PARSONS ENGINEERING SCIENCE, INC.

8000 Centre Park Drive, Suite 200 • Austin, Texas 78754 • (512) 719-6000 • Fax: (512) 719-6099

SWF 69026

February 7, 1996

RECEIVED

FEB - 8 1996

INDUSTRIAL & HAZARDOUS WASTE
CORRECTIVE ACTION SECTION

Guy Tidmore
U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Subject: Sampling Plan for Evaluation of Background Level in Soil Types at CSSA WMU Closures
Contract F33615-89-D-4003, order 126
Parsons ES 721460.06

Dear Mr. Tidmore:

On behalf of Camp Stanley Storage Activity (CSSA), Parsons ES is submitting a copy of the *Sampling Plan for Evaluation of Background Metals Levels in Soil Types at CSSA*. This plan describes facility-wide background sampling to be conducted for the purpose of determining Risk Reduction Standard 1 (RRS1) closure criteria for surface soil types and bedrock (Glen Rose Limestone) at CSSA. CSSA plans to use the resulting background levels as comparison criteria for future closure of individual SWMU sites at the facility.

Investigations at several SWMUs at CSSA are scheduled to begin in late February. Since CSSA generally prefers to close SWMUs under RRS1, it is imperative that RRS1 criteria are determined as soon as possible. For this reason, we request an expedited review of the background sampling plan. The background sampling activities are tentatively planned to begin as soon as the TNRCC and EPA approve the sampling plan. If there is no response to this request within 30 days, regulatory approval will be assumed and background sampling will be conducted so that SWMU closure work at CSSA can continue. If you have any questions, please call me at 512/719-6062 or Brian Murphy at CSSA (210/698-5208). Thank you in advance for your review.

Sincerely,

Julie Burdey

Julie Burdey
Project Manager

xc: Brian Murphy, CSSA
Capt Williston, AL/OEB
Richard Clarke, TNRCC
Luis Campos, TNRCC
Malcolm Ferris, TNRCC
Jo Jean Mullen, AFCEE
R.C. Wooten, Parsons ES (letter only)
Ken Rice, Parsons ES
Susan Roberts, Parsons ES
David Highland, Parsons ES

69026

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CORRECTIVE ACTION SECTION

Richard Clarke
TNRCC
P.O. Box 13087
Austin, Texas 78711-3087

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Parsons ES 721460.06

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Sampling Plan for Evaluation of Background Metals Levels in Soil Types at Camp Stanley Storage Activity

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

CSSA Waste Management Unit Closures
Armstrong Laboratory/OEB
Contract F33615-89-D-4003
Order 126, Mod 1

January 1996

Sampling Plan for Evaluation of Background Metals Levels in Soil Types at Camp Stanley Storage Activity

January 1996

Prepared by

Parsons Engineering Science, Inc.
8000 Centre Park Drive, Suite 200
Austin, Texas 78754

Reviewed and approved by

TNRCC	_____ Name	_____ Date
EPA	_____ Name	_____ Date
CSSA	_____ Name	_____ Date

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AA	Atomic absorption
AFCEE	Air Force Center for Environmental Excellence
As	Arsenic
ASTM	American Society of Testing and Materials
Ba	Barium
BGL	Below ground level
Cd	Cadmium
COC	Chain-of-custody
Cr	Chromium
CSSA	Camp Stanley Storage Activity
Cu	Copper
EPA	U.S. Environmental Protection Agency
Hg	Mercury
I&HW	Industrial and hazardous waste
ICP	Inductively coupled plasma
mg/kg	Milligram per kilogram
MS	Matrix spike
MSD	Matrix spike duplicate
mya	Million years ago
Ni	Nickel
OB	Open burn
OD	Open detonation
Pb	Lead
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
RRS1	Risk reduction standard 1
SWMU	Solid waste management unit
TAC	Texas Administrative Code
TNRCC	Texas Natural Resources Conservation Commission
USDA	United States Department of Agriculture
UTL	Upper tolerance limit
Zn	Zinc

SAMPLING PLAN FOR EVALUATION OF BACKGROUND METALS LEVELS IN SOIL TYPES AT CAMP STANLEY STORAGE ACTIVITY

INTRODUCTION

The Texas Risk Reduction Rules, promulgated in 30 TAC 335 Subchapter S, establish comprehensive, risk-based standards for remediation of soil, groundwater, surface water, and air contamination. These rules apply to all remedial actions undertaken in response to a release or spill of a solid waste or hazardous substance, and they will be followed during closure of solid waste management units (SWMUs) at Camp Stanley Storage Activity (CSSA), Boerne, Texas. There are three alternate levels of environmental remediation:

1. Risk Reduction Standard 1 (RRS1): Closure/remediation to background;
2. Risk Reduction Standard 2 (RRS2): Closure/remediation to health-based standards and criteria; and
3. Risk Reduction Standard 3 (RRS3): Closure/remediation with controls.

Although the closure standard which will be striven for at each SWMU at CSSA has not yet been determined, RRS1 (clean closure) will generally be the first choice. Closure under RRS1 requires comparison of site contaminant levels to background levels for all environmental media. To obtain background metal concentrations for each soil type at CSSA, background surface soil samples must be collected and analytical results must be statistically evaluated. Existing subsurface rock (Glen Rose Formation limestone) analytical data must also be statistically evaluated to determine background metal concentrations in the limestone.

This short plan describes the sampling plan which has been developed to fill the background concentration data gap. Sampling procedures, laboratory methods, quality assurance/quality control (QA/QC), and data validation are also briefly described in this plan and referenced for descriptions of previous sampling procedures and results. Background sampling will be conducted under AL/OEB contract F33615-89-D-4003, order 126.

OBJECTIVE

The objective of the background sampling and analysis at CSSA is to provide a validated and statistically evaluated data set for each native soil, or background, type at CSSA for use in SWMU closures or other work deemed necessary by CSSA. To accomplish this objective, the following is a brief list of work to be performed:

samples were collected in February 1994 as part of the F-14 site closure (ES, 1994), and surface soil samples for three soil types were collected during the B-20 Remedial Investigation (Parsons ES, 1995). These two data sets are described below:

- F-14 Closure Investigation, February 1994 (ES, 1994). Soil samples BKGR-SS1 through BKGR-SS10 were collected from background locations shown on Figure 2. One to two background samples were collected of seven different soil types: Brackett soils, Brackett-Tarrant association, Crawford and Bexar stony soils, Krum complex, Lewisville silty clay, Tarrant association, and Trinity and Frio soils. Soil samples were collected between 0.5 and 1.0 foot below ground surface, and background Glen Rose Formation samples were collected at various depths based on depth to limestone at each location. The depths ranged from 4.5 to 20 feet below ground level (BGL). Soil and rock samples were analyzed for metals by method SW6010, with the exception of nickel (by SW7520). Closure of this site under RRS1 was approved by TNRCC I&HW on November 2, 1995.
- B-20 Remedial Investigation, December 1994 (Parsons ES, 1995). Soil samples BKGR-SS11 through BKGR-SS35 were collected from background locations shown on Figure 2. These background samples consisted of three soil types: Krum complex, Crawford and Bexar stony soils, and Brackett-Tarrant association. These three soil types are found at the B-20 site. Samples were collected between 0.5 and 1.0 foot BGL, and were analyzed for arsenic (SW7062); barium, cadmium, and chromium (SW6010); lead (SW7420 or SW6010); and mercury (SW7471). The report was submitted to TNRCC and EPA in September 1995 for review, and the results were used as a basis for additional work at the B-20 site in a plan of action submitted to the agencies dated 26 October 1995. TNRCC provided one comment regarding public notification, and EPA verbally approved the plan of action in a phone call to Parsons ES on December 12, 1995.

