LA-UR-11-04610

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Title: SEISMIC HAZARDS EVALUATION OF THE LOS ALAMOS NATIONAL LABORATORY
24 February 1995

Volume 3 of 3
(consists of 3 volumes)

Author(s): Steven L. Reneau
Leigh S. House
Ivan Wong
Keith Kelson

Intended for: Reference



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Form 836 (7/06)

107°00' 106°30' 106°00' 105°30'

36°30' 36°00' 35°30' 35°00'

COLORADO PLATEAU TRANSITION ZONE

SOUTHERN ROCKY MOUNTAIN

JEMEZ VOLCANIC PROVINCE

RIO GRANDE RIFT

GREAT PLAINS

SOUTHERN ROCKY MOUNTAIN

Colorado Plateau

San Luis Basin

Española Basin

Albuquerque Basin

Jemez Mountains

Valles Caldera

Sierra Nacimiento

Sangre de Cristo Mountains

Rio Grande

Taos

Santa Fe

Pecos

Cuba

Albuquerque

Los Alamos County

Sandia Mountains

Four Hills

Tijeras

Monte Largo

Lamy

GALLINA FAULT

CAÑONES FAULT

LOBATO MESA FAULT ZONE

LA CAÑADA DEL AMAGRE-CLARA PEAK FAULT ZONE

FAULTS OF BLACK MESA EMBUDO FAULT

SEGMENT 2 FAULT

CRISTO SEGMENT 3

DE SANGRE SEGMENT 4

LOS CORDOVAS FAULT

SAWYER CANYON FAULT

PUYE FAULT SYSTEM ZONE

PAJARITO FAULT SYSTEM

POJOAQUE FAULT

NAMBE FAULT

PECOS FAULT

PICURIS FAULT

NACIMIENTO FAULT

YSIDRO FAULT

JEMEZ-SAN Jemez fault

San Ysidro fault

SAN FELIPE FAULT ZONE

Santa Ana Section

Algodones Section

SAN FRANCISCO ?? FAULT

LA BAJADA ? FAULT

CAÑONCITO FAULT

San Pedro/Ortiz

PUERCO FAULT

WEST MESA FAULT ZONE

SANDIA - RIO GRANDE FAULT ZONE

TIJERAS

A B C D E F G

LEGEND

Fault, solid line where location and age of most-recent movement are well constrained; dashed line where location and age are inferred; dotted line where location is concealed and age is inferred. Although there are many faults in the map area, only faults with proven or suspected late Pliocene or Quaternary movement are shown. Many faults in areas of Miocene and older bedrock not shown because of lack of younger deposits to assess faulting or other deformation. Diamonds show locations of segment boundaries used in hazard analysis (see Figures 7-25a through 7-25l for Pajarito fault system). Age of most-recent movement shown by symbol on downdropped side of fault (queried where uncertain)

- Holocene (past 10 ka)
- Late Pleistocene (10 ka to 150 ka)
- Middle Pleistocene (150 ka to 750 ka)

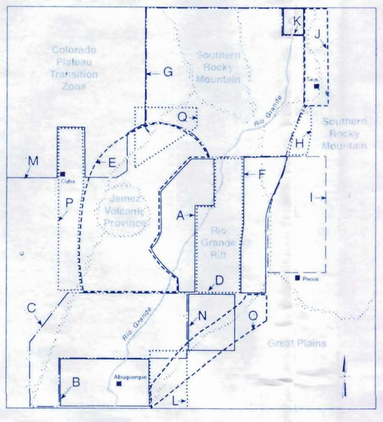
Fault, as above, except age of most-recent movement shown by symbol on downdropped side of fault (queried where uncertain):

- Early Pleistocene (0.75 Ma to 20 Ma) or Pliocene (2.0 to 5.0 Ma)
- Age unknown

Seismotectonic Province boundary

(A) Locality discussed in text (Section 4.1.3)

INDEX MAP OF SOURCES



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J.	Menges, 1990
K.	Menges, 1985
L.	Kelley & Northrop, 1975
M.	Manley et al., 1987
N.	Bachman, 1975
O.	Lisenbee et al., 1979
P.	Woodward, 1987
Q.	Gonzalez & Dethier, 1991

N

0 10 20 km

Contour Interval 200 feet

Base map from USGS Albuquerque, Aztec, Raton, and Santa Fe, 1: 250,000

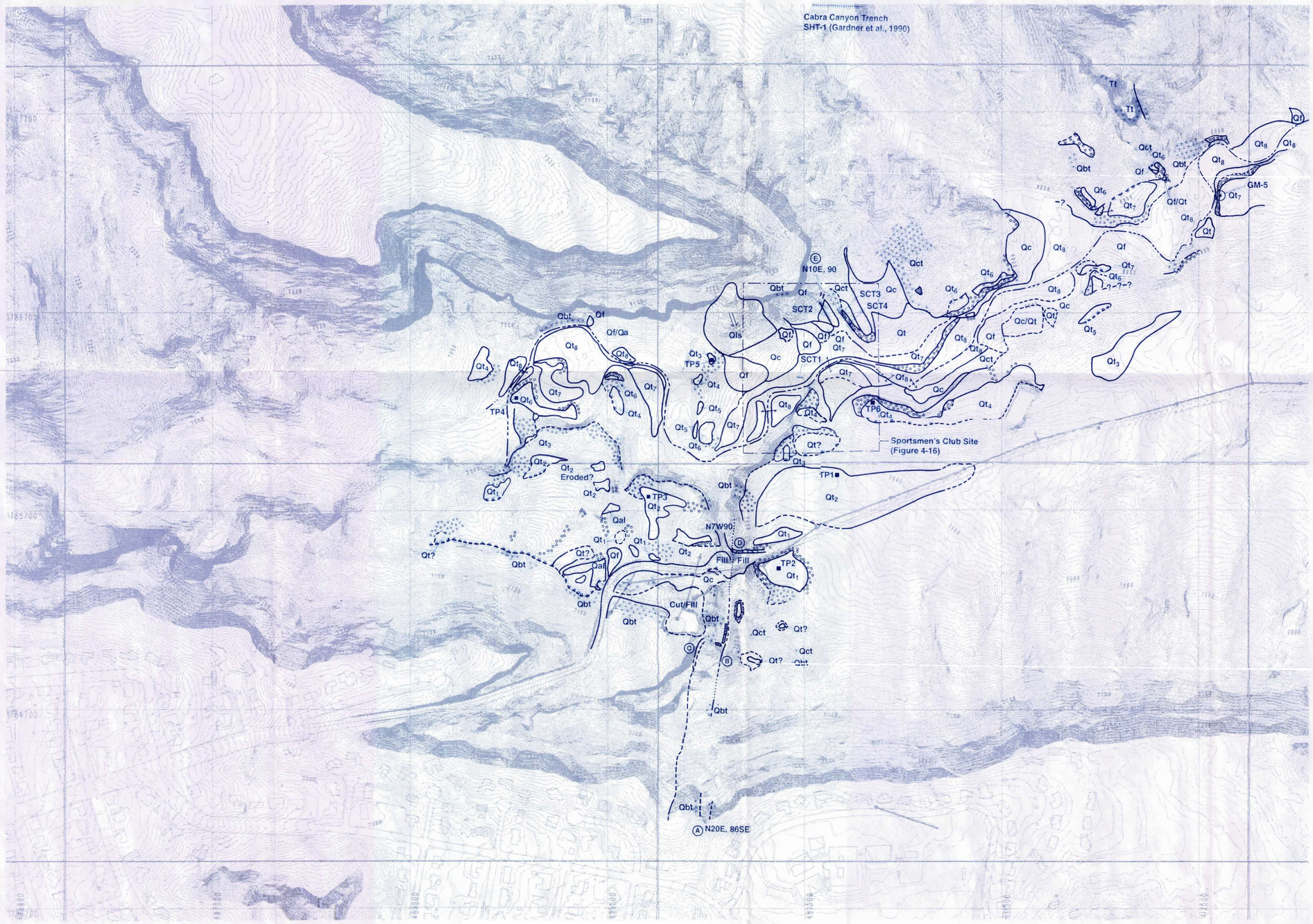
Plate 1

MAP OF QUATERNARY AND PLIOCENE FAULTS AND SEISMOTECTONIC PROVINCES IN THE LANL REGION

Project No. 91C0509	Los Alamos Seismic Hazards

Woodward-Clyde Federal Services

SK9423-A9500/020795/gos



LEGEND

- Qt_8
- Qt_7
- Qt_6
- Qt_5
- Qt_4
- Qt_3
- Qt_2
- Qt_1

Late Quaternary fluvial terrace surfaces
Qt_1 – oldest · · · , Qt_8 – youngest

- Qc — Colluvial deposit
- Qls — Landslide
- Qf — Fan deposit
- Qa — Alluvial deposit
- Terrace gravel
- Contact (dash indicates buried or uncertainty)
- Bedrock Outcrop (Qct - Cerro Toledo, Qbt - Bandelier Tuff, Tt - Tschicoma Formation)
- Back edge of terrace surface (dash indicates buried or uncertain)
- Fault, solid where known or well constrianed, dashed where inferred, dotted where buried
- TP5 — Soil test pit
- SCT1 — Trench location, Sportsmen's Club Site
- GM-5 — Charcoal sample location (collected by S. Reneau, LANL)
- A — Locality discussed in text

