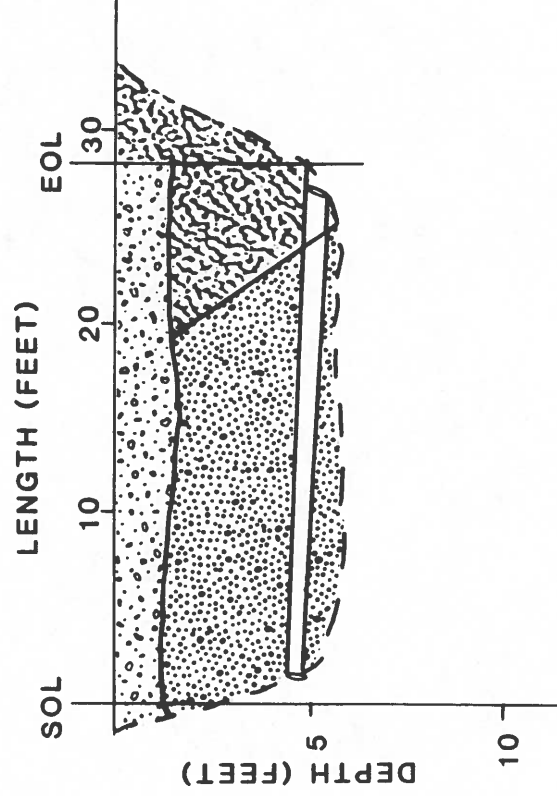
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 02

EXCAVATED 20 SEPT 1988



damp, medium grey silty, gravelly SAND, fill



moist, medium grey, silty SAND, in - situ



miscellaneous metallic debris with random soil backfill
noted strong petroleum odor, no free water observed

4 - inch diameter galvanized steel pipe along north trench wall

TEST PIT LOG

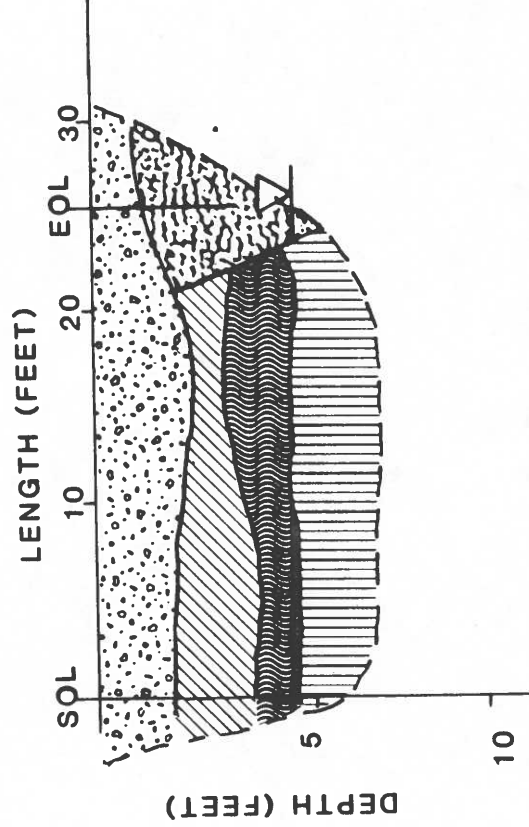
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501






PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 03

EXCAVATED 20 SEPT 1988



-  damp, medium grey silty, gravelly SAND, fill
-  moist, dark brown sandy SILT, fill
-  moist, dark brown ORGANICS, - root mass fill
-  moist, dark brown organic SILT, fill?
-  miscellaneous metallic debris with random soil backfill, strong petroleum odor noted, no sheen observed

ATE - AT TIME OF EXCAVATION

TEST PIT LOG

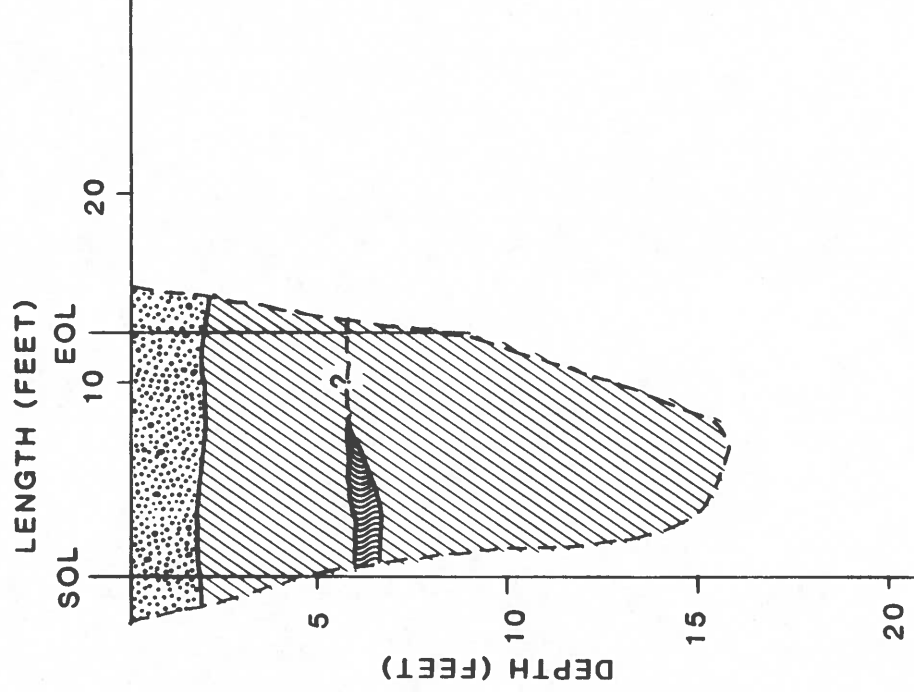
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 04

EXCAVATED 20 SEPT 1988



moist, medium brown silty, gravelly SAND, fill



moist, dark brown sandy SILT, softer below 7 feet, in - situ?



moist, dark brown organic root mass, fill

TEST PIT LOG

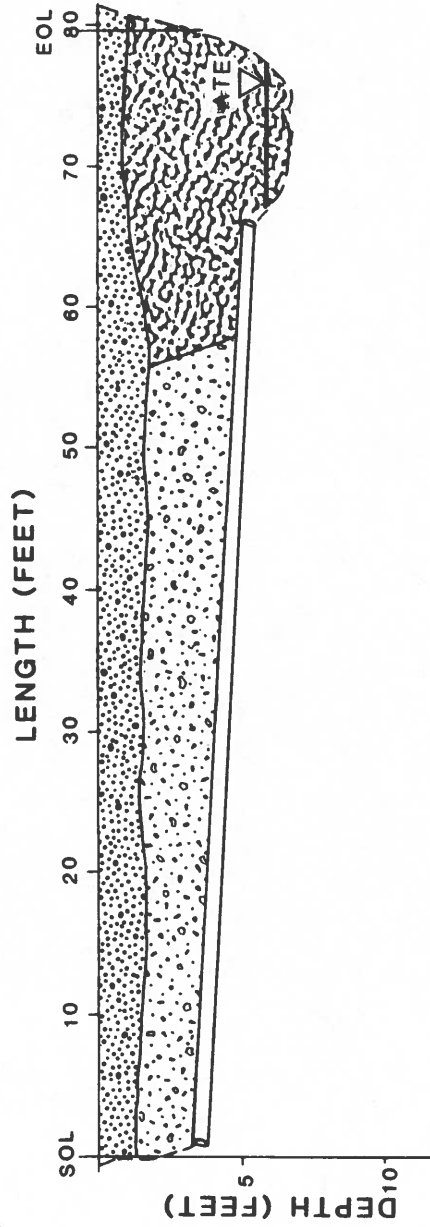
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 05

EXCAVATED 20 SEPT 1988



damp, medium brown silty, gravelly SAND, fill



moist, medium brown gravelly SAND, fill



miscellaneous metallic debris random soil backfill,
strong petroleum odor, free product at pipe

6 - inch diameter galvanized steel pipe

NOTES: Distinct oil staining observed in soil at end of pipe.
Free product observed in pipe (very viscous)