Table 1 shows the soil type and metal concentrations for each of the samples. Background concentrations of arsenic, barium, cadmium, chromium, lead, and mercury were statistically calculated (using the procedure described below) for the Glen Rose Formation limestone, Krum complex, Brackett-Tarrant association, and Crawford and Bexar stony soils, and statistical calculations and results are presented in full in the B-20 Remedial Investigation Report (Parsons ES, 1995).

Based on published maps of the region, only the Upper Glen Rose Formation was thought to outcrop at CSSA. However, based on preliminary geological information (obtained during project work on contract F33615-89-D-4003, order 67), it is believed that the Lower Glen Rose Formation also outcrops at CSSA. This geologic data collection was not completed until 30 November 1995, and the field data has not yet been completely reviewed and evaluated. The data are thus considered preliminary.

Sample ID	Soil Type[1]	Arsenic SW6010/SW7062[2] (mg/kg)	Barium SW6010 (mg/kg)	Cadmium SW6010 (mg/kg)	Chromium SW6010 (mg/kg)	Lead SW6010/SW7420[3] (mg/kg)	Mercury SW7471 (mg/kg)	Nickel SW7520 (mg/kg)	Zinc SW6010 (mg/kg)	Copper SW6010 (mg/kg)
BKGR-SS35	Crawford and Bexar stony soils	<2.5	39	<1.9	3.6	8.7	<0.01	NA	NA	NA

1 From Soil Survey for Bexar County, Texas, USDA Soil Conservation Service, June 1966
2 Samples BKGR-SS1 through BKGR-SS10 were analyzed for arsenic using SW6010. Samples BKGR-SS11 thru BKGR-SS35 were analyzed for arsenic using SW7062.
3 Method SW6010 was used if lead levels in sample would require dilution to analyze by method SW7420. Samples BKGR-SS1 through BKGR-SS10 were all analyzed for lead using SW6010.
4 Duplicate of preceeding sample.
5 Data qualified with a "J" during validation; value should be considered estimated.
mg/kg = milligrams per kilogram
NA=Not analyzed

Table 2. Comparison of Upper and Lower Glen Rose Formation Background Metals Levels Camp Stanley Storage Activity, Texas

Sample ID and depth (feet)	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Unit Member
BKGR-SB1 (4.5)	2.2 U	3.5	0.54 U	2.0 U	58	0.03 U	Lower
BKGR-SB2 (10)	2.1 U	5.5	0.52 U	2.0	48	0.03 U	Lower
BKGR-SB3 (19.5)	2.2 U	4.5	0.54 U	2.2	52	0.03 U	Lower
BKGR-SB9 (5)	2.0 U	7.8	0.51 U	2.0	40	0.03 U	Lower
BKGR-SB10 (20)	2.2 U	6.4	0.55 U	3.7	44	0.03 U	Lower
BKGR-SB4 (17.5)	2.1 U	5.3	0.52 U	2.2	42	0.03 U	Upper
BKGR-SB5 (10)	2.1	6.9	0.53 U	2.7	39	0.03 U	Upper
BKGR-SB6 (18)	4.3	6.6	0.53 U	2.4	36	0.03 U	Upper
BKGR-SB7 (24)	2.7	4.1	0.52 U	2.5	51	0.03 U	Upper
BKGR-SB8 (5)	2.1 U	3.8	0.54 U	2.0 U	46	0.03 U	Upper
BKGR-SB9 (5)	2.0 U	7.8	0.51 U	2.0	40	0.03 U	Lower
BKGR-SB10 (20)	2.2 U	6.4	0.55 U	3.7	44	0.03 U	Lower
Lower Glen Rose Range	ND	3.5-7.8	ND	ND-3.7	36-51	ND	
Upper Glen Rose Range	ND-4.3	4.1-6.9	ND	ND-2.7	40-58	ND	

ND = Not detected (also designated with the "U" qualifier).

Locations were chosen away from identified or suspected SWMUs and, where possible, near identifiable landmarks. If sample locations are discovered to lie within unidentified SWMUs, the location will be changed accordingly.

SAMPLING PROCEDURES

Tentative background sampling locations are shown on Figures 3 through 10. The field team leader and a representative of CSSA familiar with present and past property uses will make the final determination of sampling locations in the field. All background surface soil samples will be collected at a depth of approximately 0.5 foot, as in previous investigations. The surface soil will be cleared away with a decontaminated shovel or trowel. The sample will then be collected with a decontaminated trowel into a stainless steel bowl. The soil will be mixed to collect a homogeneous sample, and any rocks or vegetation will be removed from the sample. The sample will then be transferred into the appropriate sample jars and prepared for shipment.

All sampling equipment will be decontaminated prior to use with an Alconox® soap scrub wash, potable water rinse, and American Society of Testing and Materials (ASTM) Type II reagent grade water rinse. Decontaminated equipment that is not used immediately after air drying will be wrapped with aluminum foil for storage or transport.

Samples collected from new sample locations will be numbered consecutively, starting with BKGR-SS36 (the last background sample collected was BKGR-SS35). All samples will be collected into their appropriate glass bottles with Teflon-lined lids. Sample bottles will be new and will be supplied by the analytical laboratory. Sample labels will be affixed to each container to identify the collector's name, date and time of collection, sample number, and analysis to be performed.

Sample containers will be placed on ice for storage and shipment. Individual sample bottles will be wrapped in bubble pack and placed in sealed plastic bags to prevent breakage during shipment. The bags will be placed into insulated shipping coolers with ice to maintain a proper temperature (4 degrees Celsius). A chain-of-custody (COC) record describing the contents of the cooler will be placed in a sealed plastic bag and taped to the upper lid of the cooler.

Standard sample COC procedures will be maintained. Samples will be kept in a secured area when not in the immediate possession of the sampler. Custody seals will be placed on the coolers to prevent tampering during shipment. The sealed sample coolers will be shipped via overnight delivery.

LABORATORY ANALYSIS

Analytical techniques will follow procedures described in *Test Methods for Evaluating Solid Waste*, U.S. Environmental Protection Agency, SW-846 and the HQ Air Force Center for Environmental Excellence (AFCEE) *Quality Assurance Project Plan (QAPP)* (AFCEE, 1996). All data will be analyzed by Terra Laboratory in League City, Texas, and reported using level 3 quality control and reporting requirements and the

Table 4. Laboratory Analytical Methods, Method Detection Limits, and Groundwater Protection Standards Camp Stanley Storage Activity, Texas

Analyte	Analytical Method[1]	Method Detection Limit[2] (mg/kg)	Groundwater Protection Standard[3] (mg/kg)	AFCEE QAPP Required PQL (mg/kg)
Arsenic	SW7060A	0.25	5	0.5
Barium	SW6010	0.7	200	2
Cadmium	SW7131	0.025	0.5	0.1
Chromium	SW6010	0.7	10	7
Copper	SW6010	0.75	NS	6
Lead	SW7421	0.025	1.5	0.5
Mercury	SW7471	0.05	0.2	0.1
Nickel	SW6010	1.2	10	15
Zinc	SW6010	0.05	NS	2

NS = Not specified

[1] *Test Methods for Evaluating Solid Waste* (EPA SW-846).