Note: Base map from Facility for Information Management, Analysis and Display (FIMAD), Los Alamos National Laboratory

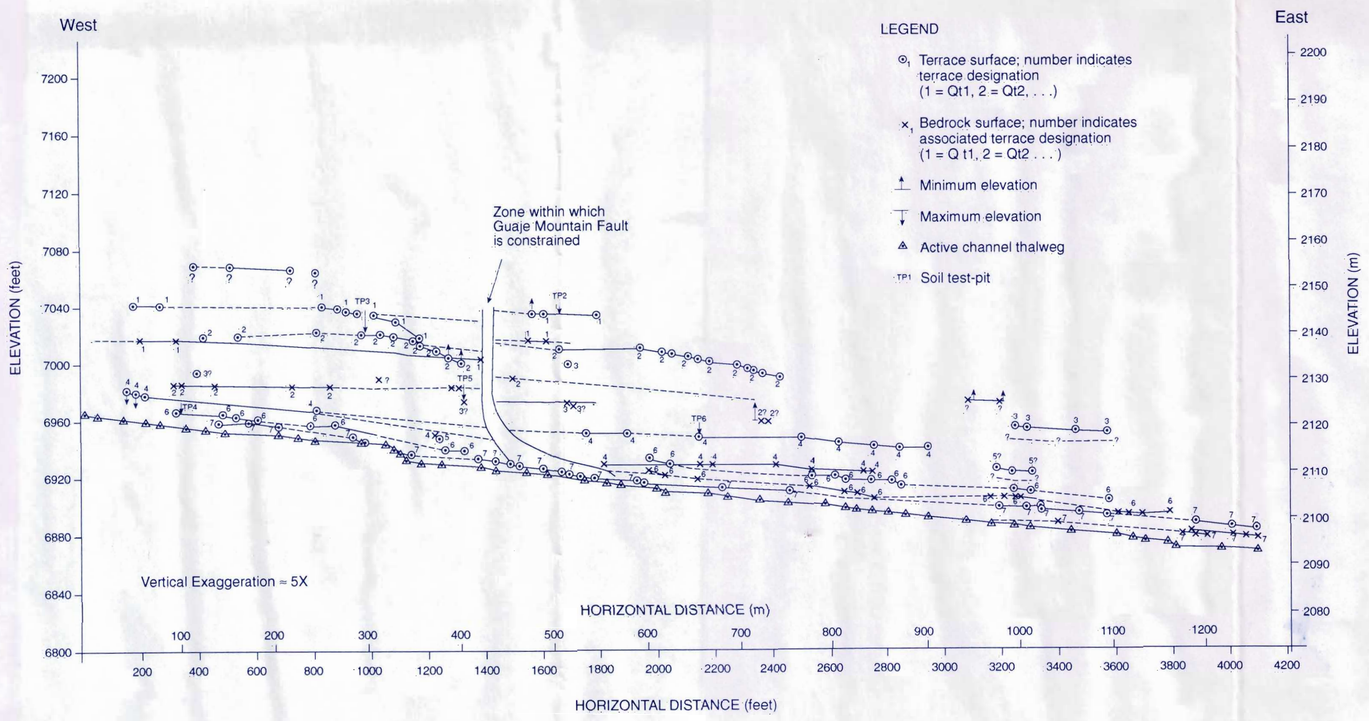


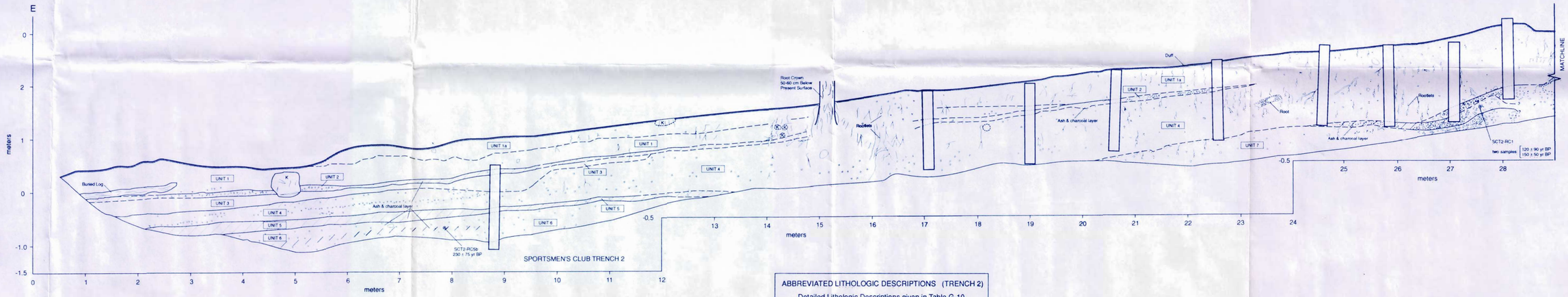
Plate 10

MAP AND LONG-PROFILES OF FLUVIAL TERRACES AND SURFICIAL DEPOSITS, RENDIJA CANYON AREA

Project No. 91C0509	Los Alamos Seismic Hazards

Woodward-Clyde Federal Services

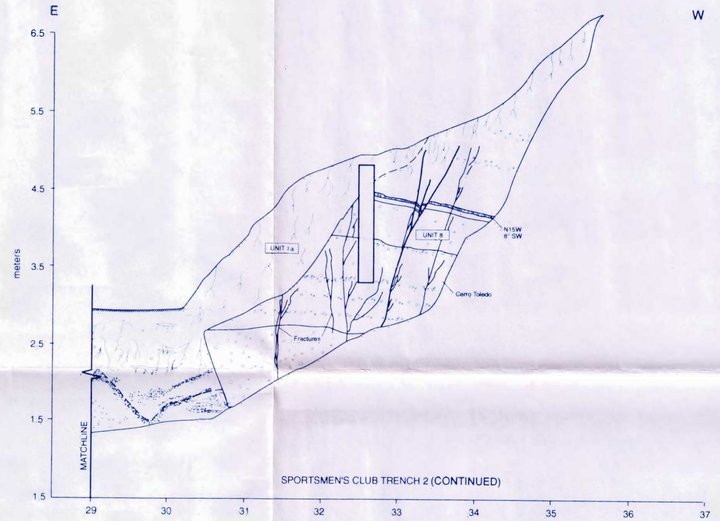
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ABBREVIATED LITHOLOGIC DESCRIPTIONS (TRENCH 2)

Detailed Lithologic Descriptions given in Table G-10

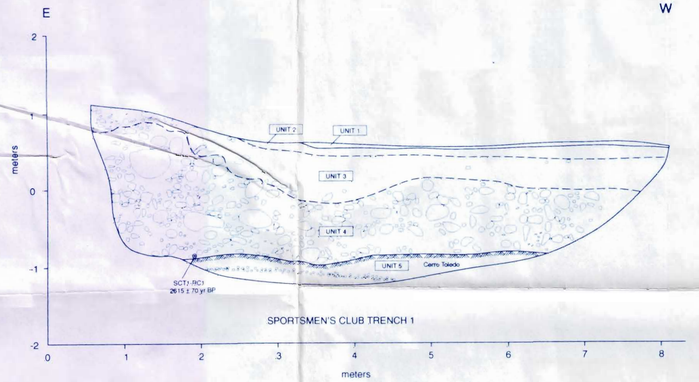
Unit 1:	Alluvium
Unit 1a:	Alluvium
Unit 2:	Alluvium, burn layer 1
Unit 3:	Alluvium
Unit 4:	Alluvium
Unit 5:	Alluvium
Unit 6:	Alluvium
Unit 7:	Alluvium
Unit 8:	Cerro Toledo bedrock

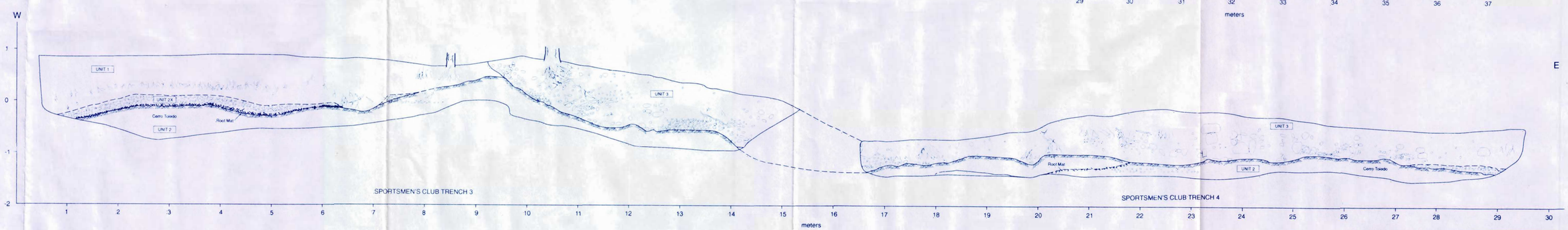


ABBREVIATED LITHOLOGIC DESCRIPTIONS (TRENCH 1)