TEST PIT LOG

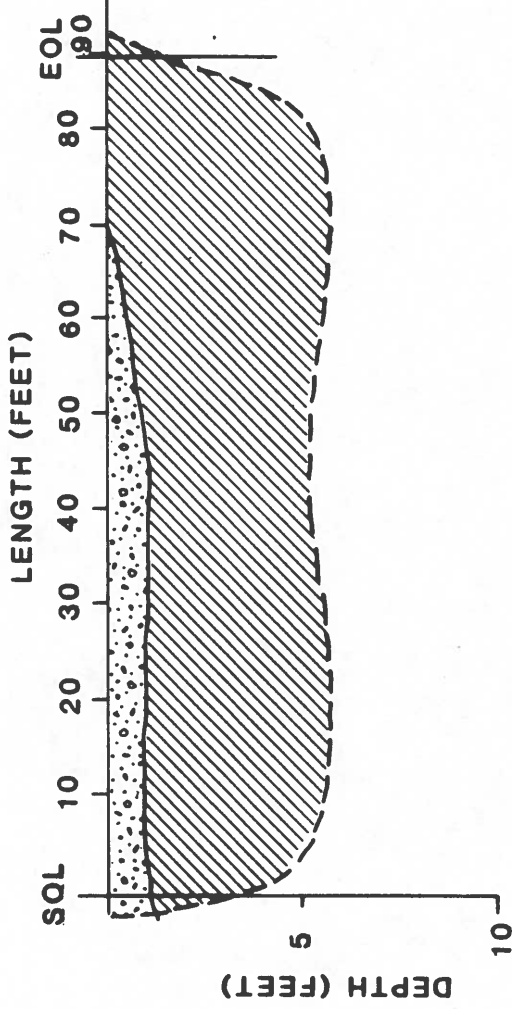
750 W.2nd Ave. Suite 100
Anchorage, Alaska 99501


PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 06

EXCAVATED 20 SEPT 1988



 damp, medium brown silty, gravelly SAND, fill

 moist, medium brown sandy SILT, in - situ

TEST PIT LOG

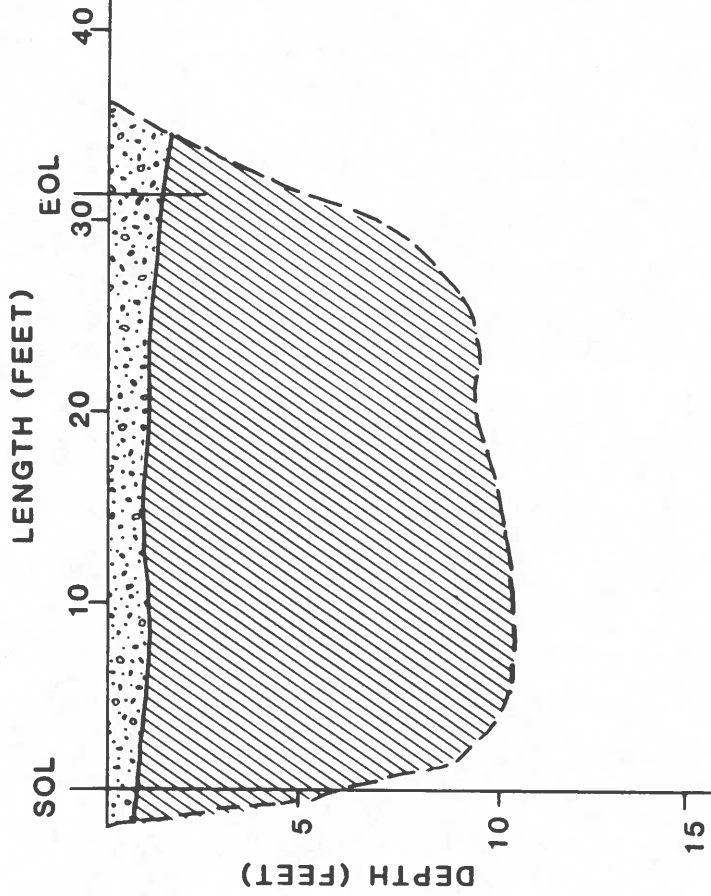
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 07

EXCAVATED 20 SEPT 1988



moist, medium brown silty, gravelly SAND, fill



moist, medium brown sandy SILT, in - situ

TEST PIT LOG

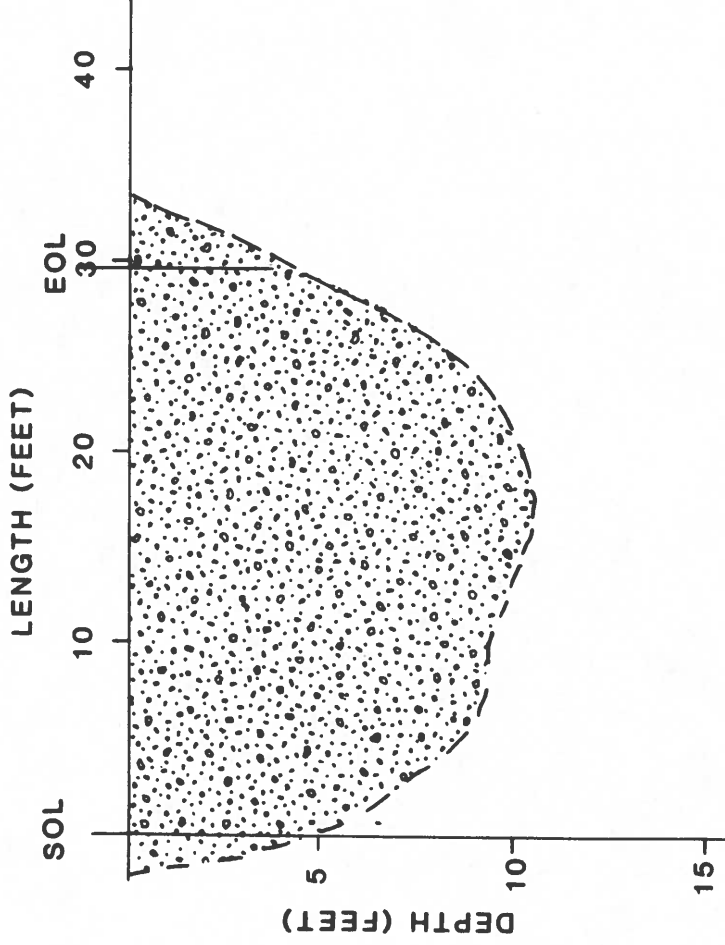
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 08

EXCAVATED 20 SEPT 1988



moist, medium brown silty, gravelly SAND, fill

TEST PIT LOG

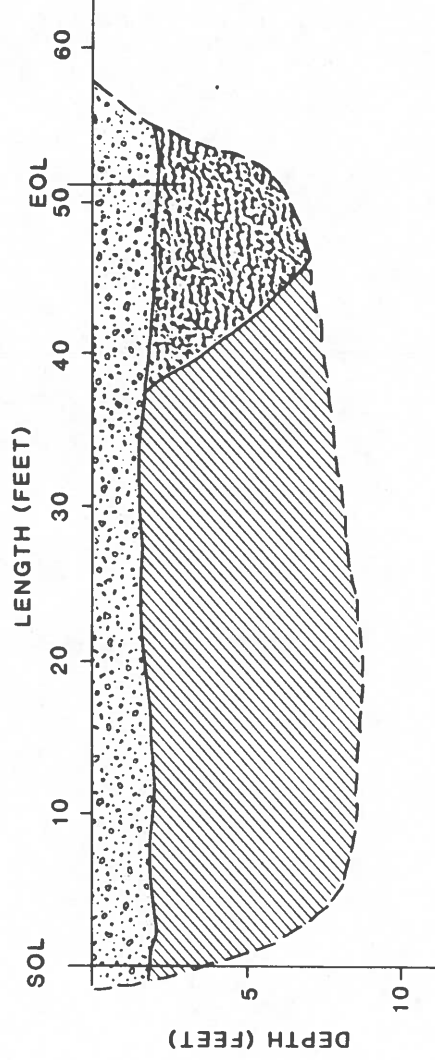
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501

PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 09

EXCAVATED 20 SEPT 1988



moist, medium brown silty, gravelly SAND, fill



miscellaneous metallic debris, random soil fill, strong petroleum odor.



moist, medium brown sandy SILT, in - situ

TEST PIT LOG

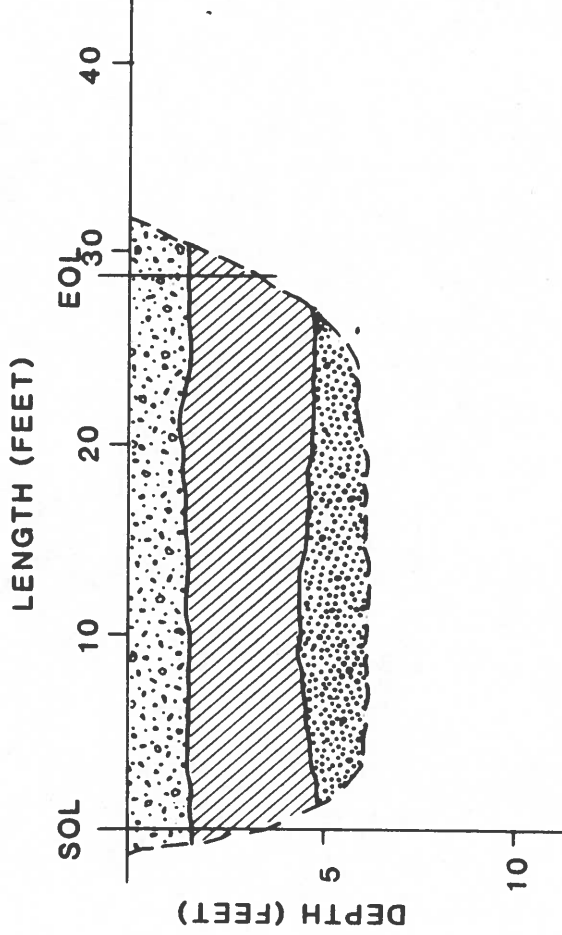
750 W. 2nd Ave. Suite 100
Anchorage, Alaska 99501