[2] Detection limits reported by Terra Laboratories, League City, Texas.

[3] Non-residential groundwater protection standards (comparison criteria for site closure under RRS2) are provided to show that method detection limits are lower than these standards.

described in the QAPP appended to the B-20 Partial Facility Closure Plan (ES, 1994b) will be followed during validation of the background sample data.

STATISTICAL EVALUATION

Background concentrations will be calculated using methods presented in two U.S. Environmental Protection Agency documents:

- *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities*, Interim Final Guidance, February 1989 (EPA, 1989).
- *Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities*, Draft Addendum to Interim Final Guidance, July 1992 (EPA, 1992b).

The background concentrations will be calculated with a Tolerance Interval test, using a one-sided tolerance interval to estimate the upper bound on a large fraction of the concentration distribution. Use of the Tolerance Interval test for this purpose was recently approved by the TNRCC in a similar study at a nearby U.S. Air Force facility (Kelly AFB, 1994), and this test was also used in the background metal concentration evaluation for the B-20 site at CSSA (Parsons ES, 1995). Furthermore, the upper tolerance limit (UTL) is referenced in the EPA documents listed above as an approved method to compare background monitoring data to compliance wells (EPA, 1989 and 1992). For background soil data, the UTL predicts the upper range of background concentrations from a relatively small data set.

The UTL is designed for use on data that consist mainly of positive detections. Since background data sets typically contain many non-detects, several tests and procedures must be conducted on those sets of data. Non-detect data must be evaluated and manipulated in a manner depending on the percentage of non-detects within the sample population. After screening for non-detects, the data must be screened for normality. The UTL assumes a normal or lognormal distribution. Specific procedures which will be used to evaluate background levels are described in detail in the B-20 Remedial Investigation Report (Parsons ES, 1995).

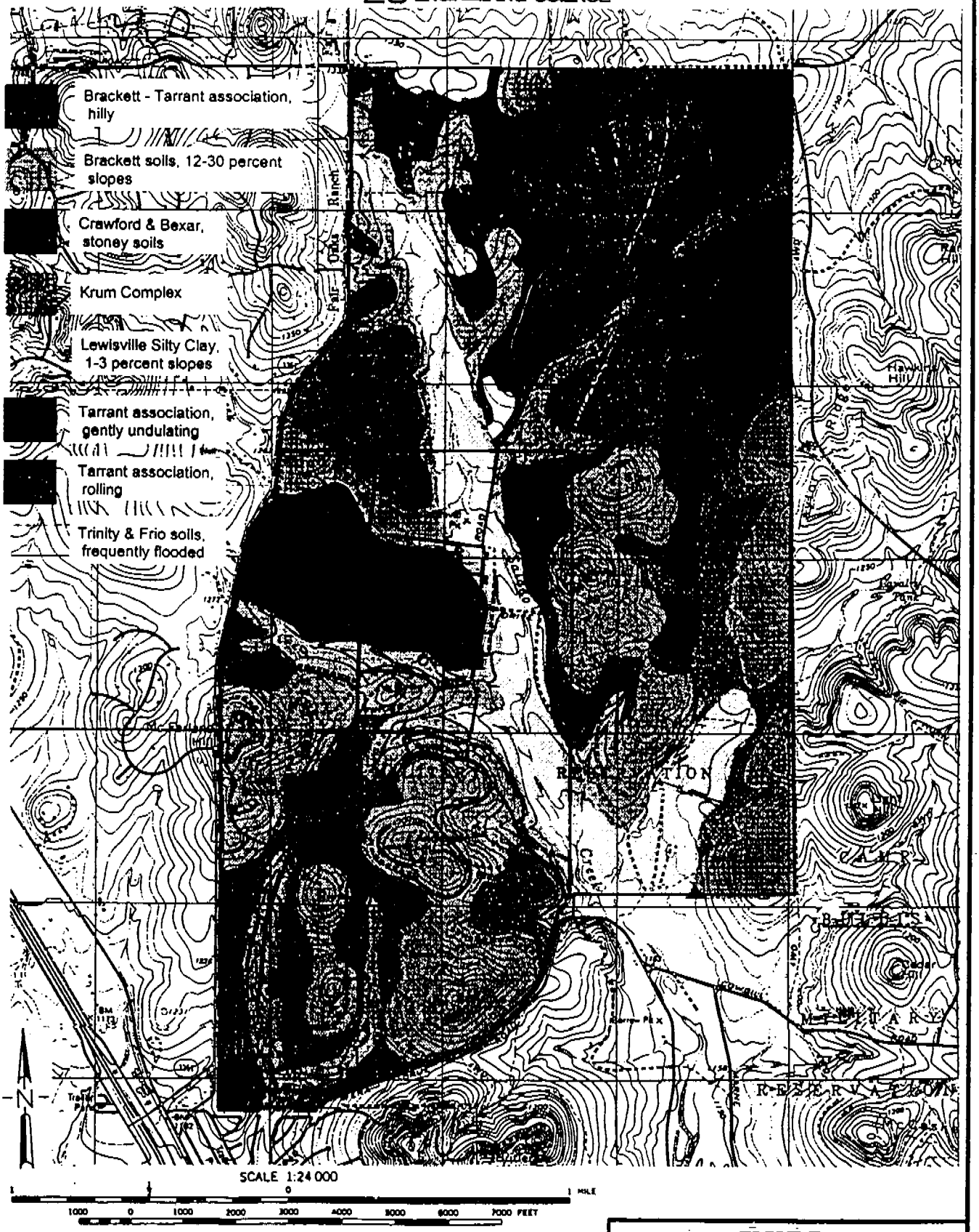
REPORTING

Background sampling and statistical evaluation results will be presented in a technical memorandum/report to CSSA. The document will include a complete description of sampling procedures, sample location maps, a data validation report, all background analytical data, and all statistical calculations.

REFERENCES

AFCEE, 1996. *Quality Assurance Project Plan*, Version 1.0, HQ Air Force Center for Environmental Excellence. January 1996.

EPA, 1988. *Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses*. U.S. Environmental Protection Agency, 1988.