Detailed Lithologic Descriptions given in Table G-9

Unit 1:	Alluvium/overbank deposits
Unit 2:	Alluvium/overbank deposits
Unit 3:	Alluvium/overbank deposits
Unit 4:	Alluvium/channel deposit
Unit 5:	Cerro Toledo bedrock





LEGEND

- SCT1-1 2615 ±70 yr BP — Radiocarbon sample. Age in radiocarbon years with ±1σ. See Table 4-1 for details and calendar corrected ages.
- Fault, dashed where approximate or inferred
- Contact, dashed where approximate
- Fractures
- K — Krotovina (filled animal burrow or root cast)
- Clasts

ABBREVIATED LITHOLOGIC DESCRIPTIONS (TRENCHES 3 and 4)

Detailed Lithologic Descriptions given in Table G-11

Unit 1:	Colluvium/slope wash
Unit 2:	Cerro Toledo bedrock
Unit 2x:	Colluvium
Unit 3:	Alluvium

Plate 11

SPORTSMEN'S CLUB TRENCHES 1, 2, 3, AND 4

Project No. 91C0509	Los Alamos Seismic Hazards

Woodward-Clyde Federal Services

COLORADO PLATEAU TRANSITION ZONE

SOUTHERN ROCKY MOUNTAIN

JEMEZ VOLCANIC PROVINCE

RIO GRANDE RIFT

SOUTHERN ROCKY MOUNTAIN

GREAT PLAINS

Colorado Plateau

San Luis Basin

Albuquerque Basin

Española Basin

Los Alamos County

Valles Caldera

Jemez Mountains

Sierra Nacimiento

Sandia Mountains

Cuba

Albuquerque

Santa Fe

Pecos

Taos

GALLINA FAULT

CAÑONES FAULT

EL CANADO DEL AMARGO-PEAK FAULT ZONE

FAULTS OF BLACK MESA

EMBUDO FAULT

LOS CORDOVAS FAULT

Rio Grande

Sangre de Cristo Mountains

CASTO SEGMENT

TAOS SEGMENT

PAJARITO FAULT

PAJARITO FAULT SYSTEM

JEMEZ MOUNTAINS FAULT

NACIMIENTO FAULT

SAN YSIDRO FAULT

JEMEZ-SAN YSIDRO fault

SAN FELIPE FAULT ZONE

Santa Ana Section

Section

SAN FRANCISCO ? FAULT

BAJADA FAULT

LA BAJADA FAULT ZONE

POJOAQUE FAULT

NAMBE FAULT

PECOS FAULT

PICURIS FAULT

CAÑONCITO FAULT

San Pedro/Ortiz

TUERAS

Monte Largo

Tres Pas

Four Hills

PUERCO FAULT

WEST MESA FAULT ZONE

SANDIA - RIO GRANDE FAULT ZONE

Lamy

LEGEND

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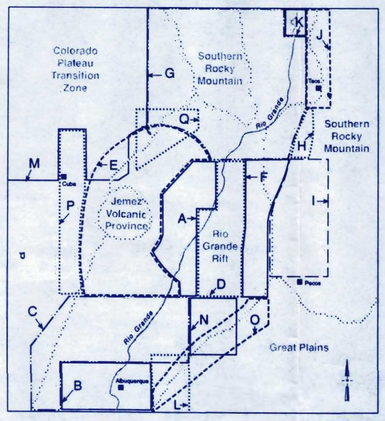
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- Age unknown

Seismotectonic Province boundary

Locality discussed in text (Section 4.1.3)

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N.	Bachman, 1975
O.	Lisenbee et al., 1979
P.	Woodward, 1987
Q.	Gonzalez & Dethier, 1991

MAGNITUDE

0.0	
1.0	
2.0	
3.0	
4.0	
5.0	
No Measure	

0 10 20 km

Base map from USGS Albuquerque, Aztec, Raton, and Santa Fe. 1: 250,000

Plate 12

RELOCATED EARTHQUAKES, QUATERNARY AND PLIOCENE FAULTS AND SEISMOTECTONIC PROVINCES IN THE LANL REGION

Project No. 91C0509

Los Alamos Seismic Hazards

Woodward-Clyde Federal Services

SK9423-A9500/020795/gos

106°30"

106°7'30"

36°00'

35°37'30"

LOBATO MESA FAULT ZONE

DEL PEAK FAULT

LA CAÑADA AMAGRE FAULT

CLARA

EMBUDO

FAULT

PUYE FAULT ZONE

PAJARITO FAULT SYSTEM

PAJARITO FAULT

RENDIJA CANYON FAULT

GUAJE MOUNTAIN FAULT

SAWYER CANYON FAULT

LA BAJADA FAULT

SAN FRANCISCO FAULT

SANTA CLARA INDIAN RESERVATION

SAN JUAN INDIAN RESERVATION

SAN ILDEFONSO INDIAN RESERVATION

COCHITI INDIAN RESERVATION

SANTA FE NATIONAL FOREST

CAJA DEL RIO PLATEAU

Rio Grande

Pajarito Plateau

Española

Los Alamos County Municipal Airport

LEGEND

Fault, dashed where approximately located or inferred, dotted where uncertain; tick mark on footwall. (this study)

Fault, dashed where approximately located or inferred, dotted where uncertain; tick mark on footwall. (after Gardner and House, 1987; Golombek, 1983; Kelley, 1978; Smith et al., 1970)

Aerial photograph lineament (this study)

Rupture scenarios of the Pajarito fault system shown in Figures 7-25a through 7-25f

Investigation Sites

1. Pajarito Canyon
2. Water Tanks
3. Water Canyon
4. Guaje Pines
5. County Landfill
6. Cabra Canyon (Gardner et al., 1990)
7. Rendija Canyon and Sportsmen's Club
8. TA-63 (Kolbe et al., 1995)
9. Embudo Fault (Wachs et al., 1988)
10. Puye Fault Zone (LaForge and Anderson, 1988)
11. Bland Canyon (Gardner and House, 1987)
12. TA-67 (Kolbe et al., 1994)

N

0 5 km

Contour Interval 50 meters

Base map from USGS Abiquiu and Los Alamos. 1 : 100,000

Plate 2

MAP OF MAJOR FAULT TRACES AND LINEAMENTS ON THE PAJARITO PLATEAU

Project No. 91C0509	Los Alamos Seismic Hazards

Woodward-Clyde Federal Services

SK9423-A9500/011395/gos

COLORADO PLATEAU TRANSITION ZONE

SOUTHERN ROCKY MOUNTAIN

JEMEZ VOLCANIC PROVINCE

RIO GRANDE RIFT

SOUTHERN ROCKY MOUNTAIN

GREAT PLAINS

Colorado Plateau

San Luis Basin

Española Basin

Albuquerque Basin

Los Alamos County

Valles Caldera

Sierra Nacimiento

Jemez Mountains

Sandia Mountains

Four Hills

Tijeras

Monte Largo

Rio Grande

Rio Chama

Rio Puerco

Rio Jemez

Rio Pueblo de Taos

Rio Embudo

Rio Pojoaque

Rio Nambe

Rio Pecos

Taos

Santa Fe

Pecos

Cuba

Lamy

1978
1979

1931
1970
1971

1930
1947

1918

GALLINA FAULT

LOS CORDOVAS FAULT

EMBUDO FAULT

PICURIS FAULT

POJOAQUE FAULT

NAMBE FAULT

PECOS FAULT

NACIMIENTO FAULT

JEMEZ-SAN ISIDRO FAULT

San Ysidro fault

Santa Ana Section

SAN FELIPE FAULT ZONE

Section

Algodones

SAN FRANCISCO ? FAULT

BAJADA FAULT

LA ? FAULT

CAÑONCITO FAULT

PUERCO FAULT

WEST MESA FAULT ZONE

SANDIA- RIO GRANDE FAULT ZONE

TIJERAS FAULT ZONE

EAST MESA FAULT ZONE

BLACK MESA FAULT

SIMBOLO

107°00'
106°30'
106°00'
105°30'
36°30'
36°00'
35°30'
35°00'

LEGEND

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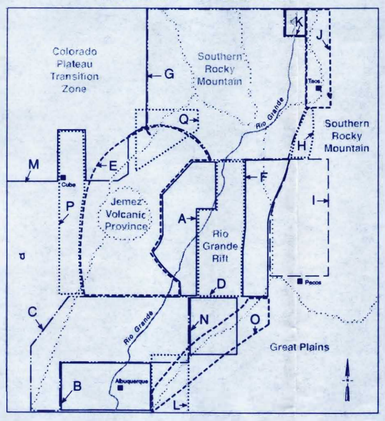
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Seismotectonic Province boundary

(A) Locality discussed in text (Section 4.1.3)

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N.	Bachman, 1975
O.	Lisenbee et al., 1979
P.	Woodward, 1987
Q.	Gonzalez & Dethier, 1991

MAGNITUDE	MM INTENSITY
0.0	1.0
1.0	2.0
2.0	3.0
3.0	4.0
4.0	5.0
5.0	6.0
	No Measure