PROJECT NO. 2627-002

PROJECT NAME FSLIC: Hayward Hills

TRENCH TR - 10

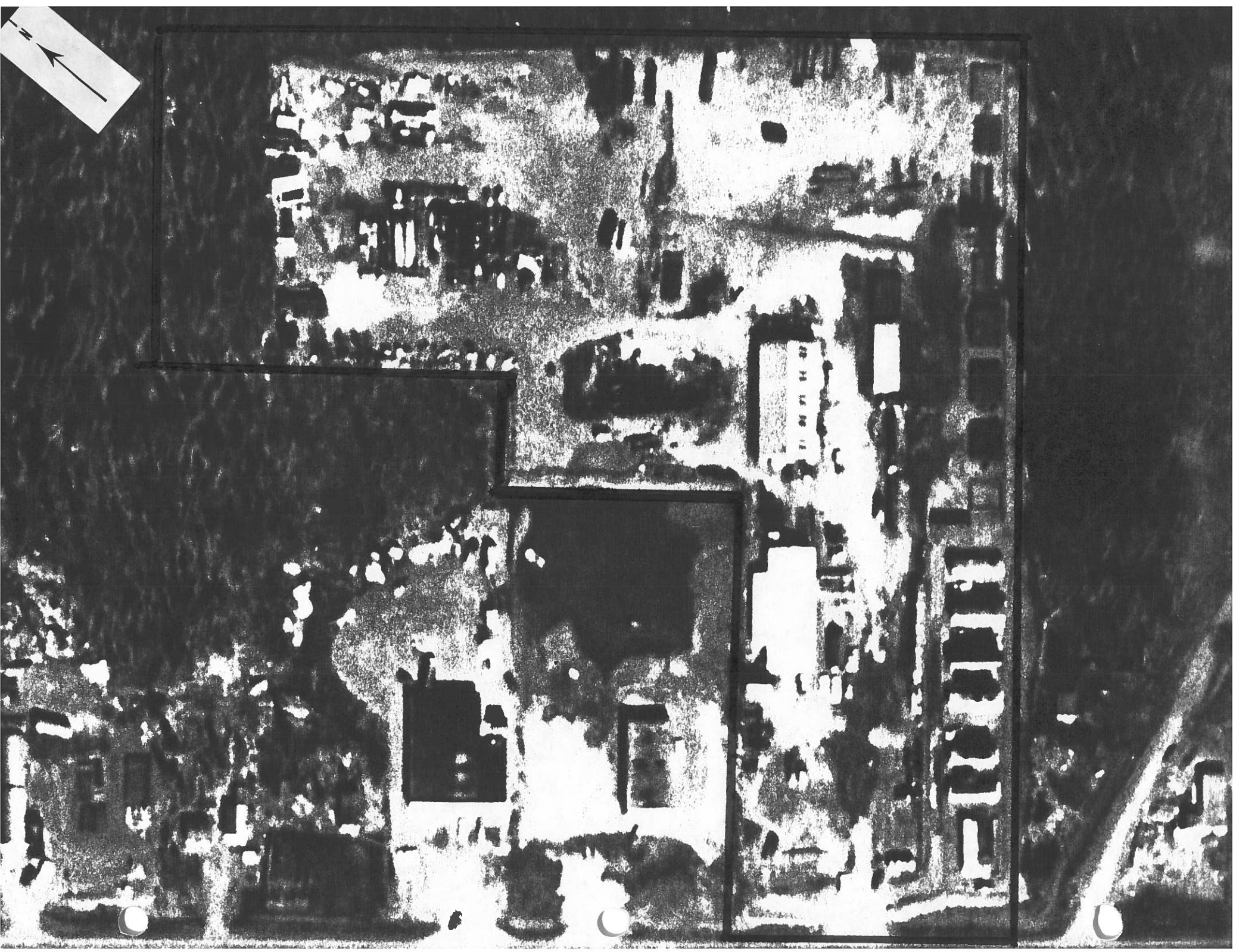
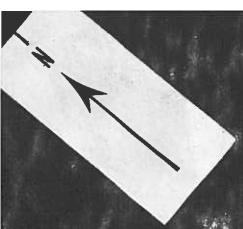
EXCAVATED 20 SEPT 1988

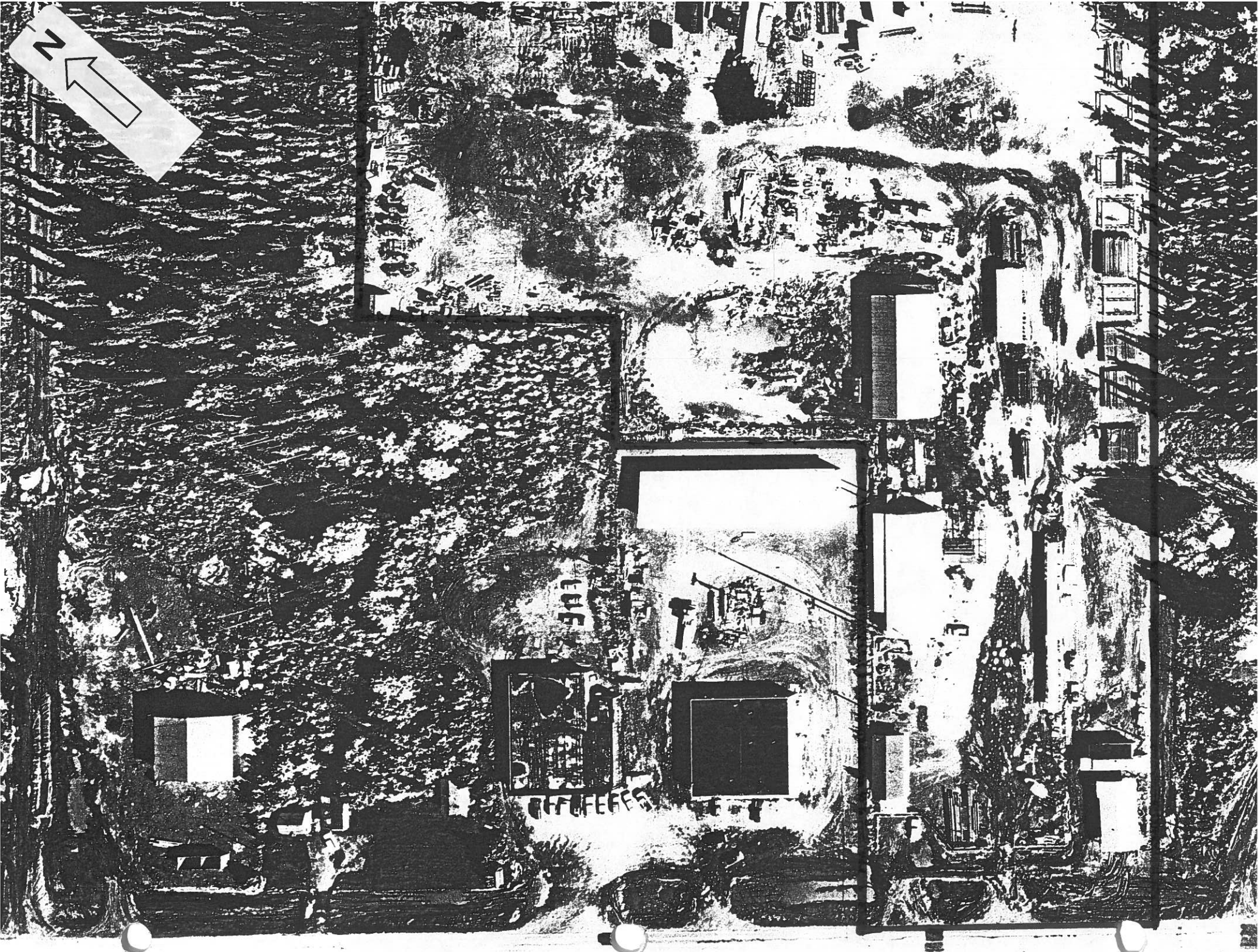
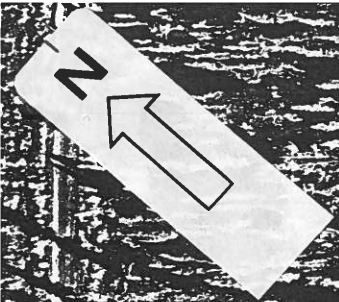