VAN RAUB, TEX.
29098-F8-TF-024
1991
DMA 8243 I NW-SERIES V882

CAMP BULLIS, TEX.
29098-F5-TF-024
1992
DMA 8243 I NW-SERIES V882

SOURCE: USGS 7.5' QUADRANGLES

FIGURE 1

SOILS MAP

MARCH 1995

CAMP STANLEY STORAGE ACTIVITY

SOILS 3/8/95

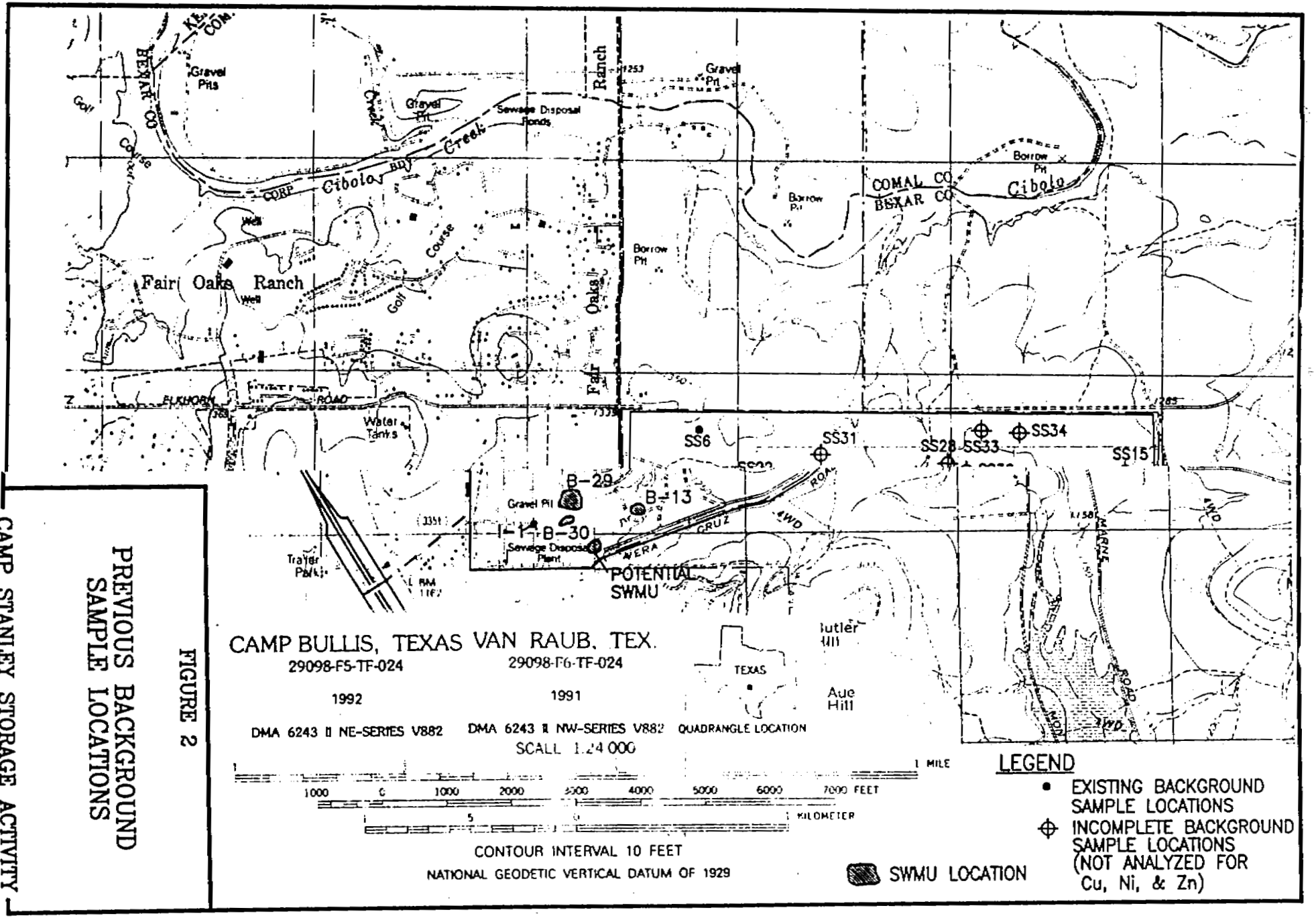


FIGURE 2

PREVIOUS BACKGROUND SAMPLE LOCATIONS

CAMP STANLEY STORAGE ACTIVITY