0 10 20 km

Base map from USGS Albuquerque, Aztec, Raton, and Santa Fe. 1: 250,000

Plate 3

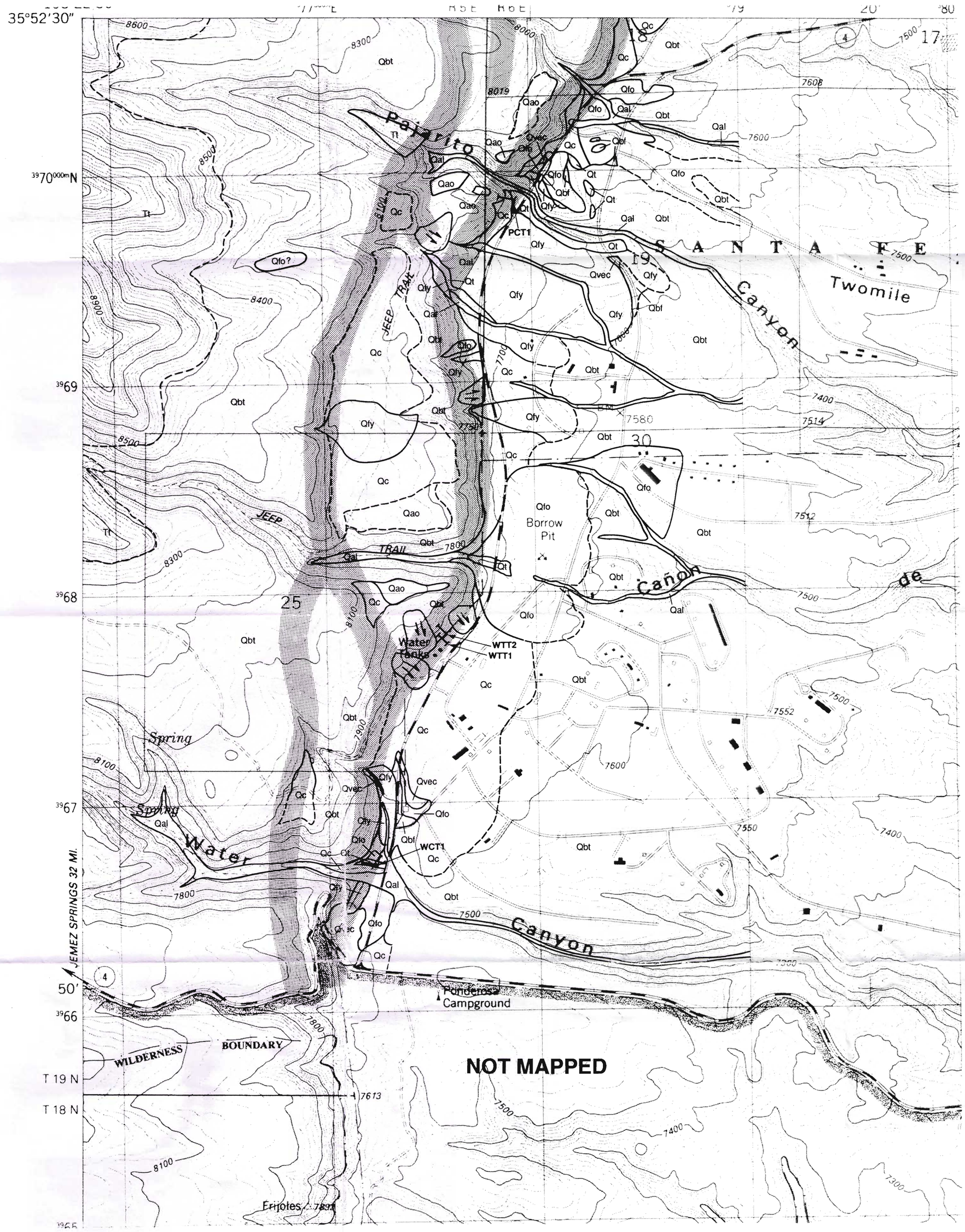
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Project No. 91C0509

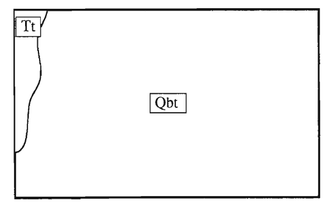
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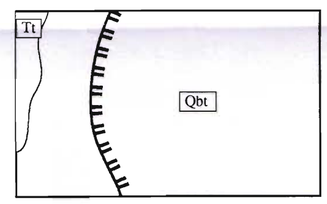


INFERRED GENERALIZED SEQUENCE OF POST-1.2 MA EVENTS



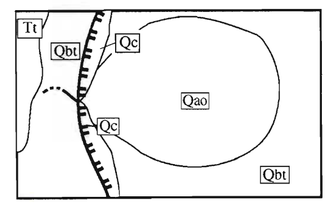
A

Deposition of Bandelier Tuff (1.2 Ma)



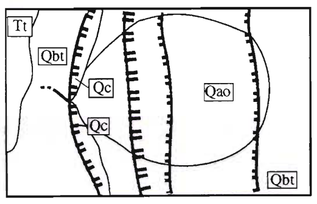
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Episode of Faulting



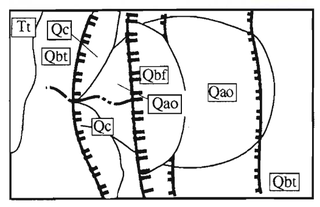
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Deposition of Older Alluvium



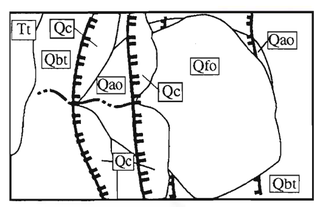
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Episode of Faulting



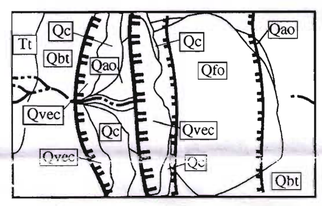
E

Deposition of Fine-Grained Basin Fill



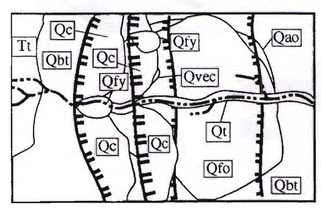
F

Deposition of Tschicoma-boulder Fans, Faulting



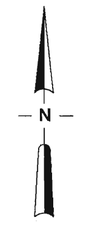
G

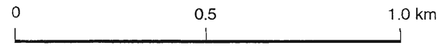
Deposition of El Cajete Pumice



H

Drainage Integration, Development of Axial Terraces, Faulting





Base map enlarged to 1:12,000 from USGS Frijoles quadrangle

LEGEND

Qal Active Alluvium

Qfy Younger Alluvial-fan Deposits: Coarse-grained; predominantly dacite clasts

Qt Fluvial Terrace Deposits: Coarse-grained; dacite and tuff clasts

Qvec El Cajete Pumice: Rhyolitic volcanic deposit

Qfo Older Alluvial-fan Deposits: Coarse-grained; predominantly dacite clasts

Qbf Basin-fill Alluvium: Fine-grained; predominantly pumice and tuff clasts, minor dacite clasts

Qao Older Alluvium: Coarse-grained to west; fine-grained to east; predominantly tuff clasts, minor dacite boulders to west

Qbt Bandelier Tuff

Tf Tschicoma Formation: Dacite

Qc Colluvium: Fine- to coarse-grained; predominantly tuff clasts

Zone within which principal Pajarito fault traces are inferred, many secondary and antithetic fault traces are not shown

Landslide deposits

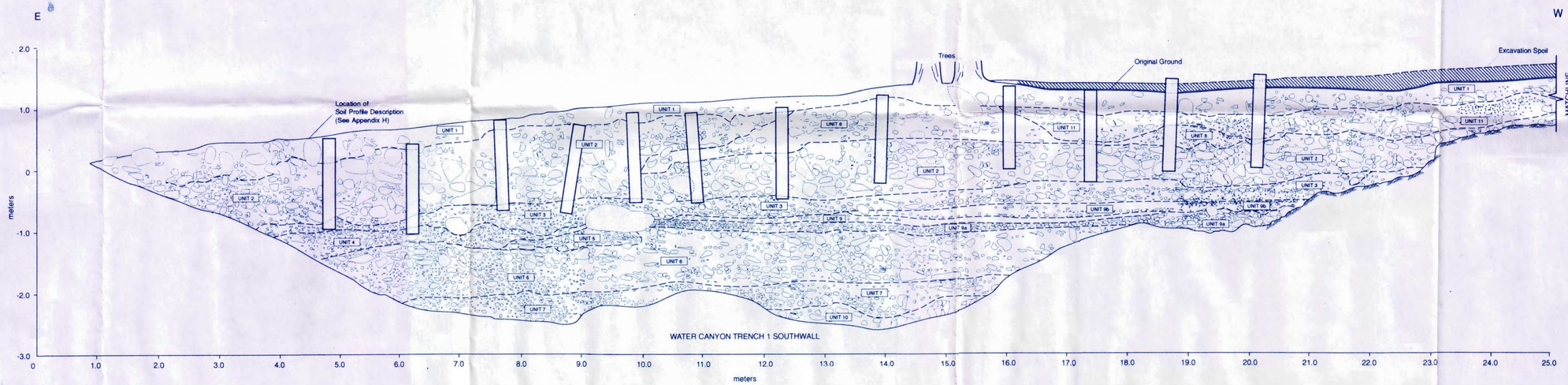
WTT1 Trench locality (WCT: Water Canyon; WTT: Water Tanks; PCT: Pajarito Canyon)