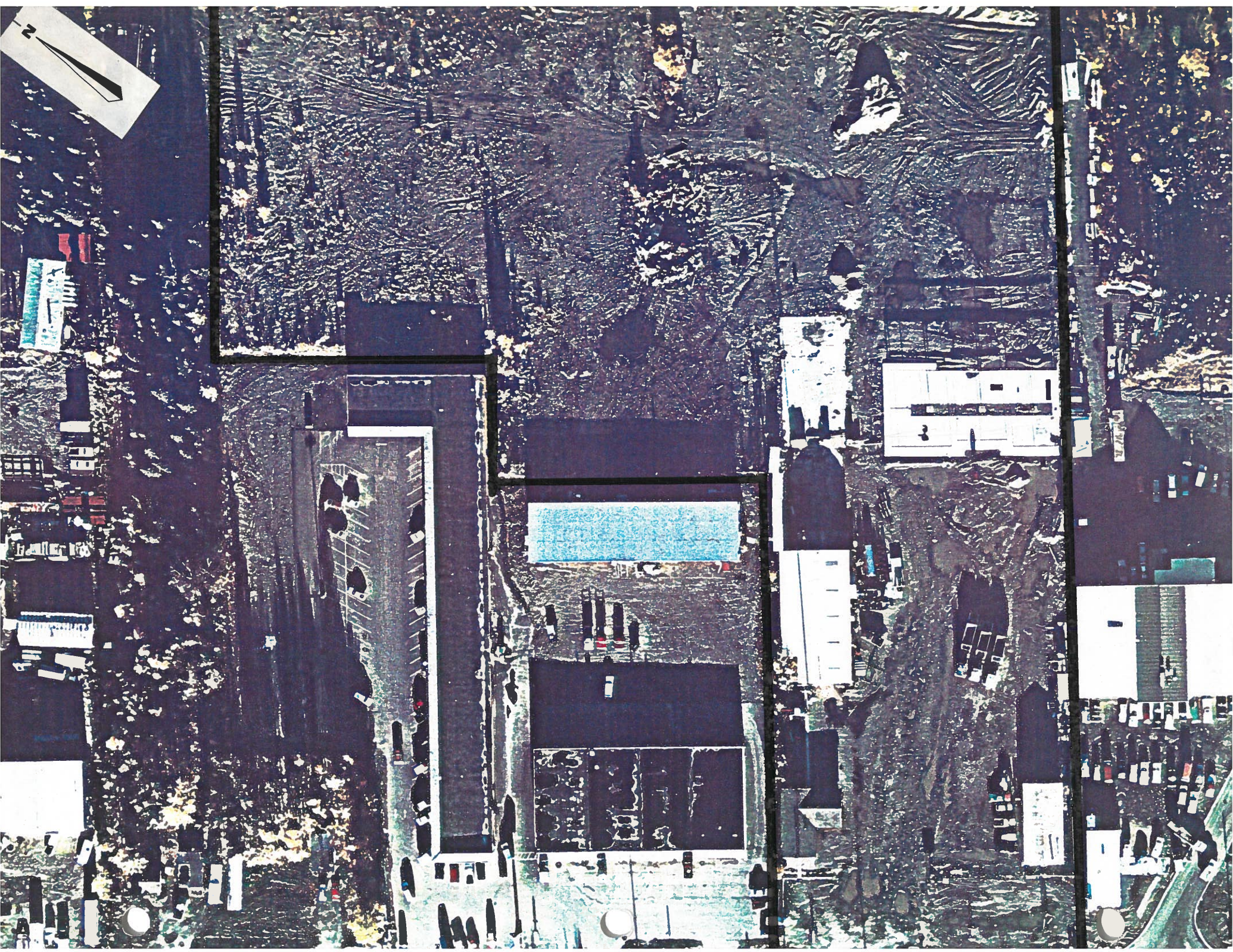
-  damp, medium grey silty, gravelly SAND, fill
-  damp, medium brown sandy SILT; in - situ
-  damp, medium brown gravelly SAND; in - situ

APPENDIX C

AERIAL PHOTOGRAPHS

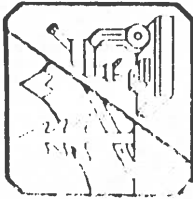






APPENDIX D

ANALYTICAL LABORATORY RESULTS



NORTHERN TESTING LABORATORIES, INC.

500 UNIVERSITY PLAZA WEST SUITE 100
2505 FAIRBANKS STREET

FAIRBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99503

PHONE (907) 452-1111
FACSIMILE (907) 452-1112

NORTEC

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Attn: Rick Mitchell

Source: See Below

Sample ID# : A092788-2, 5, 12

Parameter Unit A092788-2 A092788-5 A092788-12
CD-1/S-2 CD-1/S-5 CD-1/S-12

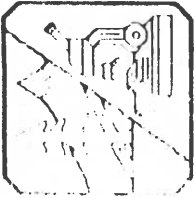
Total Petroleum mg/dry kg 103 61.4 51.2

Hydrocarbons

% Solids % 80.3 91.3 77.3

Reported By: *FLM* Date: 10/26/88

Francois Rodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 101
2505 FAIRBANKS STREET

FAIRBANKS ALASKA 99709
ANCHORAGE ALASKA 99503

TEL: 451-1111
FAX: 451-1111

NRTEC

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Attn: Rick Mitchells

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Source: See below

Sample ID#: A092788-2,S,12

Parameter Unit A092788-2 A092788-5 A092788-12 Detection
CD-1/S-2 CD-1/S-5 CD-1/S-12 Limits

Aromatic Volatile Organics: EPA Method 8020

| | | | | | |
|---------------------|-----------|-----|-----|-----|-----|
| Benzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| Chlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| 1,2-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| 1,3-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| 1,4-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| Ethylbenzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| Toluene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| Xylenes | mg/dry kg | <DL | <DL | <DL | 0.4 |

% Solids

80.3

91.3

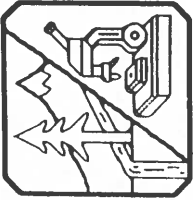
77.3

Reported By:

fa

Date: 10/26/88

Francis Rodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST, SUITE A
2505 FAIRBANKS STREET

FAIRBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99503

907-479-3115
907-277-8378

NORTEC

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Attn: Rick Mitchells

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Source: See Below

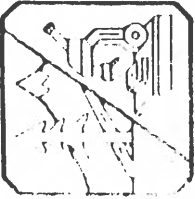
Sample ID#: A092788-17,26,28

* REVISED TRANSMITTAL

=====
Parameter Unit A092788-17 A092788-26 A092788-28
CD-2/S-3 CD-2/S-12 CD-3/S-2
=====
Total Petroleum Hydrocarbons mg/dry kg (41.5 (42.0 (46.3/(47.0
% Solids % 95.1 89.5 84.1
=====

Reported By: *flm* Date: 10/26/88
=====

Francois Rodigari, Anchorage Operations Manager
=====



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 4
2655 FAIRBANKS STREET

FAIRBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99502

307-233-1111
307-233-1112

NOTED

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Attn: Rick Mitchells

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Source: See below

Sample ID#: A092788-17, 26, 28

| Parameter | Unit | A092788-17 CD-2/S-3 | A092788-26 CD-2/S-12 | A092788-28 CD-3/S-2 | Detection Limits |
|-----------|------|------------------------|-------------------------|------------------------|---------------------|
|-----------|------|------------------------|-------------------------|------------------------|---------------------|

Aromatic Volatile Organics: EPA Method 8020

| | | | | | |
|---------------------|-----------|-----|-----|-----|-----|
| Benzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| Chlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| 1,2-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| 1,3-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| 1,4-Dichlorobenzene | mg/dry kg | <DL | <DL | <DL | 0.2 |
| Ethylbenzene | mg/dry kg | <DL | <DL | <DL | 0.1 |
| Toluene | mg/dry kg | 0.1 | <DL | <DL | 0.1 |
| Xylenes | mg/dry kg | <DL | <DL | <DL | 0.4 |

% Solids

95.1

89.5

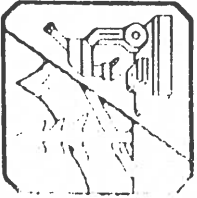
84.1

Reported by:

Fh Li

Date: 10/26/88

Francois Rouigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 1
2505 FAIRBANKS STREET

FAIRBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99503

807 451-1111
300 451-1111

NRTEC
750 West 2nd Avenue #100
Anchorage, Alaska 99501

Attn: Rick Mitchell

Source: See Below

Sample ID#: A092788-32,33,34,35

Date Arrived: 09/27/08
Time Arrived: 1010
Date Sampled: 09/22/08
Time Sampled: Various
Date Completed: 10/25/08

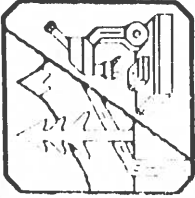
Parameter Unit A092788-32 A092788-33 A092788-34 A092788-35
CD-3/S-10 TP0-5/S-1 TP0-5/S-2 TP-9/S-1