1/17/96

17

BEXAMP9 1/15/96

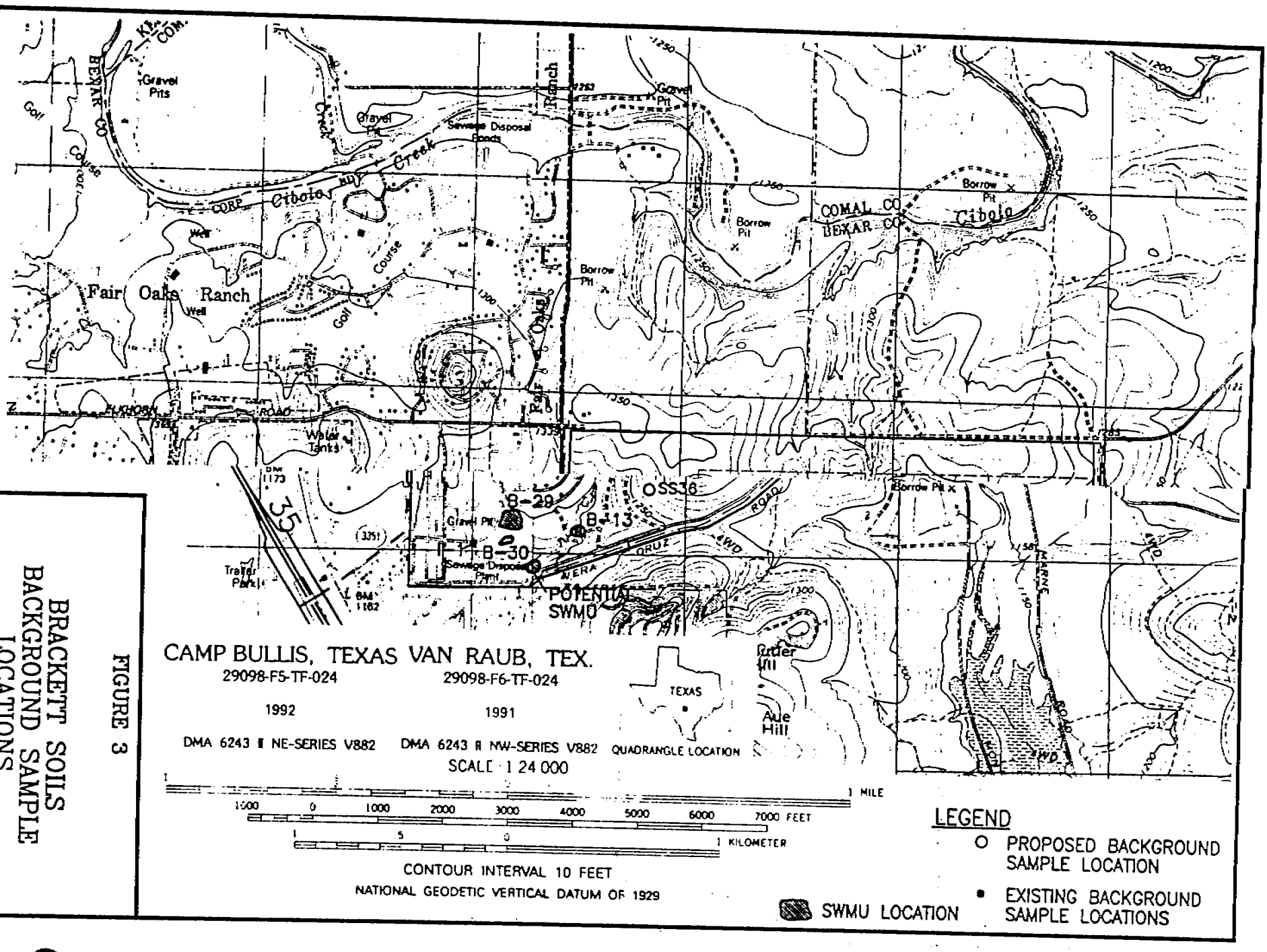


FIGURE 3
BRACKETT SOILS
BACKGROUND SAMPLE
LOCATIONS

CAMP STANLEY STORAGE ACTIVITY
1/17/96

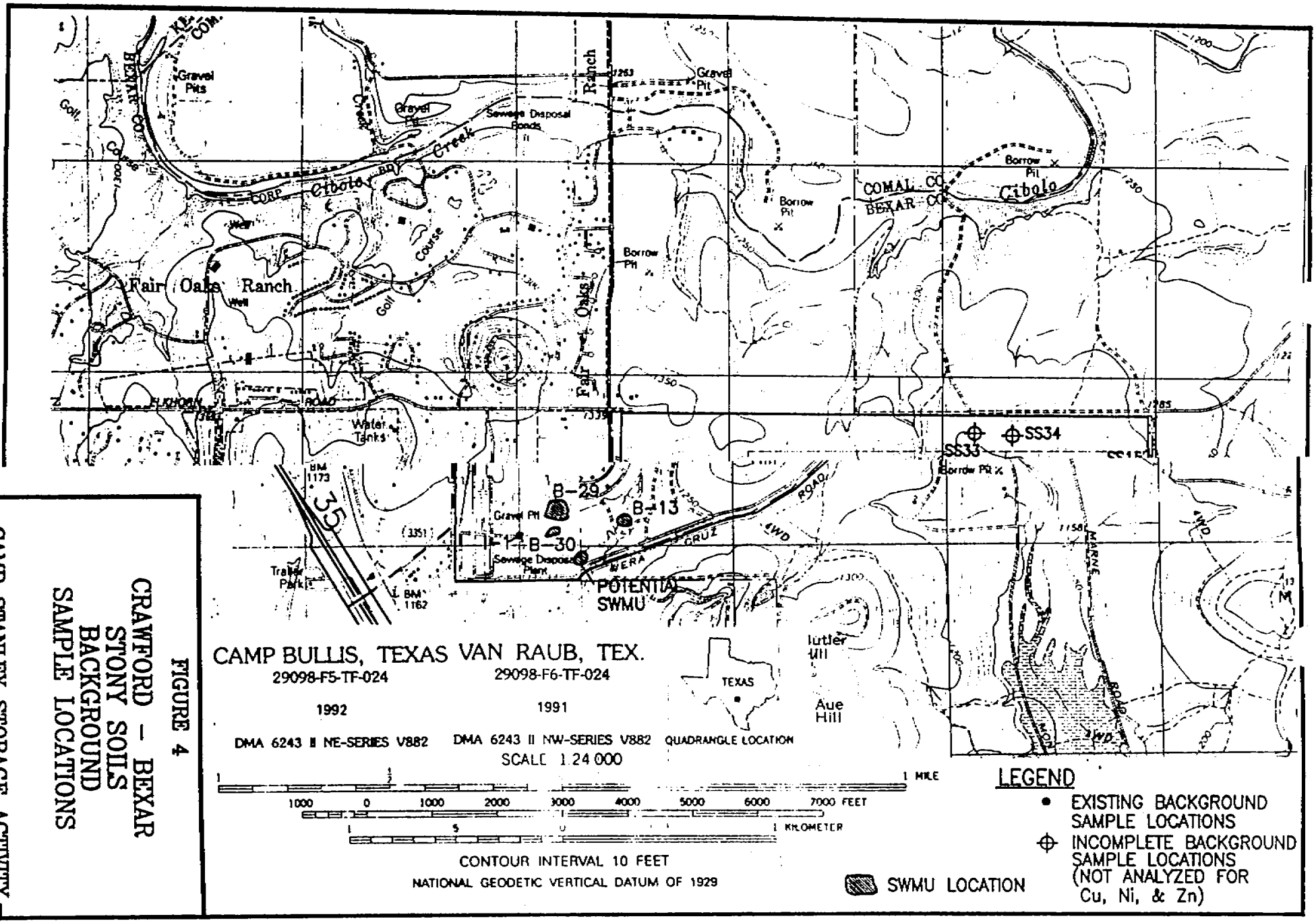
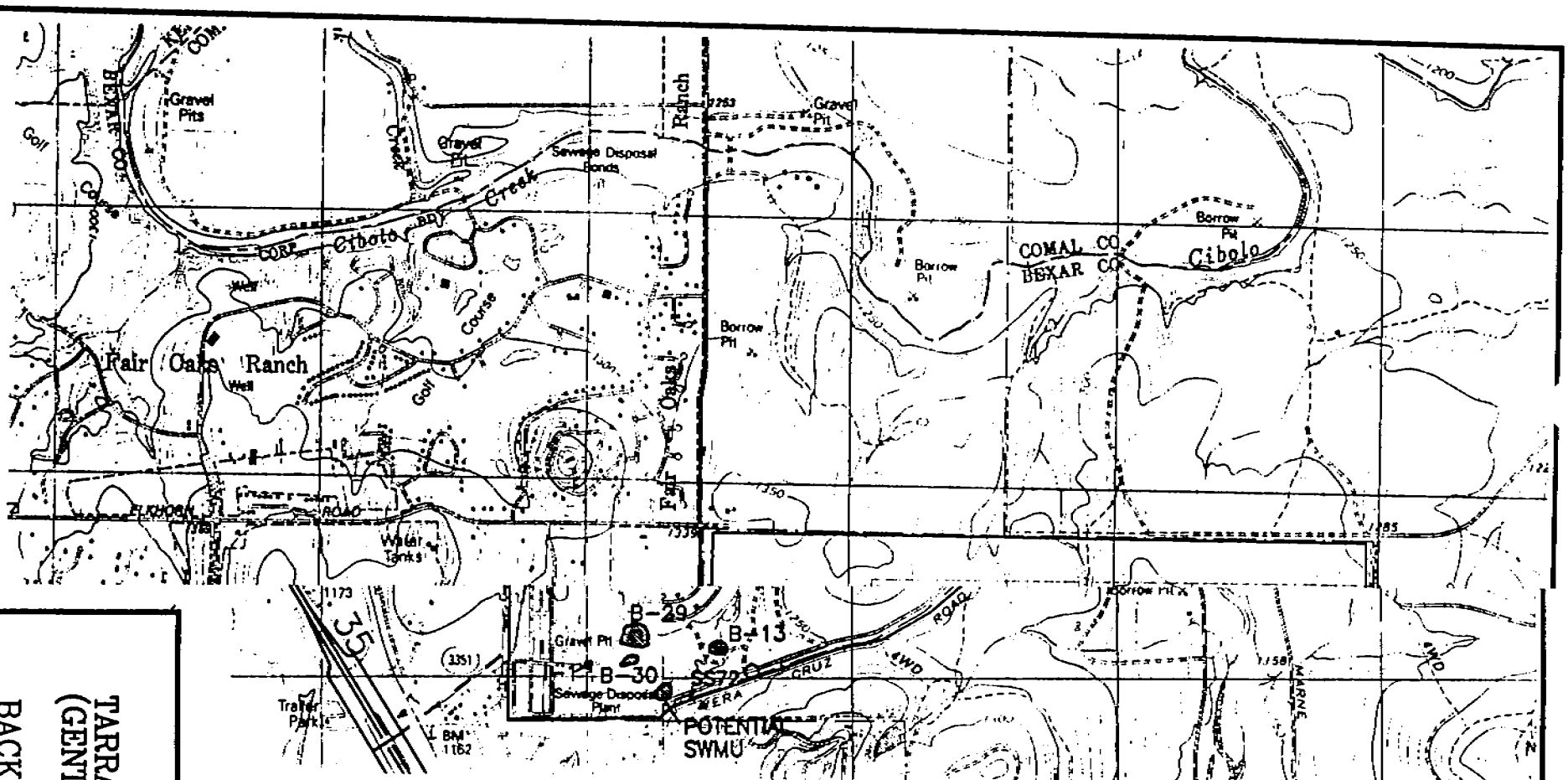


FIGURE 4

CRAWFORD – BEXAR
STONY SOILS
BACKGROUND
SAMPLE LOCATIONS



CAMP BULLIS, TEXAS VAN RAUB, TEX.