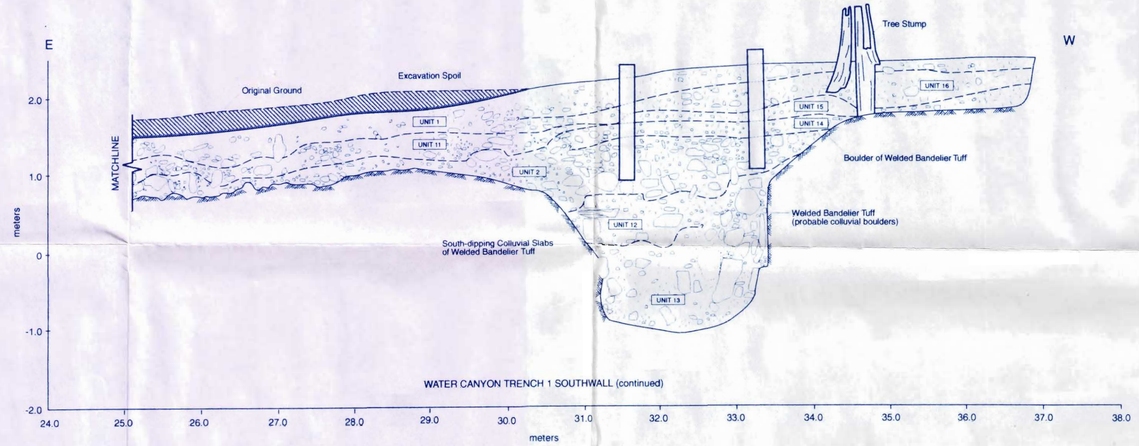
Plate 4

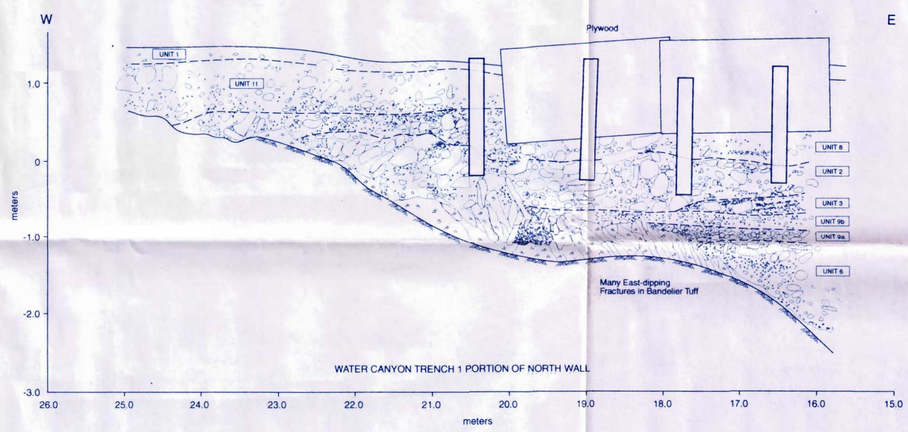
SURFICIAL DEPOSIT MAP ALONG THE PAJARITO FAULT BETWEEN TWOMILE CANYON AND WATER CANYON

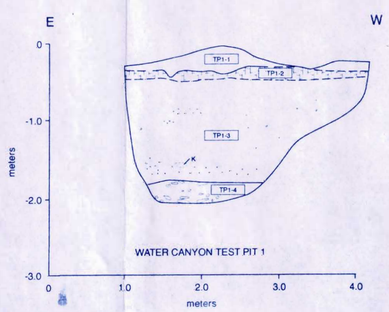
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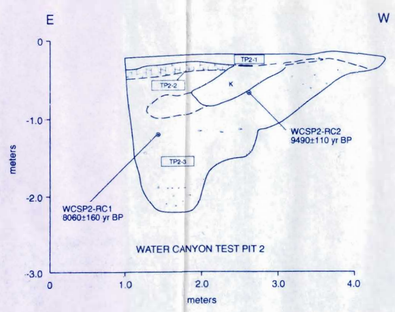
Woodward-Clyde Federal Services

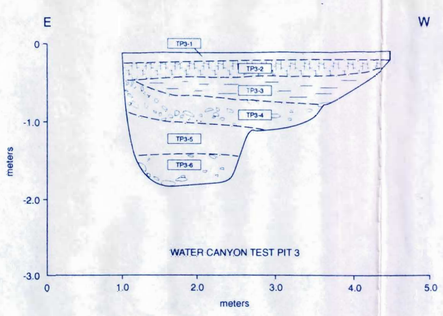












ABBREVIATED LITHOLOGIC DESCRIPTIONS

Unit 1:	Colluvium		
Unit 2:	Alluvium		
Unit 3:	Alluvium	TP1-1:	Colluvium and Loess
Unit 5:	Alluvium	TP1-2:	Bt soil horizon
Unit 6:	Alluvium	TP1-3:	Colluvium
Unit 7:	Alluvium	TP1-4:	Alluvium
Unit 8:	Alluvium	TP2-1:	Colluvium and Loess
Unit 9:	Alluvium	TP2-2:	Bt soil horizon
Unit 9a:	Alluvium	TP2-3:	Colluvium
Unit 9b:	Alluvium	TP3-1:	Colluvium and Loess
Unit 10:	Alluvium	TP3-2:	Colluvium
Unit 11:	Alluvium	TP3-3:	Colluvium
Unit 12:	Colluvium	TP3-4:	Alluvium
Unit 13:	Colluvium	TP3-5:	Alluvium
Unit 14:	Alluvium	TP3-6:	Alluvium
Unit 15:	Colluvium		
Unit 16:	Colluvium		

Lithologic Unit Descriptions given in Tables G-1 and G-2

LEGEND

- WCSP2-RC2 9490 ± 110 yr BP — Radiocarbon sample. Age in radiocarbon years with ±1σ See Table 4-1 for details and calendar-corrected ages.
- Contact, dashed where approximate
- Fractures
- K — Krotovina (filled animal burrow or root cast)
- Bt soil horizon
- Clasts
- Bottom of excavation in Bandelier Tuff, (mostly colluvial boulders as noted, may include some *insitu* bedrock)

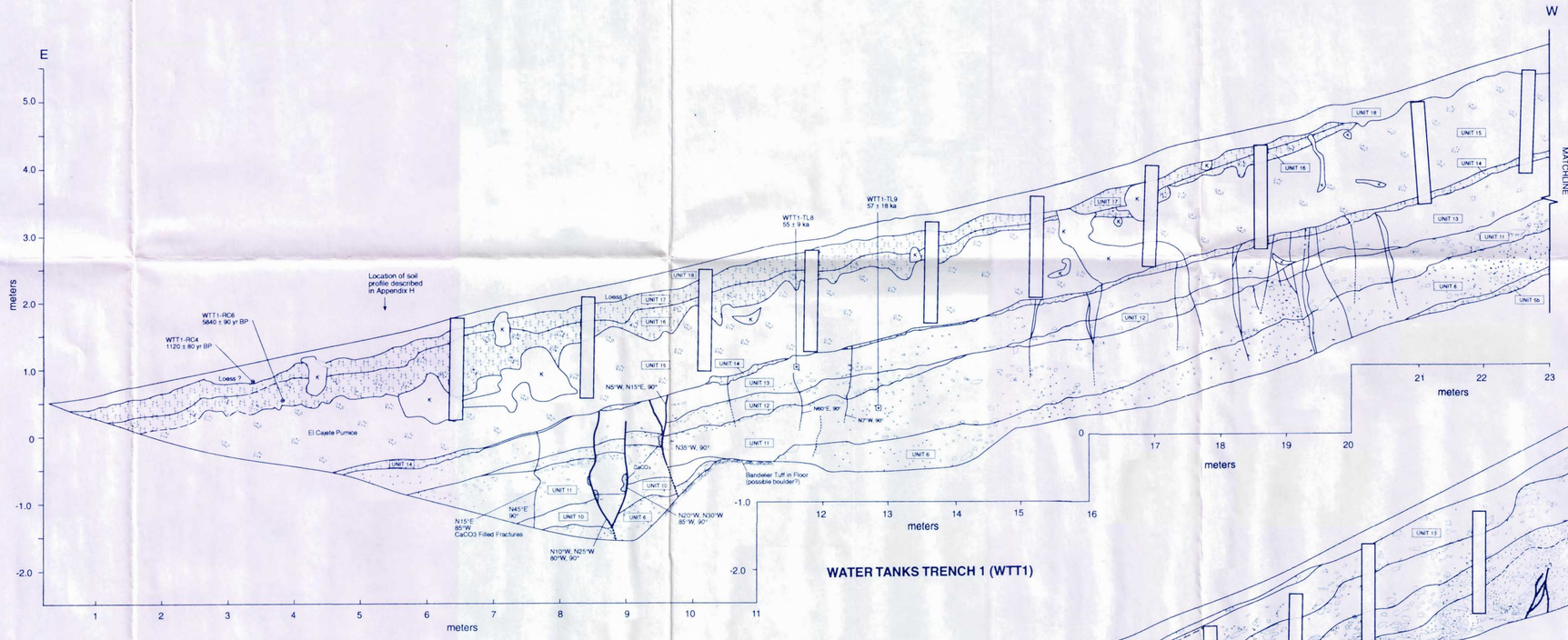
Plate 5

WATER CANYON TRENCH 1
AND TEST PITS 1, 2, AND 3

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WATER TANKS TRENCH 1 (WTT1)