Total Petroleum Hydrocarbons mg/dry kg 41.6 138.000 115.000 2740

% Solids % 76.4 90.0 87.1

Reported By: *fly* Date: 10/26/08

Francois Rodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 1
2505 FAIRBANKS STREET

FAIRBANKS ALASKA 99709
ANCHORAGE ALASKA 99500

PHONE 333-1111
TELETYPE 333-1177

NOTE:

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Attn: Rick Mitchells

Source: See below

Sample ID#: A092788-32, 33, 34, 35

| Parameter | Unit | A092788-32 CD-3/S-10 | A092788-33 TP05/S-1 | A092788-34 TP05/S-2 | A092788-35 TP-9/S-1 | Detection Limits |
|---|-----------|-------------------------|------------------------|------------------------|------------------------|---------------------|
| Aromatic Volatile Organics: EPA Method 8020 | | | | | | |
| Benzene | mg/dry kg | (DL) | (DL) | 1.4 | (DL) | 0.1 |
| Chlorobenzene | mg/dry kg | (DL) | (DL) | (DL) | (DL) | 0.1 |
| 1,2-Dichlorobenzene | mg/dry kg | (DL) | (DL) | (DL) | (DL) | 0.2 |
| 1,3-Dichlorobenzene | mg/dry kg | (DL) | (DL) | (DL) | (DL) | 0.2 |
| 1,4-Dichlorobenzene | mg/dry kg | (DL) | (DL) | (DL) | (DL) | 0.2 |
| Ethylbenzene | mg/dry kg | (DL) | 44 | 21 | (DL) | 0.1 |
| Toluene | mg/dry kg | 0.2/0.1 | 64 | 42 | (DL) | 0.1 |
| Xylenes | mg/dry kg | (DL) | 370 | 340 | 0.7 | 0.1 |
| % Solids | % | 91.6 | 76.4 | 90.0 | 87.1 | - |

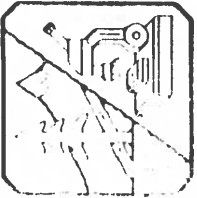
Aromatic Volatile Organics: EPA Method 8020

Reported By:

Ph Li

Date: 10/26/88

Francois Rodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 111
2905 FARBANKS STREET

FARBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99503

NORTEC
750 West 2nd Avenue #100
Anchorage, Alaska 99503

Attn: Rick Mitchell

Source: See Below

Sample ID#: A092780-37,39,41

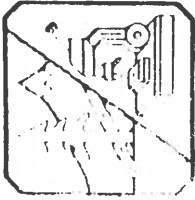
Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed:

Parameter Unit A092780-37 A092780-39 A092780-41
CD-1/S-A CD-2B/S-A CD-3/S-A

Total Petroleum Hydrocarbons mg/l (0.9) (0.9) (0.8)

Reported By: *phi* Date: 10/26/88

Francois Redigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 100
2505 FAIRBANKS STREET

FAIRBANKS ALASKA 99709
ANC-ORANGE, ALASKA 99500

307-476-1111
307-476-1112

NORTEC
750 West 2nd Avenue #100
Anchorage, Alaska 99501

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: Various
Date Completed: 10/25/88

Attn: Rick Mitchells

Source: See Below

Sample ID#: A092788-45, 46, 47

| Parameter | Units | A092788-45 | A092788-46 | A092788-47 | Detection |
|-----------|-------|------------|------------|------------|-----------|
| | | CD-1/S-9 | CD-26/S-B | CD-3/S-B | Limit |

Purgeable Aromatics: EPA Method 602

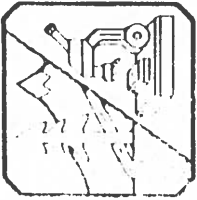
| | | | | | |
|---------------------|------|-----|-----|-----|-----|
| Benzene | ug/l | <DL | <DL | <DL | 0.2 |
| Chlorobenzene | ug/l | <DL | <DL | <DL | 0.2 |
| 1,2-Dichlorobenzene | ug/l | <DL | <DL | <DL | 0.2 |
| 1,3-Dichlorobenzene | ug/l | <DL | <DL | <DL | 0.2 |
| 1,4-Dichlorobenzene | ug/l | <DL | <DL | <DL | 0.2 |
| Ethylbenzene | ug/l | <DL | <DL | <DL | 0.2 |
| Toluene | ug/l | <DL | <DL | <DL | 0.2 |
| Xylenes | ug/l | <DL | <DL | <DL | 0.6 |

Reported by:

Flu

Date: 10/26/88

Francis Rodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

500 UNIVERSITY PLAZA WEST SUITE A
2505 FAIRBANKS STREET

FAIRBANKS ALASKA 99709
ANCHORAGE ALASKA 99503

HRTEC

750 West 2nd Avenue #100
Anchorage, Alaska 99501

Date Arrived: 09/27/88
Time Arrived: 1010
Date Sampled: 09/22/88
Time Sampled: -
Date Completed: 10/25/88

Attn: Rick Mitchellis

Source: TPO-5/S-1

Sample ID#: A092788-33

Parameter Unit Results Detection Limit

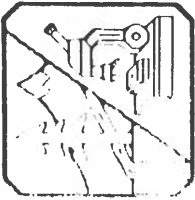
ORGANOCHLORINE PESTICIDES AND PCBs: EPA Method 8080

| | | | |
|--------------|-----------|-----|-----|
| Aroclor 1016 | mg/dry kg | <DL | 0.1 |
| Aroclor 1221 | mg/dry kg | <DL | 0.1 |
| Aroclor 1232 | mg/dry kg | <DL | 0.1 |
| Aroclor 1242 | mg/dry kg | 33 | 0.1 |
| Aroclor 1248 | mg/dry kg | <DL | 0.1 |
| Aroclor 1254 | mg/dry kg | <DL | 0.1 |
| Aroclor 1260 | mg/dry kg | <DL | 0.1 |

% Solids % 76.4

Reported By: *Flu* Date: 10/26/88

Francois Sodigari, Anchorage Operations Manager



NORTHERN TESTING LABORATORIES, INC.

600 UNIVERSITY PLAZA WEST SUITE 1000
2505 FA PRANKS STREET
FAIRBANKS, ALASKA 99709
ANCHORAGE, ALASKA 99500

907-473-1111
907-473-1111

Quality Control Report

=====

Client: NORTEC
ID#: A092788-2 through 47

Listed below are quality control assurance reference samples with a known concentration prior to analysis. The acceptable limits represent a 95% confidence interval established by the Environmental Protection Agency or by our laboratory through repetitive analyses of the reference sample. The reference samples indicated below were analyzed at the same time as your sample, ensuring the accuracy of your results.

| Standard ID# | Parameter | Unit | Result | Acceptable Limit |
|---------------|---------------------|-------|--------|------------------|
| Varian Mix 16 | Benzene | ug/l | 5.8 | 4.2 - 7.8 |
| | Toluene | ug/l | 5.4 | 4.2 - 7.8 |
| | Ethylbenzene | ug/l | 4.9 | 4.2 - 7.8 |
| | Chlorobenzene | ug/l | 5.2 | 4.9 - 7.1 |
| | 1,4-Dichlorobenzene | ug/l | 4.7 | 4.5 - 7.5 |
| | 1,3-Dichlorobenzene | ug/l | 5.0 | 4.8 - 7.2 |
| EPA WP683-2 | 1,2-Dichlorobenzene | ug/l | 5.0 | 4.1 - 7.9 |
| | Aroclor 1242 | mg/kg | 56 | 19 - 62 |
| EPA 379-3 | Oil & Grease | mg/l | 17.6 | 13.2 - 25.6 |

Reported By: *Ami*

Date: 10/25/88

=====

Francois Rodigari, Anchorage Operations Manager

=====

APPENDIX E
SITE PHOTOGRAPHS

PHOTOGRAPHIC LOG

FSLIC - Hayward Hill Subdivision

2627-002

September 20, 1988

Photograph No.

Description

- 1 TR-05. Excavation along 6-inch diameter steel pipeline. Note metallic debris along trench sidewalls. View north.
- 2 TR-01. General metallic debris from abandoned debris fill area. Note open disposal pit in background. View north.
- 3 TR-01. General metallic debris from abandoned debris fill area. Note groundwater in trench. View east.
- 4 TR-01. General metallic debris from abandoned debris fill area. Note groundwater in trench. View west.
- 5 TR-01. General characteristics of metallic debris in abandoned pit area. View east.
- 6 TR-01. General metallic debris, wire rope in abandoned pit area. View east.
- 7 TR-01. Standing groundwater in trench, abandoned pit area. Note floating petroleum hydrocarbon product. View east.
- 8 TR-03. Contact at debris fill and adjacent soils. Note groundwater level. View southeast.
- 9 TR-03. Contact at debris fill and adjacent soils. Note groundwater and organic fill. View southeast.
- 10 TR-05. Excavation along 6-inch diameter pipeline, apparently from wash grate area near building in background. View south.
- 11 TR-02. General trench wall excavation. Note apparent steel drain line. View northwest.