29098-F5-TF-024 29098-F6-TF-024

1992 1991

DMA 6243 II NE-SERIES V882 DMA 6243 II NW-SERIES V882 QUADRANGLE LOCATION

SCALE 1:24 000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

LEGEND

- PROPOSED BACKGROUND SAMPLE LOCATION
- EXISTING BACKGROUND SAMPLE LOCATION
- SWMU LOCATION

FIGURE 5

TARRANT ASSOCIATION (GENTLY UNDULATING) SOILS BACKGROUND SAMPLE LOCATIONS

CAMP STANLEY STORAGE ACTIVITY

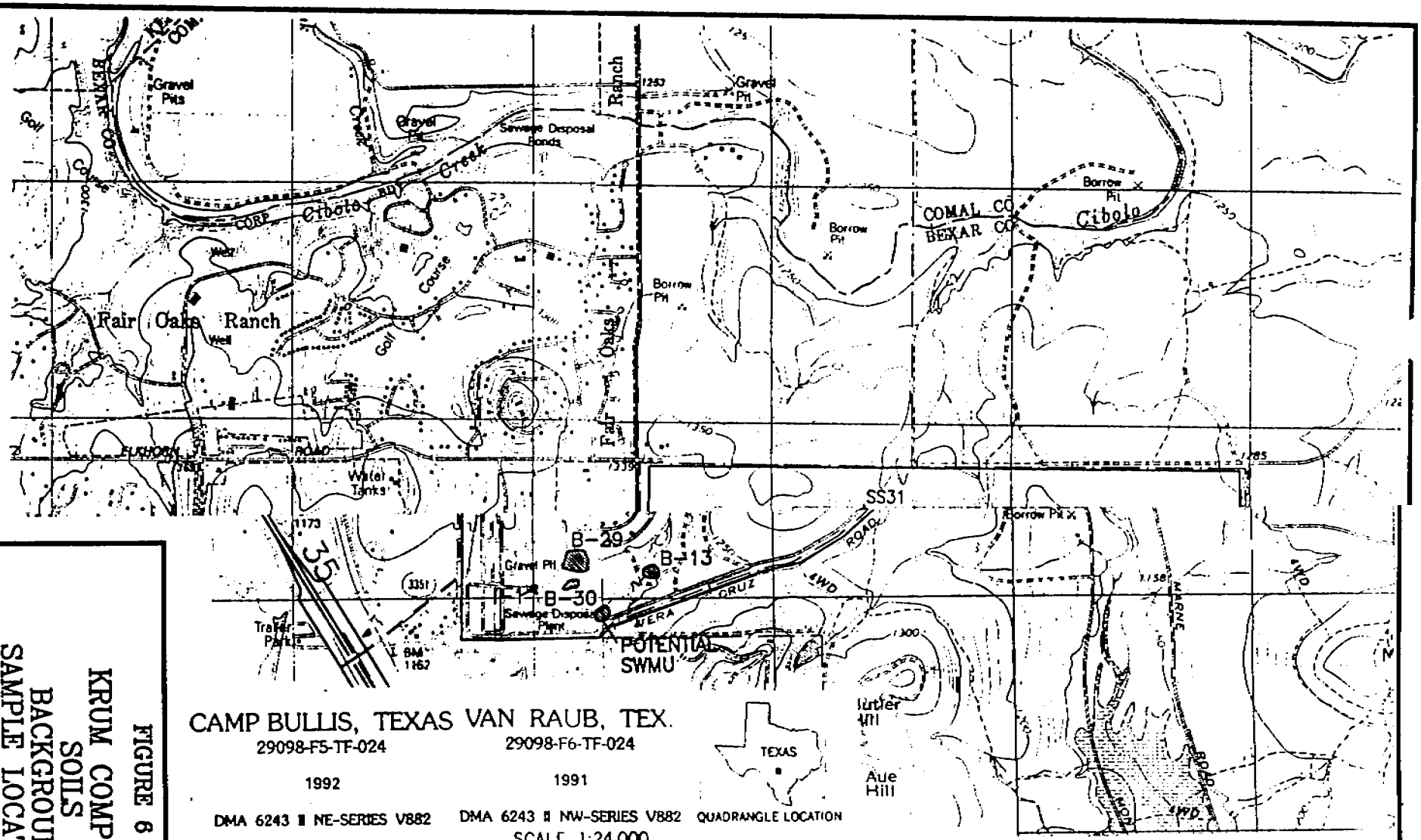


FIGURE 6
KRUM COMPLEX
SOILS
BACKGROUND
SAMPLE LOCATIONS

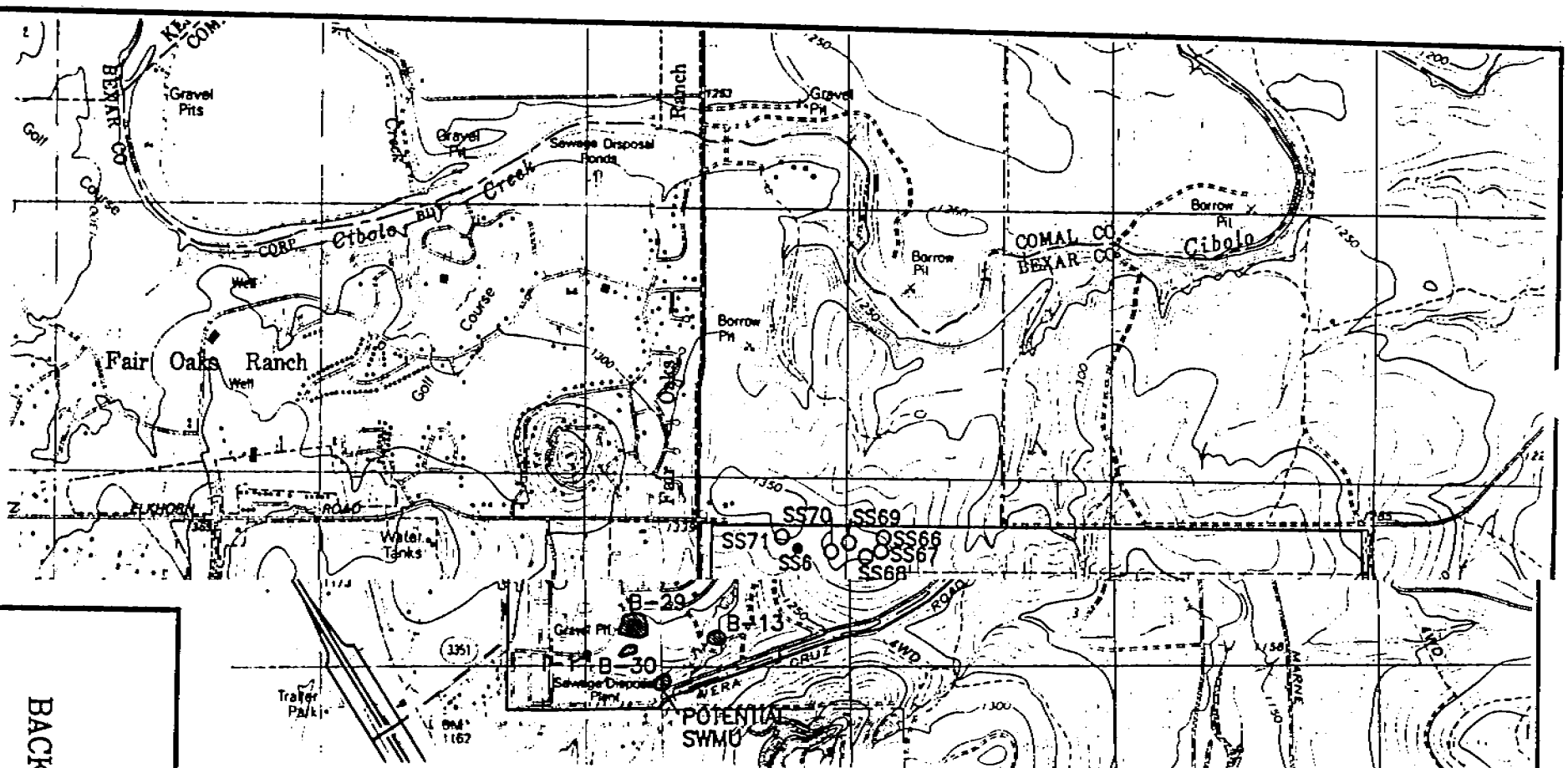


FIGURE 7
LEWISVILLE SILTY CLAY BACKGROUND SAMPLE LOCATIONS

CAMP STANLEY STORAGE ACTIVITY
27
1/17/96

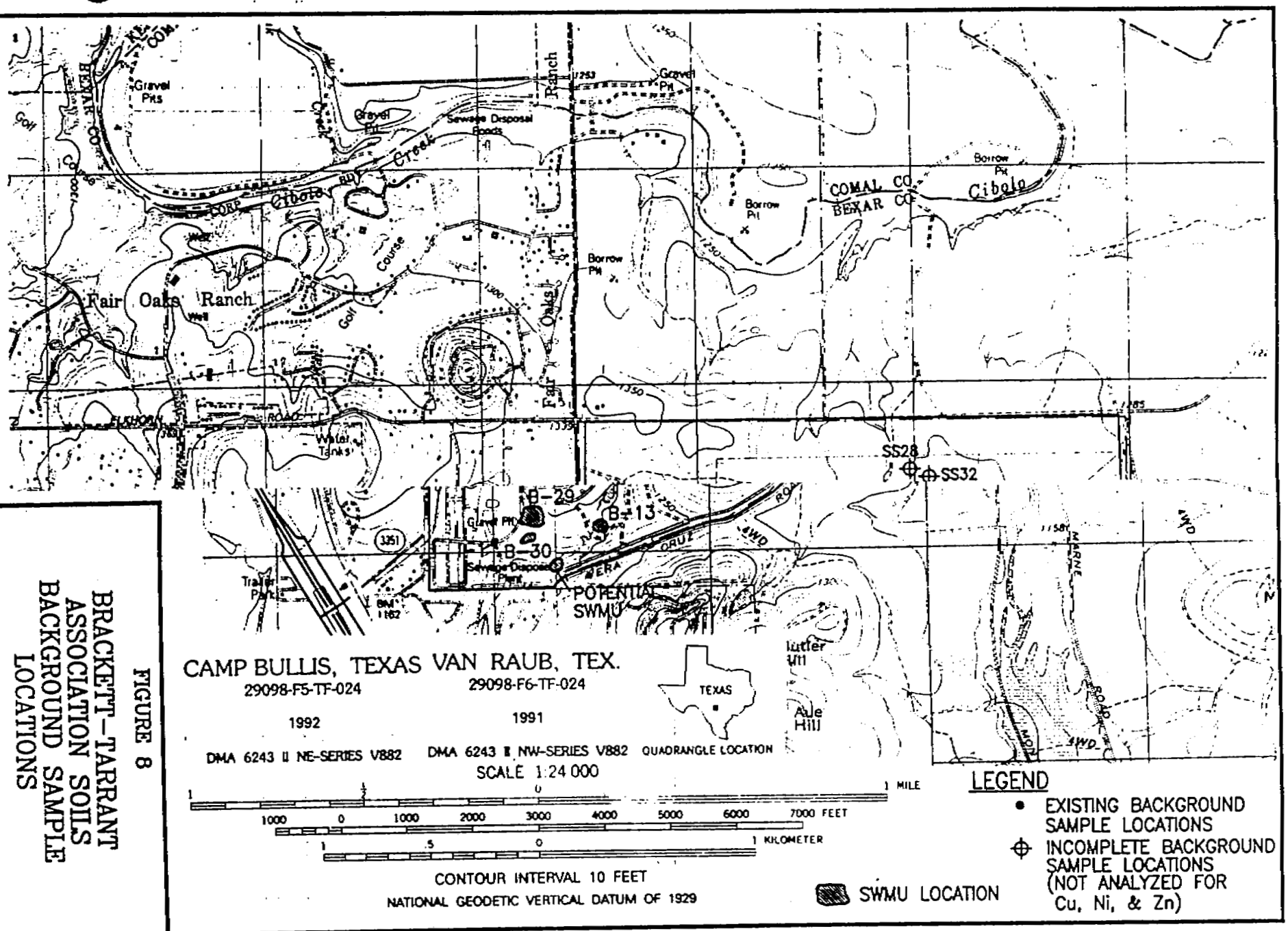


FIGURE 8