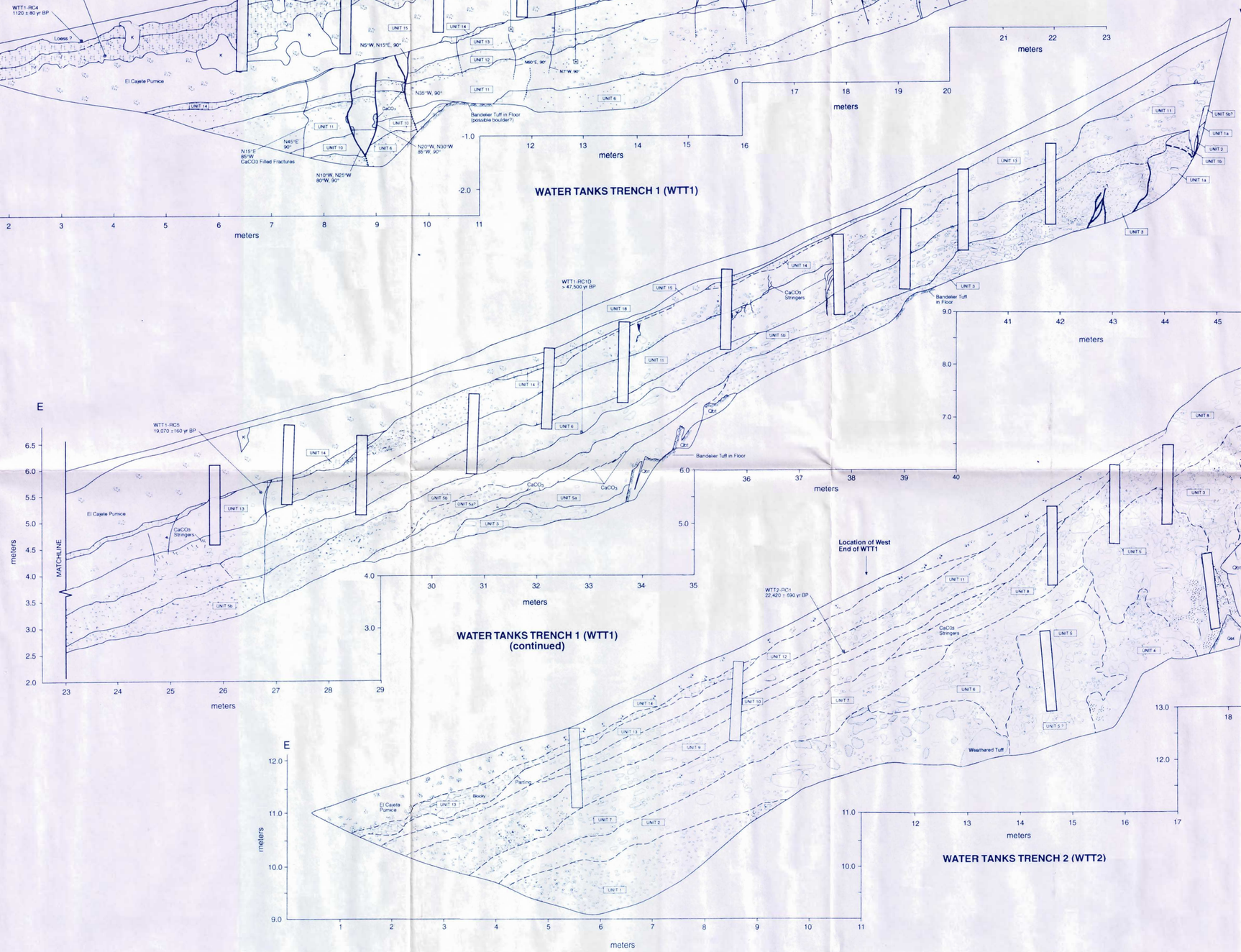
ABBREVIATED LITHOLOGIC DESCRIPTIONS
(TRENCH 1)

Detailed Lithologic Descriptions given in Table G-3

Unit 1a:	Debris colluvium (tectonic ?)	Unit 13:	Colluvium
Unit 1b:	Colluvium/fissure fill	Unit 14:	Mottled buried soil in colluvium
Unit 2:	Colluvium/fissure fill	Unit 15:	El Cajete pumice deposit (air fall ?)
Unit 3:	Debris colluvium (tectonic ?)*	Unit 16:	Colluvium/reworked pumice
Unit 5a:	Colluvium (tectonic ?)*	Unit 17:	Bt soil horizon/colluvium
Unit 5b:	Colluvium (tectonic ?)*	Unit 18:	Colluvium with A soil horizon
Unit 6:	Colluvium**	Unit Qbt:	Bandelier Tuff
Unit 10:	Colluvium		
Unit 11:	Colluvium (tectonic ?)**	* Well-developed buried soil, with Bt horizon, developed in these units is not explicity shown on log	
Unit 12:	Colluvium	** Moderately developed buried soil, with Bt horizon, developed in these units is not explicity shown on log	

LEGEND

- WTT1-TL9 57 ± 18ka — Thermoluminescence sample. Age with ± 2σ error
- WTT1-RC6 5840 ± 90 yr BP — Radiocarbon sample. Age in radiocarbon years with ± 1σ error. See Table 4-2 for details and calendar calibrated ages.
- Fault, dashed where approximate
- Contact, dashed where approximate
- Fractures
- K — Krotovina (filled animal burrow or root cast)
- Buried Bt soil horizon
- Clasts



WATER TANKS TRENCH 2 (WTT2)

WATER TANKS TRENCH 1 (WTT1) (continued)

ABBREVIATED LITHOLOGIC DESCRIPTIONS
(TRENCH 2)

Detailed Lithologic Descriptions given in Table G-4

Unit 1:	Colluvium
Unit 2:	Colluvium
Unit 3:	Colluvium/fissure fill
Unit 4:	Debris colluvium (tectonic ?)
Unit 5:	Debris colluvium (tectonic ?)
Unit 6:	Colluvium/colluvial wedge (?)
Unit 7:	Colluvium
Unit 8:	Colluvium
Unit 9:	Colluvium
Unit 10:	Colluvium
Unit 11:	Colluvium
Unit 12:	Colluvium
Unit 13:	Mottled buried soil in colluvium
Unit 14:	El Cajete pumice deposit (air fall ?)
Unit Qbt:	Bandelier Tuff