Photograph No.

Description

- 12 TR-02. Detail apparent disposal line. View northeast.
- 13 TR-05. Terminus of 6-inch diameter steel pipeline. Note product staining and groundwater in trench. Note metallic fill debris in abandoned pit area. View south.
- 14 TR-05. Terminus of 6-inch diameter steel pipeline. Note black soil over brownish soil contact (fill over in-place soils). View south.
- 15 TR-05. Terminus of 6-inch diameter pipeline. View south.
- 16 TR-05. Terminus of 6-inch diameter pipeline. View south.
- 17 TR-01. General characteristics of fill in abandoned fill area. View west.
- 18 TR-06. General characteristics of in-place soils. View northwest.
- 19 TR-06. General characteristics in-place soils. View northwest.
- 20 CD-1. Typical soil boring operations, preparing to drive samples. View southeast.
- 21 CD-3. Typical drilling operations. Note containerizing auger cuttings. View north.
- 22 CD-2-B. Typical drilling operations. Note grout mixing unit in foreground. View west.
- 23 CD-3. Typical sample splitting area and final decontamination rinse platform. Yellow sprayer used for distilled water, milk colored sprayer used for methanol rinse. View east.
- 24 CD-3. Typical decontamination area using tap water and anionic detergents. View north.

Photograph No.

Description

- 25 Confirmed water well along unmarked corner bordering TR4, Hayward Hill Subdivision. View north.
- 26 Same as photograph number 25. View east.
- 27 Suspected water well, Hayward Hill Subdivision, TR3, west corner of Kenai Spur Highway. View south.
- 28 Suspected water well, Aspen Flats Subdivision, corner of Corral Street and Kenai Spur Highway. View west.
- 29 Same as photograph number 28. View west.