BRACKETT-TARRANT ASSOCIATION SOILS BACKGROUND SAMPLE LOCATIONS

CAMP STANLEY STORAGE ACTIVITY

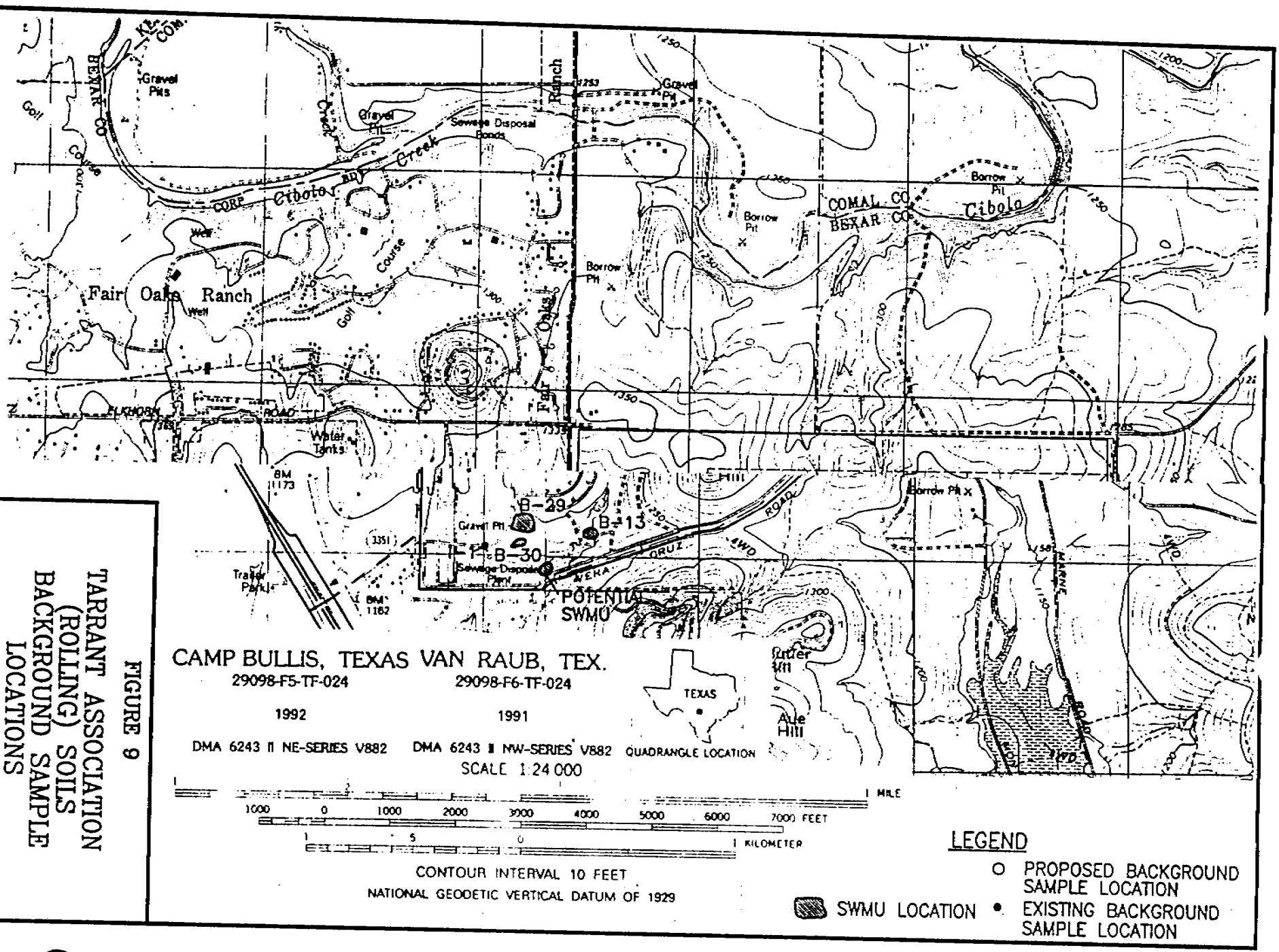


FIGURE 9

TARRANT ASSOCIATION (ROLLING) SOILS BACKGROUND SAMPLE LOCATIONS

CAMP STANLEY STORAGE ACTIVITY

1/17/96

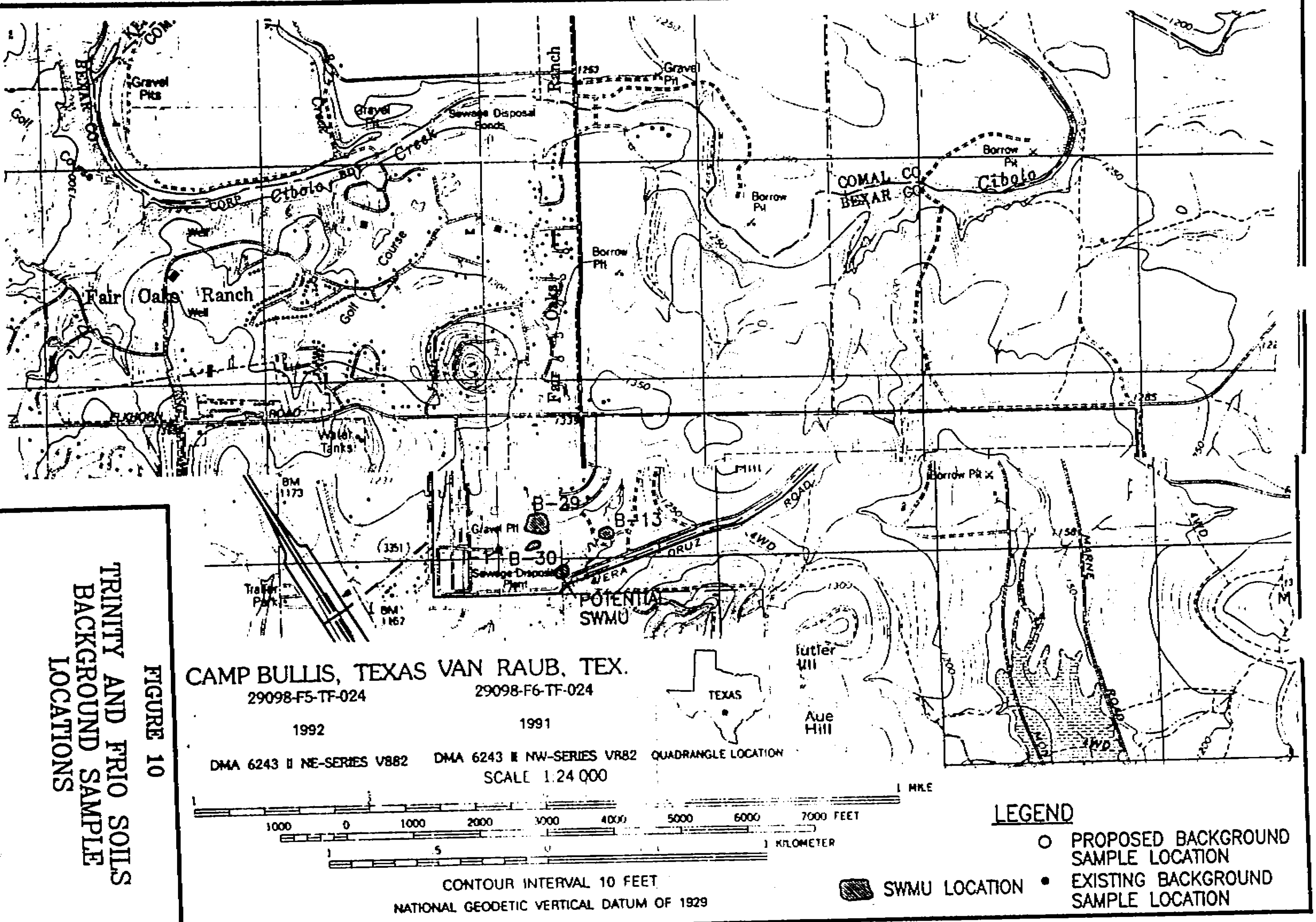


FIGURE 10
TRINITY AND FRIO SOILS BACKGROUND SAMPLE LOCATIONS