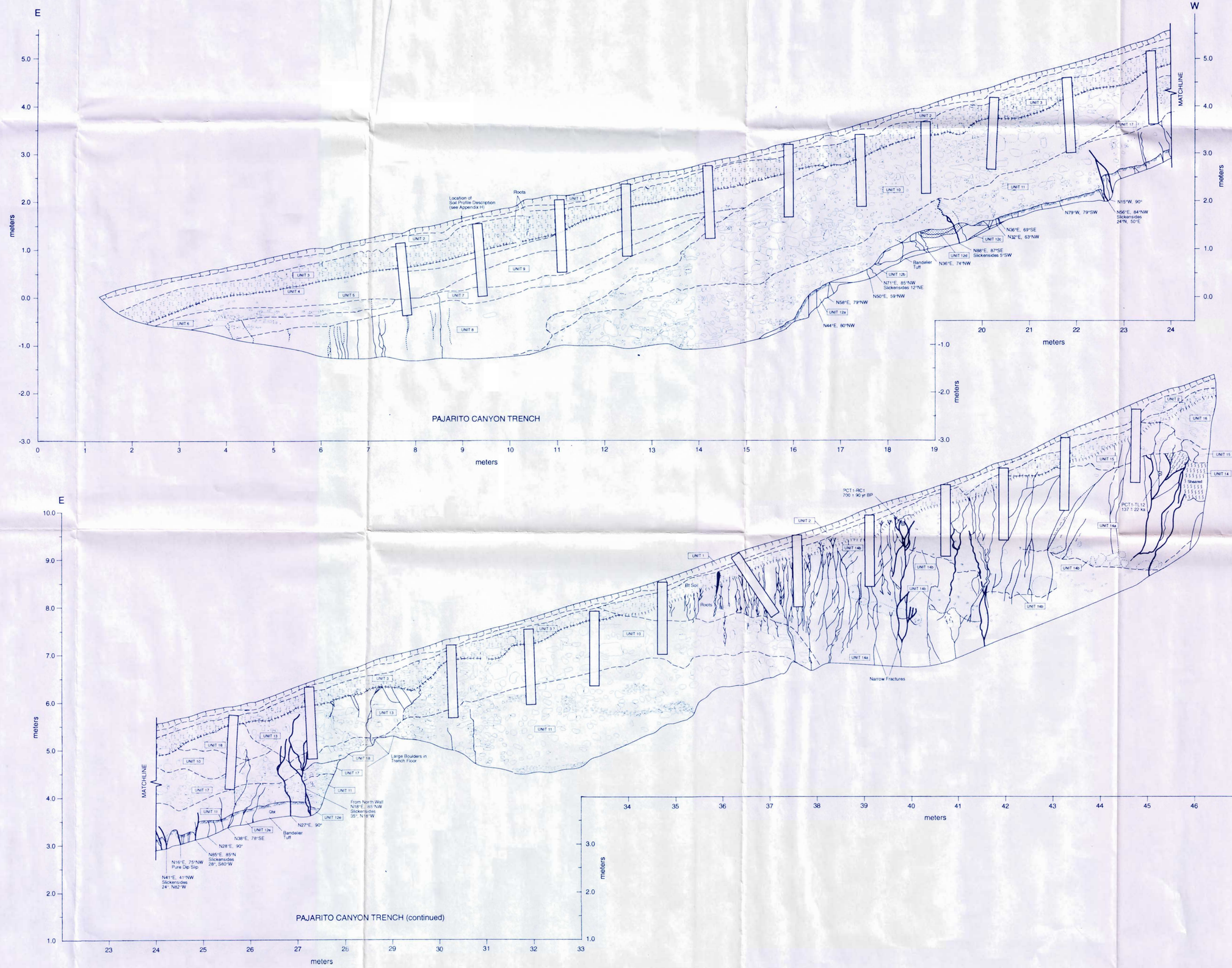
Plate 6

WATER TANK TRENCHES 1 AND 2

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LEGEND

- PCT1-TL12 137 ka ± 22 ka — Thermoluminescence sample. Age with ± 2σ
- PCT1-RC1 700 ± 90 yr BP — Radiocarbon sample. Age in radiocarbon years with ± 1σ See Table 4-1 for details and calendar calibrated ages.
- Fault, dashed where approximate
- Contact, dashed where approximate
- Fractures
- Modern soil horizon
- Buried Bt soil horizon
- Clasts

ABBREVIATED LITHOLOGIC DESCRIPTIONS

Detailed Lithologic Descriptions given in Table G-5

- Unit 1: Colluvium
- Unit 2: Loess and Colluvium
- Unit 3: Colluvium
- Unit 4: Loess
- Unit 5: Alluvium and Colluvium
- Unit 6: Alluvium
- Unit 7: Colluvium/Slopewash
- Unit 8: Loess and Colluvium
- Unit 9: Colluvium/Slopewash
- Unit 10: Alluvium/Debris-flow deposit (?)
- Unit 11: Alluvium/Debris-flow deposit (?)
- Unit 12a: Bandelier Tuff
- Unit 12b: Pyroclastic deposit/tuff (?)
- Unit 12c: Surge deposit
- Unit 12d: Pyroclastic or eolian deposit
- Unit 12e: Pyroclastic deposit
- Unit 13: Alluvium/inset channel deposit
- Unit 14a: Graben-fill deposit (?)
- Unit 14b: Graben-fill deposit (?) (sandier)
- Unit 15: Colluvium
- Unit 16: Colluvium
- Unit 17: Alluvium/Debris-flow deposit (?)
- Unit 18: Alluvium/channel deposit

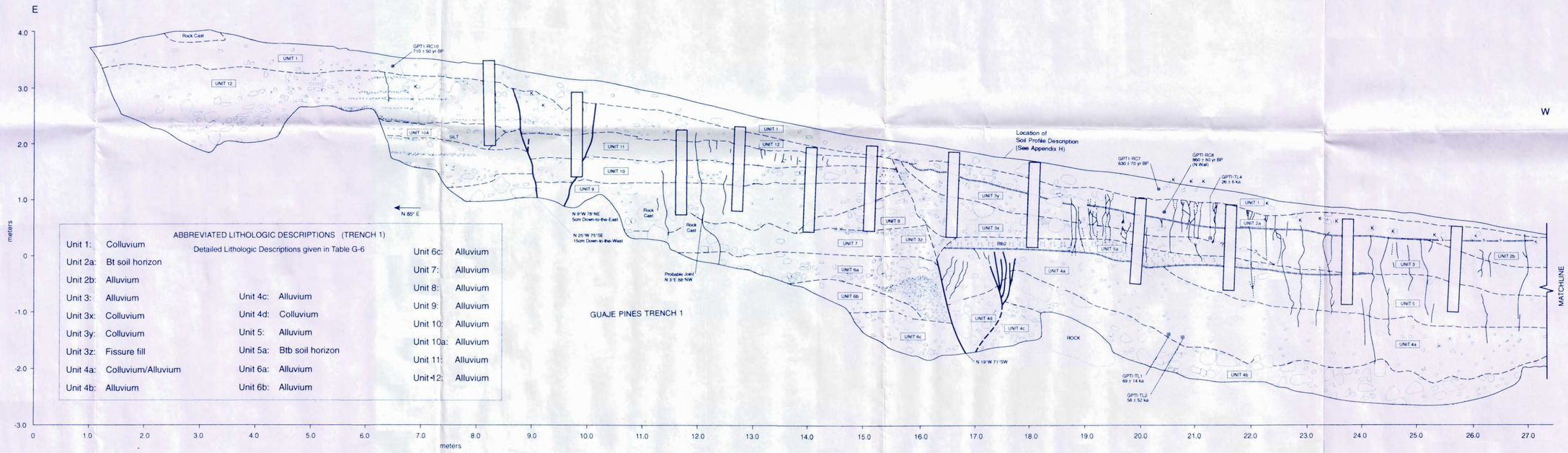
Plate 7

PAJARITO CANYON TRENCH

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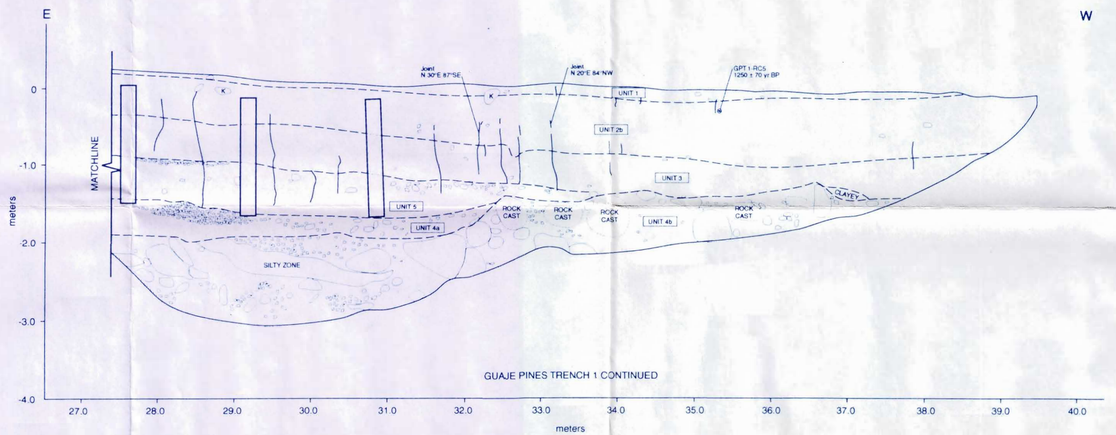
ABBREVIATED LITHOLOGIC DESCRIPTIONS (TRENCH 1)

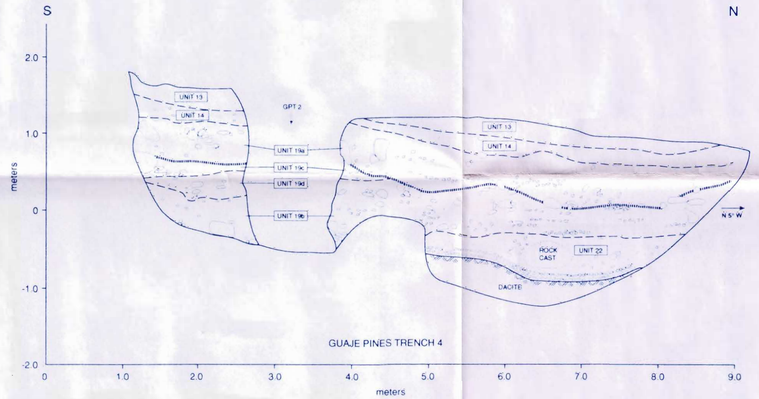
Detailed Lithologic Descriptions given in Table G-6

Unit 1:	Colluvium	Unit 4c:	Alluvium	Unit 6c:	Alluvium
Unit 2a:	Bt soil horizon	Unit 4d:	Colluvium	Unit 7:	Alluvium
Unit 2b:	Alluvium	Unit 5:	Alluvium	Unit 8:	Alluvium
Unit 3:	Alluvium	Unit 5a:	Btb soil horizon	Unit 9:	Alluvium
Unit 3x:	Colluvium	Unit 6a:	Alluvium	Unit 10:	Alluvium
Unit 3y:	Colluvium	Unit 6b:	Alluvium	Unit 10a:	Alluvium
Unit 3z:	Fissure fill			Unit 11:	Alluvium
Unit 4a:	Colluvium/Alluvium			Unit 12:	Alluvium
Unit 4b:	Alluvium				

LEGEND

- GPT2-TL5 120 ka ± 11 ka — Thermoluminescence sample. Age with ± 2σ
- GPT1-RC7 630 ± 70 yr BP — Radiocarbon sample. Age in radiocarbon years with ±1σ See Table 4-1 for details and calendar corrected ages.
- Fault, dashed where approximate or inferred
- Contact, dashed where approximate
- Fractures
- K — Krotovina (filled animal burrow or root cast)
- Soil horizon boundary
- Bt soil horizon
- Clasts