2



4



7



3

STOCK # V84

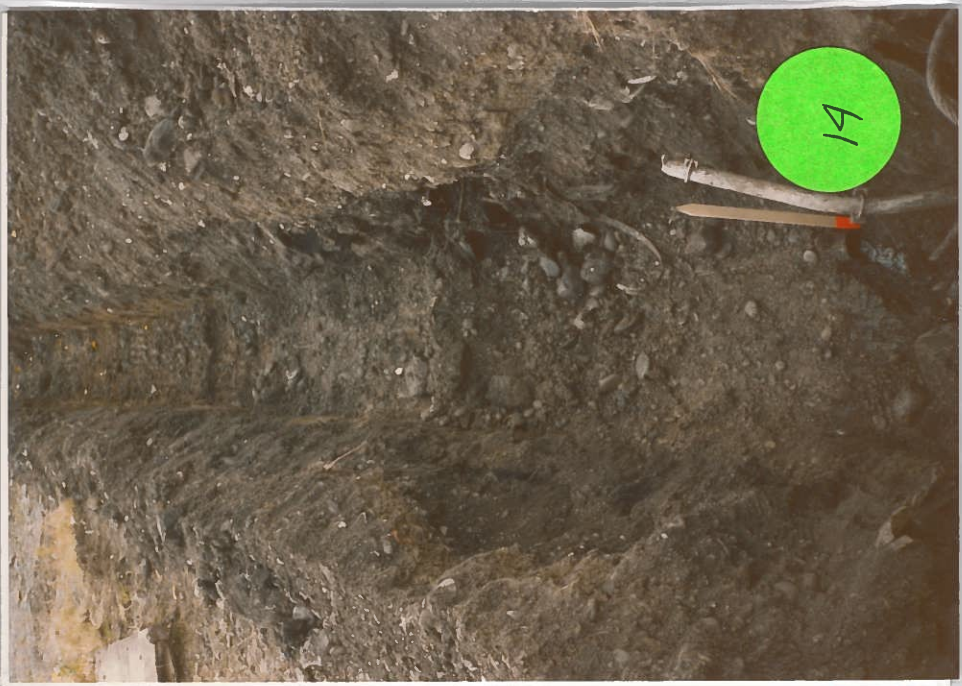
ABOUT CENTURY PLUS
1-800-421-4662





STOCK # V04

ADAM CENTER PHOTOS
1-800-421-4032

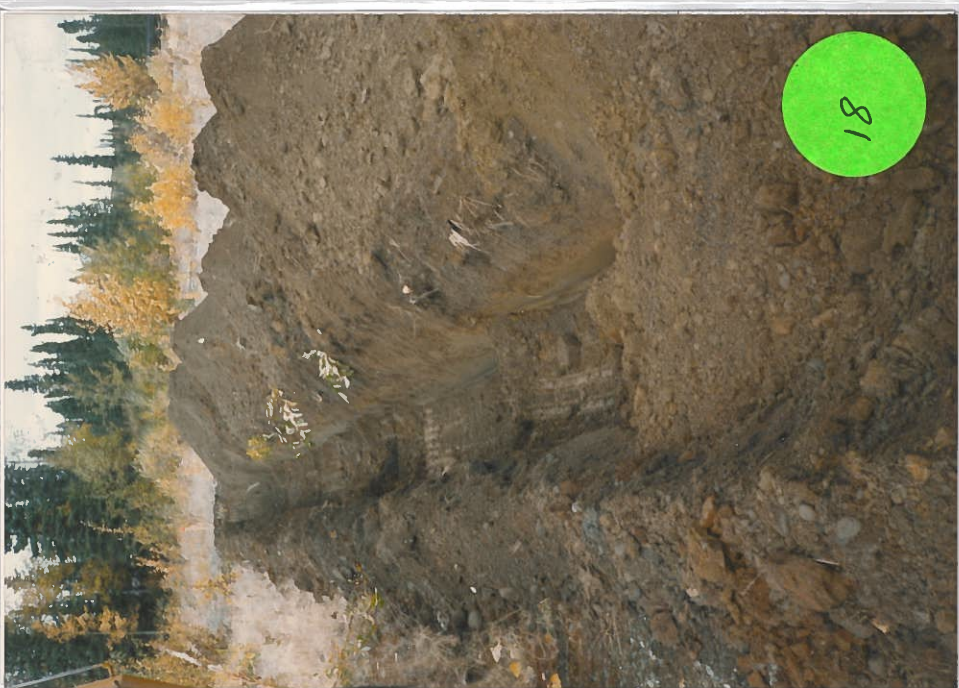




20



19

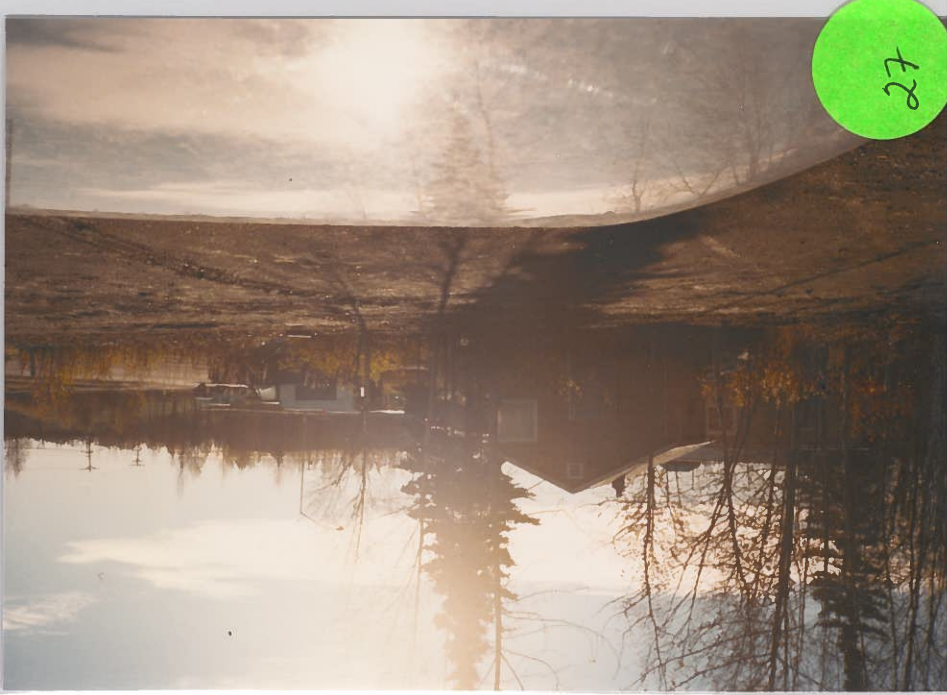


18



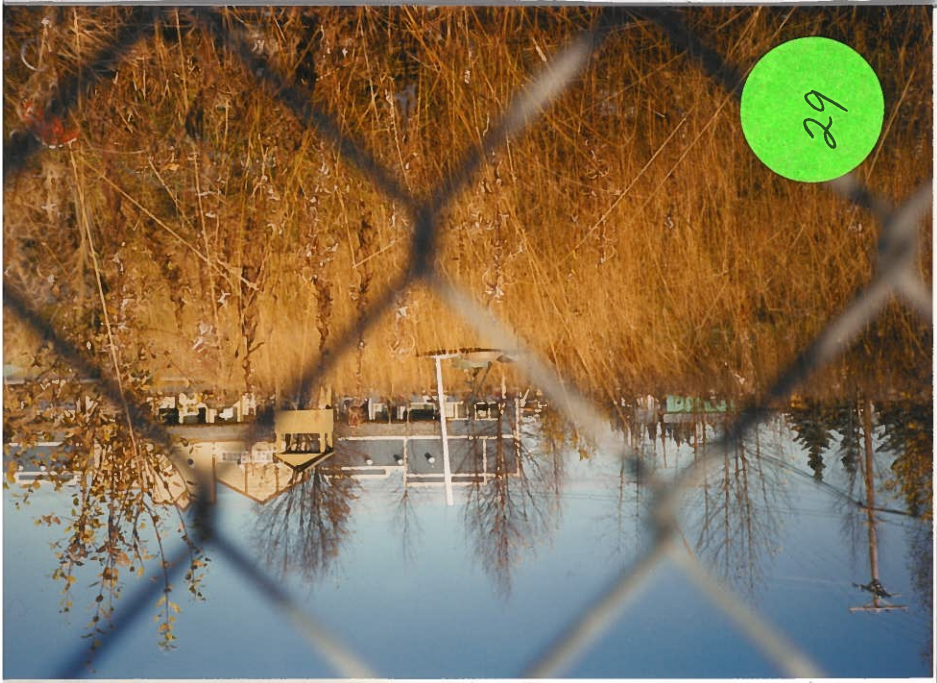
17





STOCK # VB4

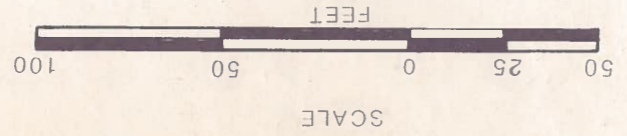
1-800-421-5882
ECHO CENTRAL SYSTEMS



SITE AND EXPLORATION PLAN
Hayward Hill Subdivision

2627-002
OCT 1988

FIGURE 1



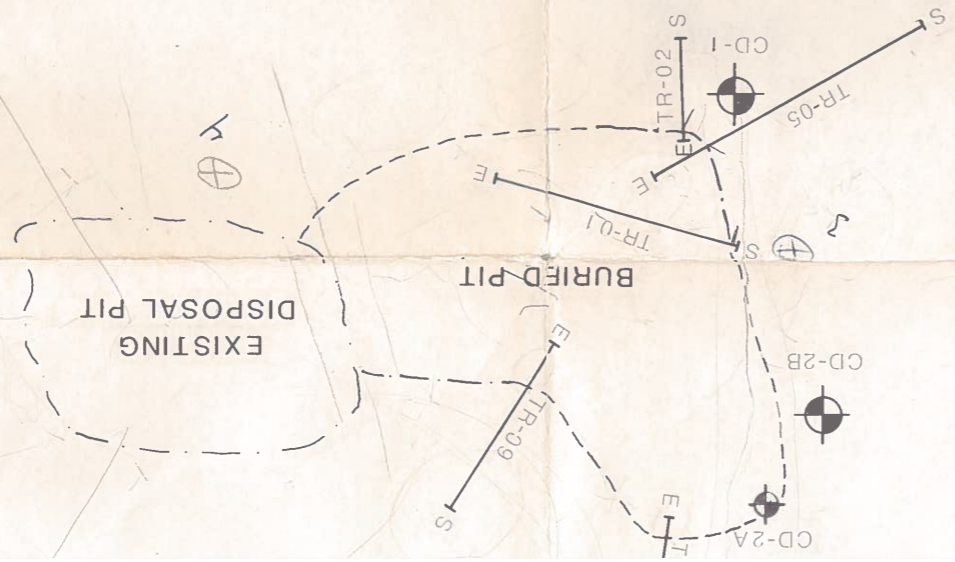
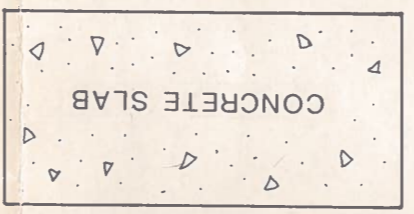
• POWER POLE

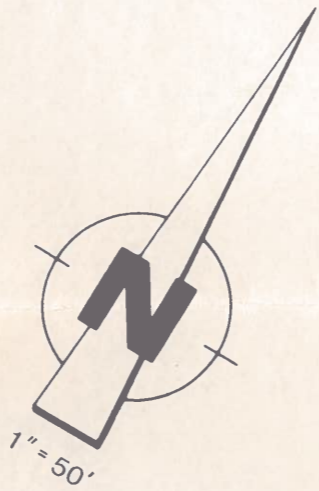
Handwritten notes:
2627-002
2627-002

TR-10
E
S

TR-08
E
S

Detail Figure 3





TR-07
E S

TR-06
E S

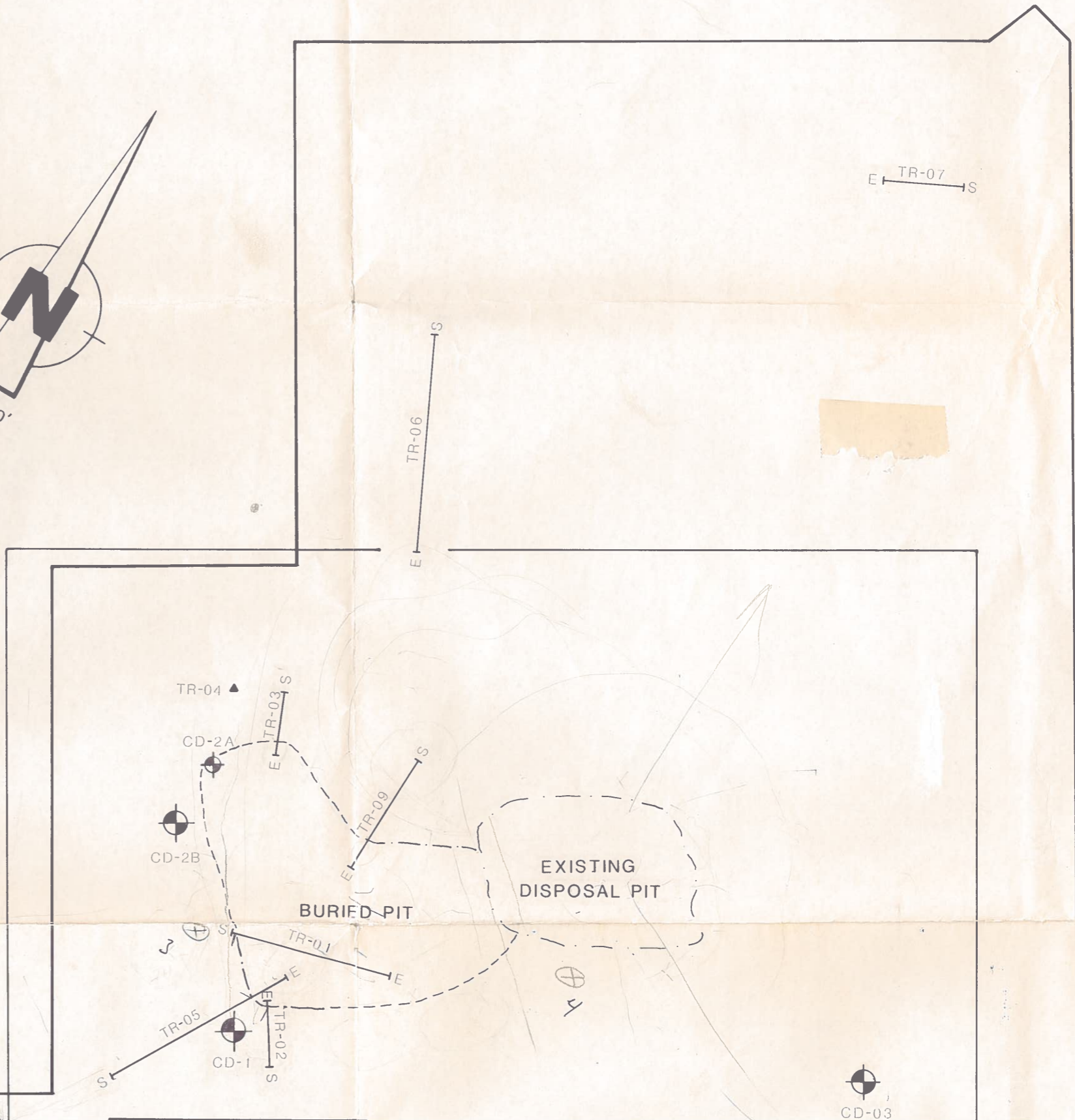
PRELIMINARY

GENERAL SITE PLAN-FIELD

TR-03
EXPLORATION TRENCH LOCATION & LENGTH


BURIED & EXPOSED DISPOSAL AREA
(EXPECTED LIMITS DASHED WHERE INFERRED)