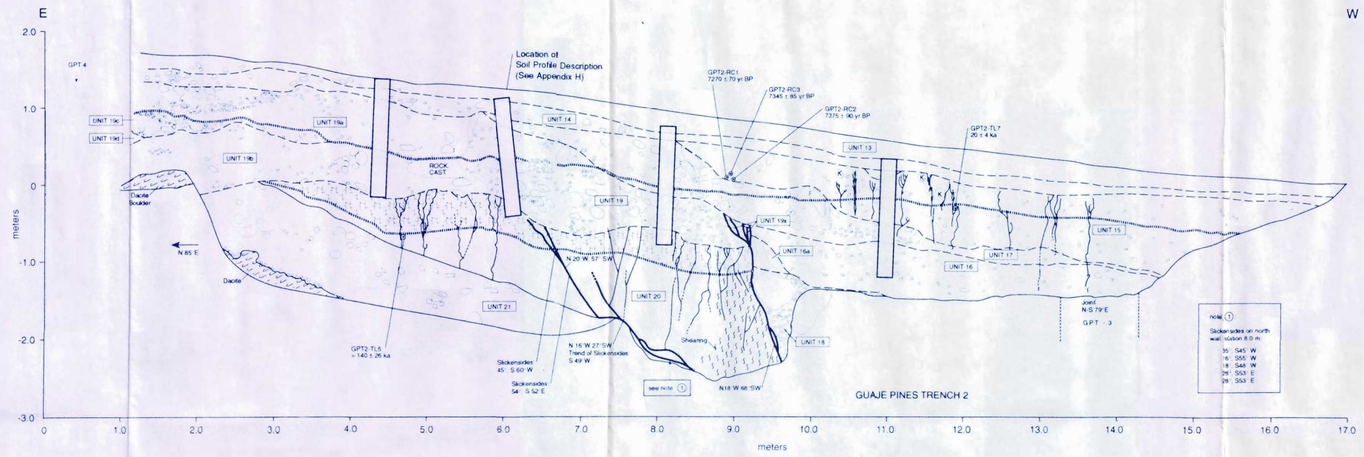




ABBREVIATED LITHOLOGIC DESCRIPTIONS (TRENCHES 2, 3, AND 4)

Detailed Lithologic Descriptions given in Table G-7

Unit 13:	Colluvium/plowed zone
Unit 14:	Colluvium
Unit 15:	Colluvium
Unit 16:	Colluvium
Unit 16a:	Colluvium
Unit 17:	Colluvium
Unit 18:	Alluvium
Unit 19a:	Alluvium
Unit 19b:	Alluvium
Unit 19c:	Alluvium
Unit 19d:	Alluvium
Unit 19x:	Alluvium or Fissure fill (?)
Unit 20:	Pond Deposit (?)
Unit 21:	Debris Flow or Alluvium
Unit 22:	Alluvium



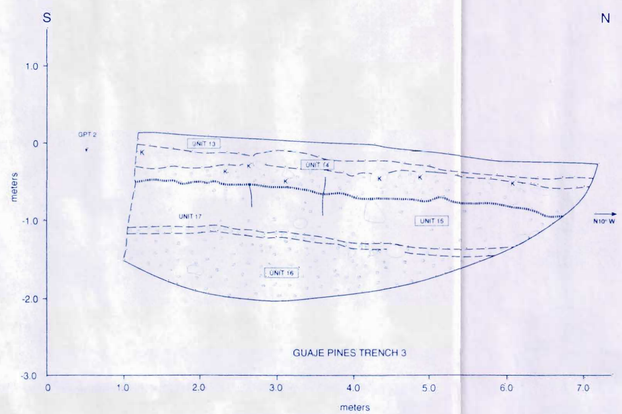


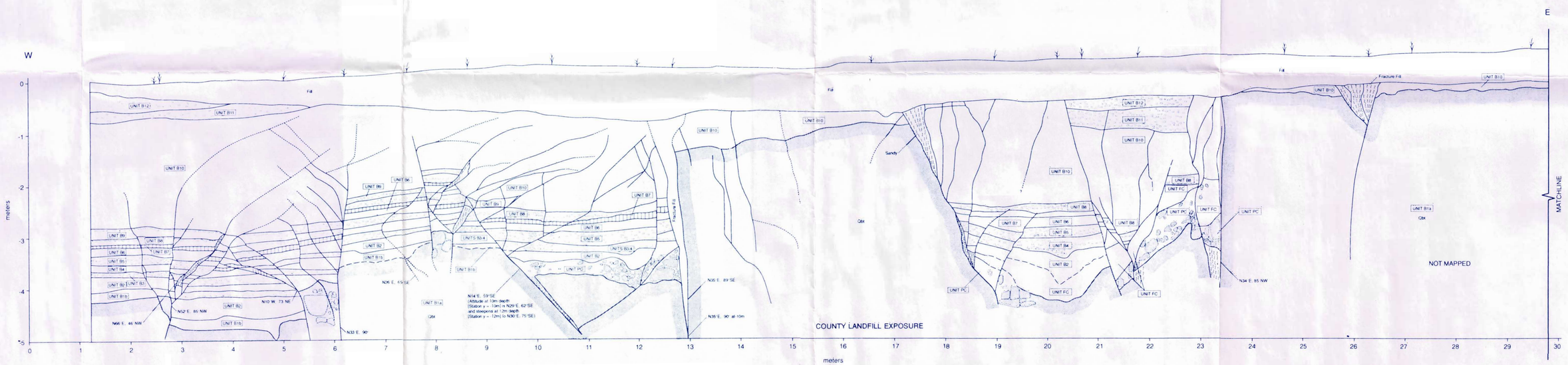
Plate 8

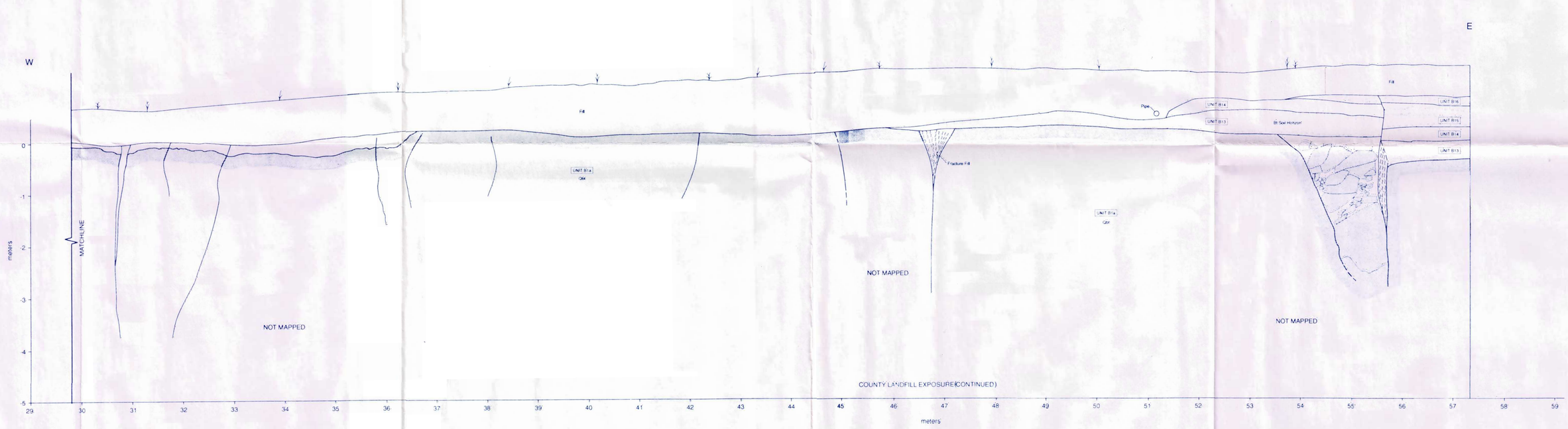
GUAJE PINES TRENCHES 1, 2, 3, AND 4

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ABBREVIATED LITHOLOGIC DESCRIPTIONS
Detailed Lithologic Descriptions given in Table G-8

Unit B1a:	Bedrock			Unit B11:	Alluvium
Unit B1b:	Bedrock			Unit B12:	Alluvium
Unit PC:	Weathered bedrock/colluvium			Unit B13:	Weathered bedrock/Alluvium
Unit FC:	Alluvium/Loess	Unit B6:	Alluvium or Loess	Unit B14:	Alluvium or Loess
Unit B2:	Alluvium	Unit B7:	Rhyolite ash (?)	Unit B15:	Alluvium
Unit B3:	Alluvium	Unit B8:	Alluvium	Unit B16:	Alluvium
Unit B4:	Alluvium or Loess	Unit B9:	Alluvium		
Unit B5:	Alluvium	Unit B10:	Alluvium or Loess		

LEGEND

- Fault, dashed where approximate or inferred
- Contact, dashed where approximate
- Fractures
- Bt soil horizon
- Clasts

Plate 9

COUNTY LANDFILL EXPOSURE

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