MONITORING WELL LOCATIONS



Return
to
ADEC

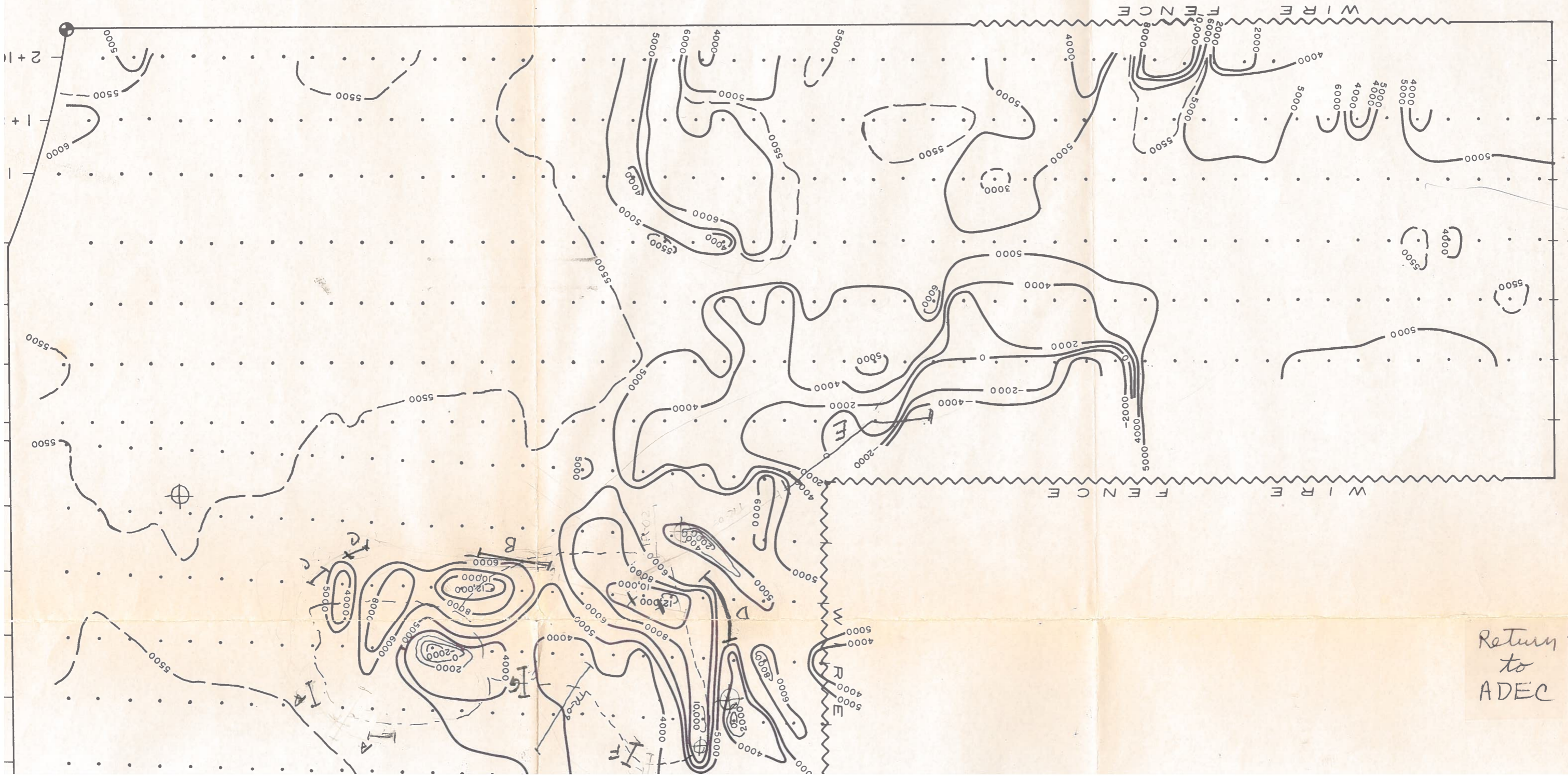
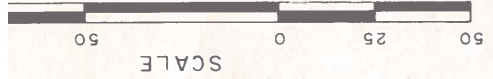
NOTE:
1. 50,000 Gammas subtracted from contour intervals.
2. Contours vary as follows: -4000, -2000, 0, 2000, 4000,
5000, 6000, 8000, 10,000, 12,000, 14,000.

* True distance equals ten feet.


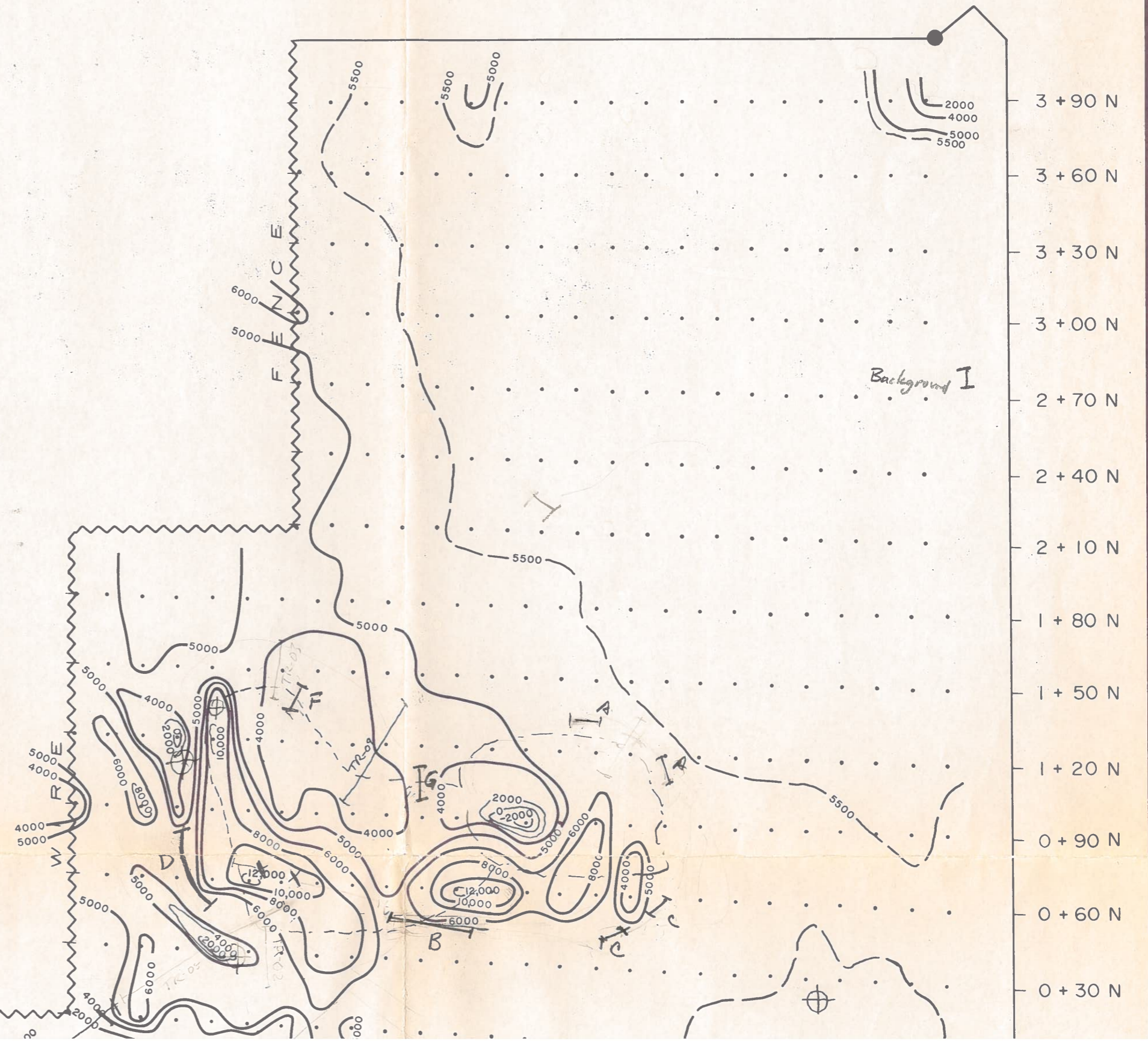
SCALE: 1" = 50 Feet (1:600)
DATE BY TC/RM DATE 9/88
APRVD: DRWN BY G.L.B.

FIGURE 2
Magnetometer Survey
Hayward Hills Subdiv

WGM
MINING & GEOLOGICAL
ANCHORAGE, ALASKA



Return
INDEX



WIRE FENCE

05

20

000

0 + 30 N

0 + 60 N

0 + 90 N

1 + 20 N

1 + 50 N

1 + 80 N

2 + 10 N

2 + 40 N

2 + 70 N

3 + 00 N

3 + 30 N

3 + 60 N

3 + 90 N