DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

TRENCH LOGS FROM A STRAND OF THE ROCK VALLEY FAULT SYSTEM, NEVADA TEST SITE, NYE COUNTY, NEVADA

By James C. Yount, Ralph R. Shroba, Catherine R. McMasters, Heather E. Huckins, and Eduardo A. Rodriguez

Prepared in cooperation with the
U.S. DEPARTMENT OF ENERGY

USGS/MAP/MF--1824

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DISCLAIMER

MISCELLANEOUS FIELD STUDIES MAP
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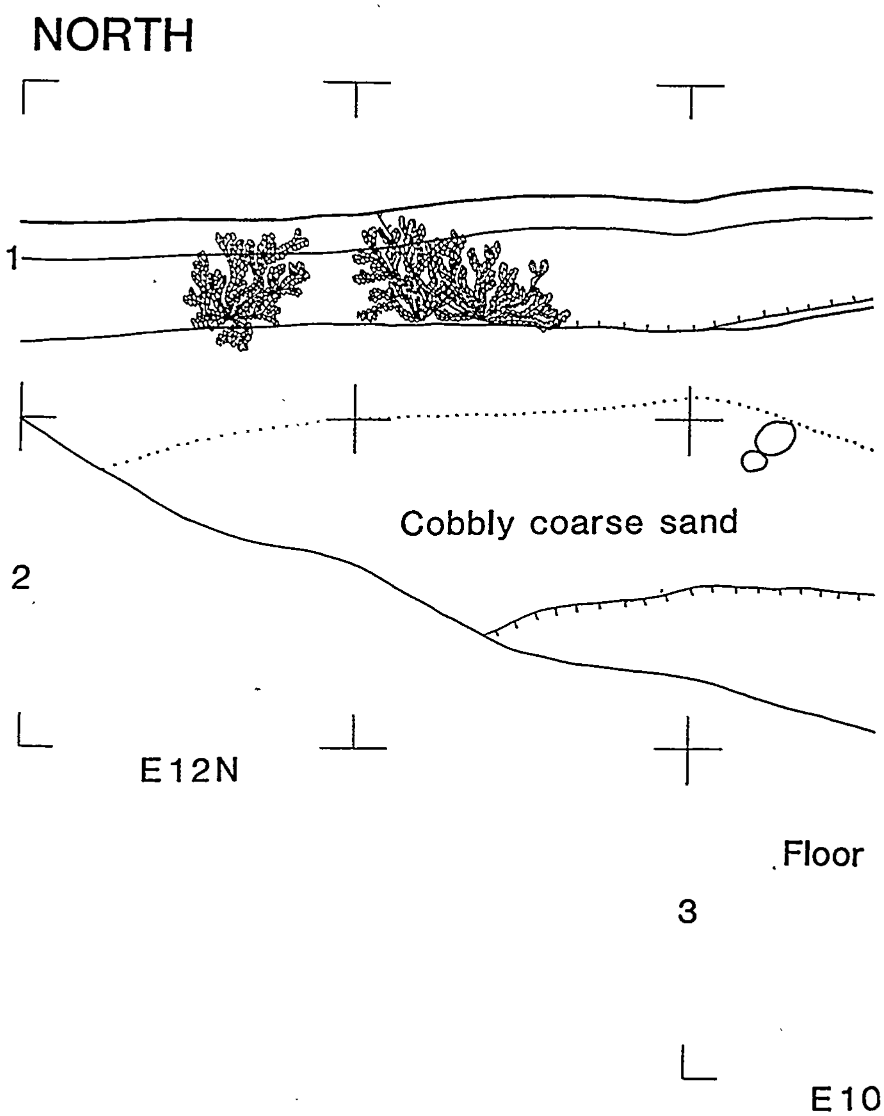
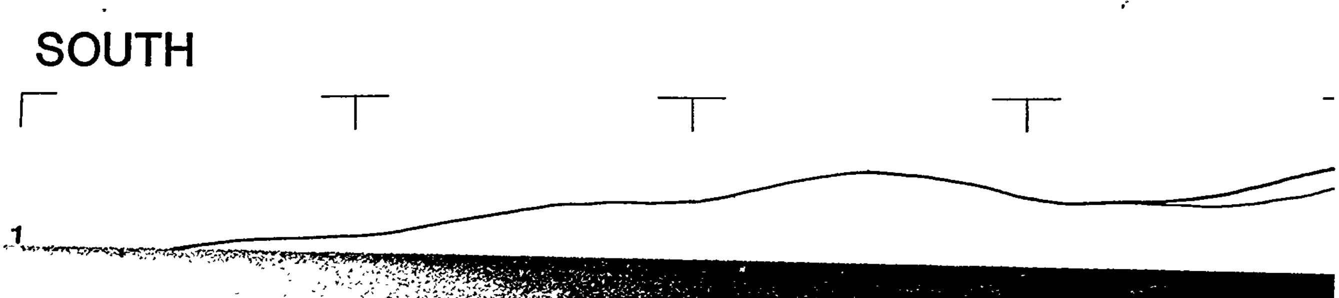
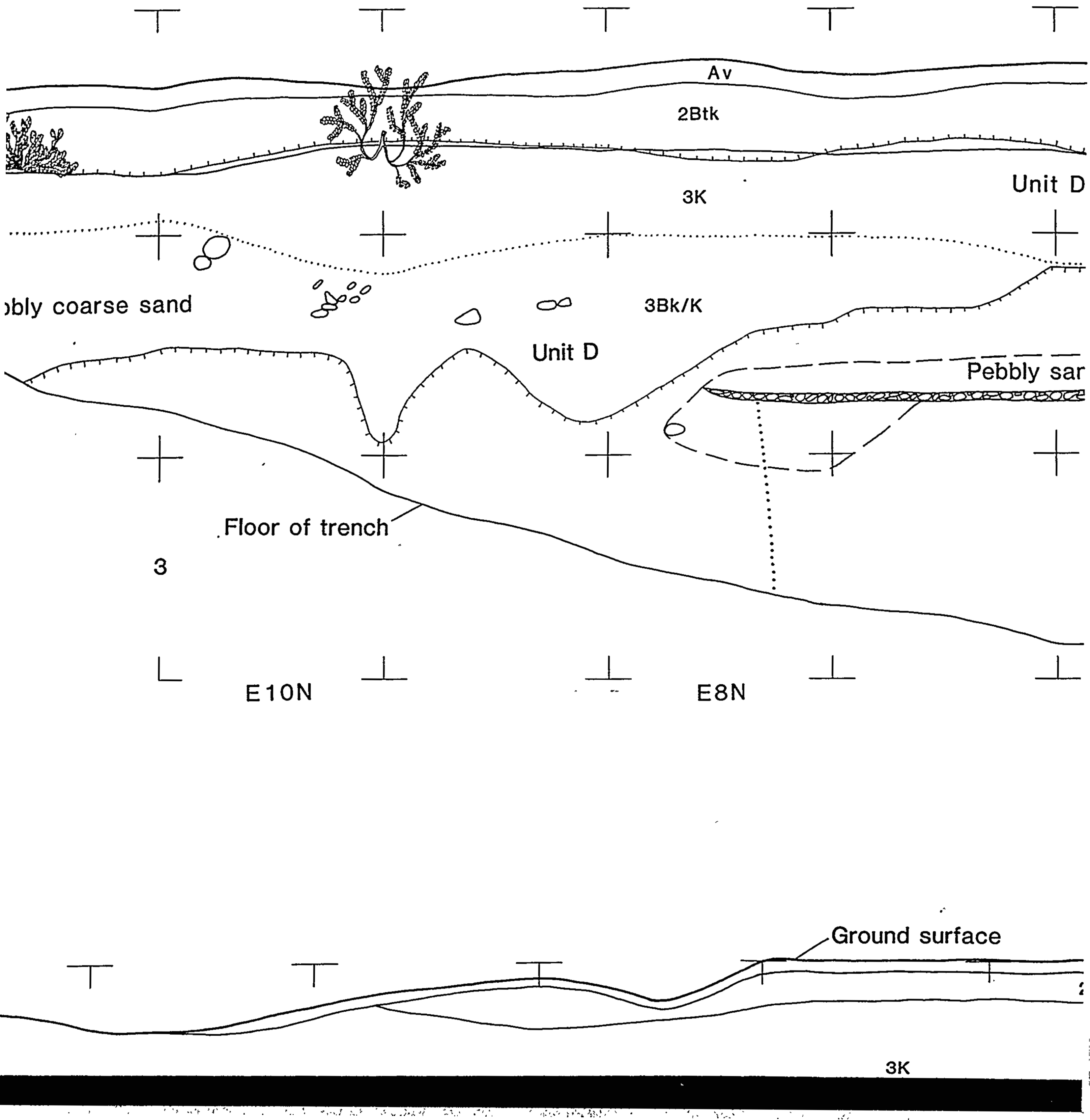
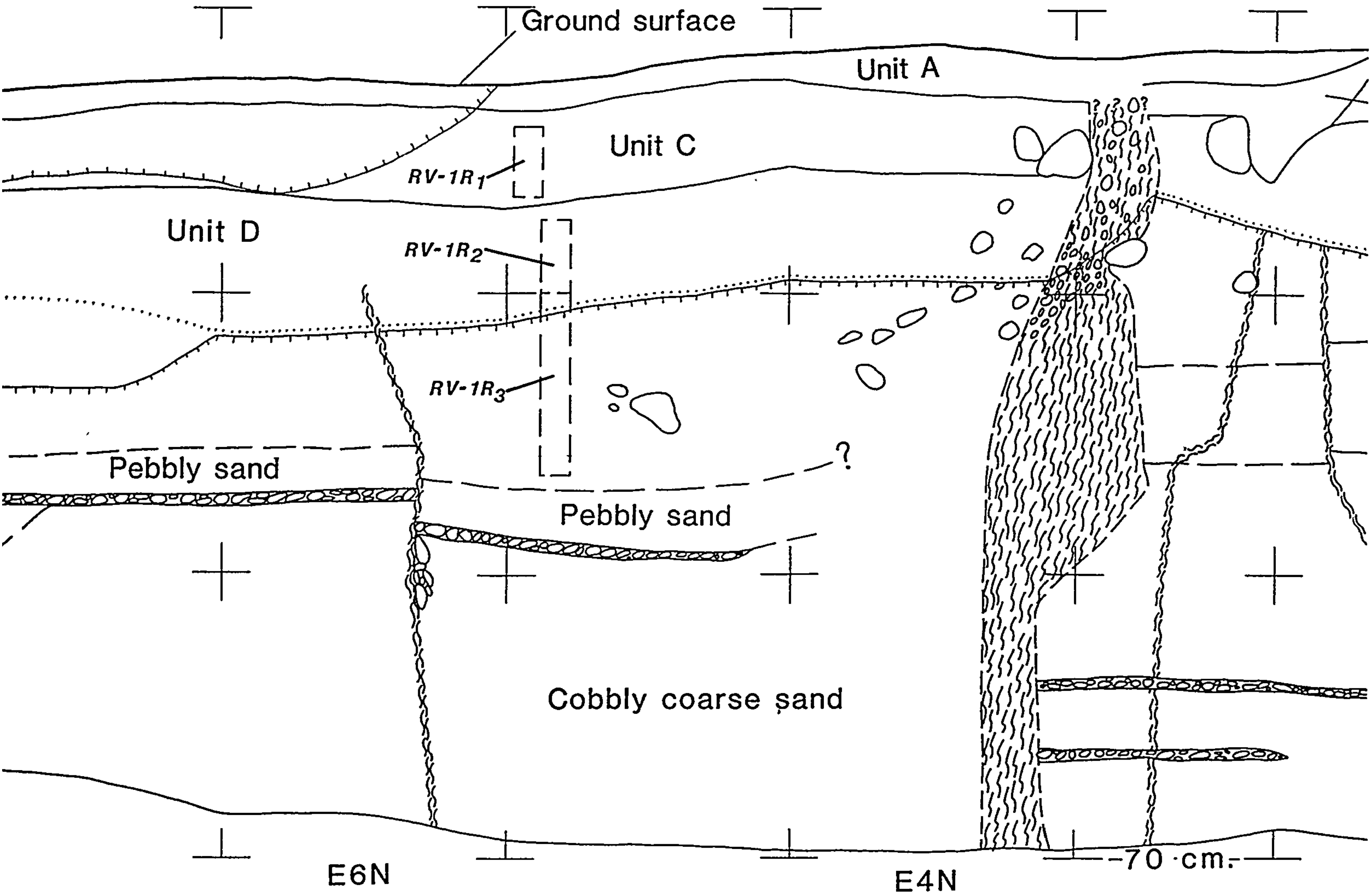
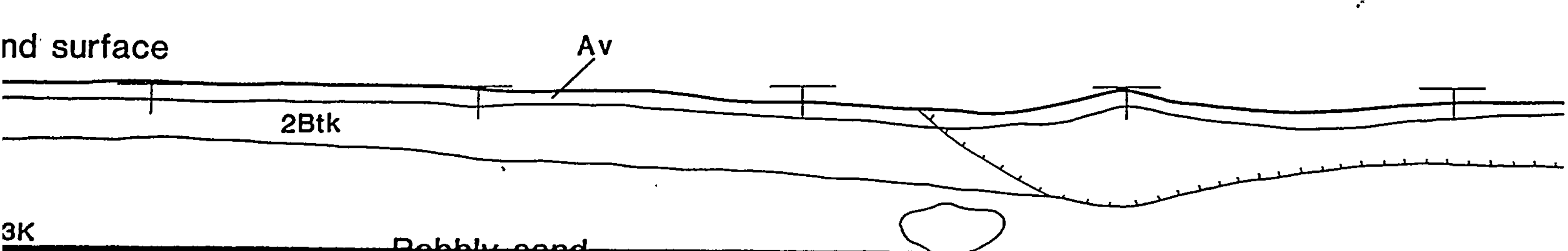






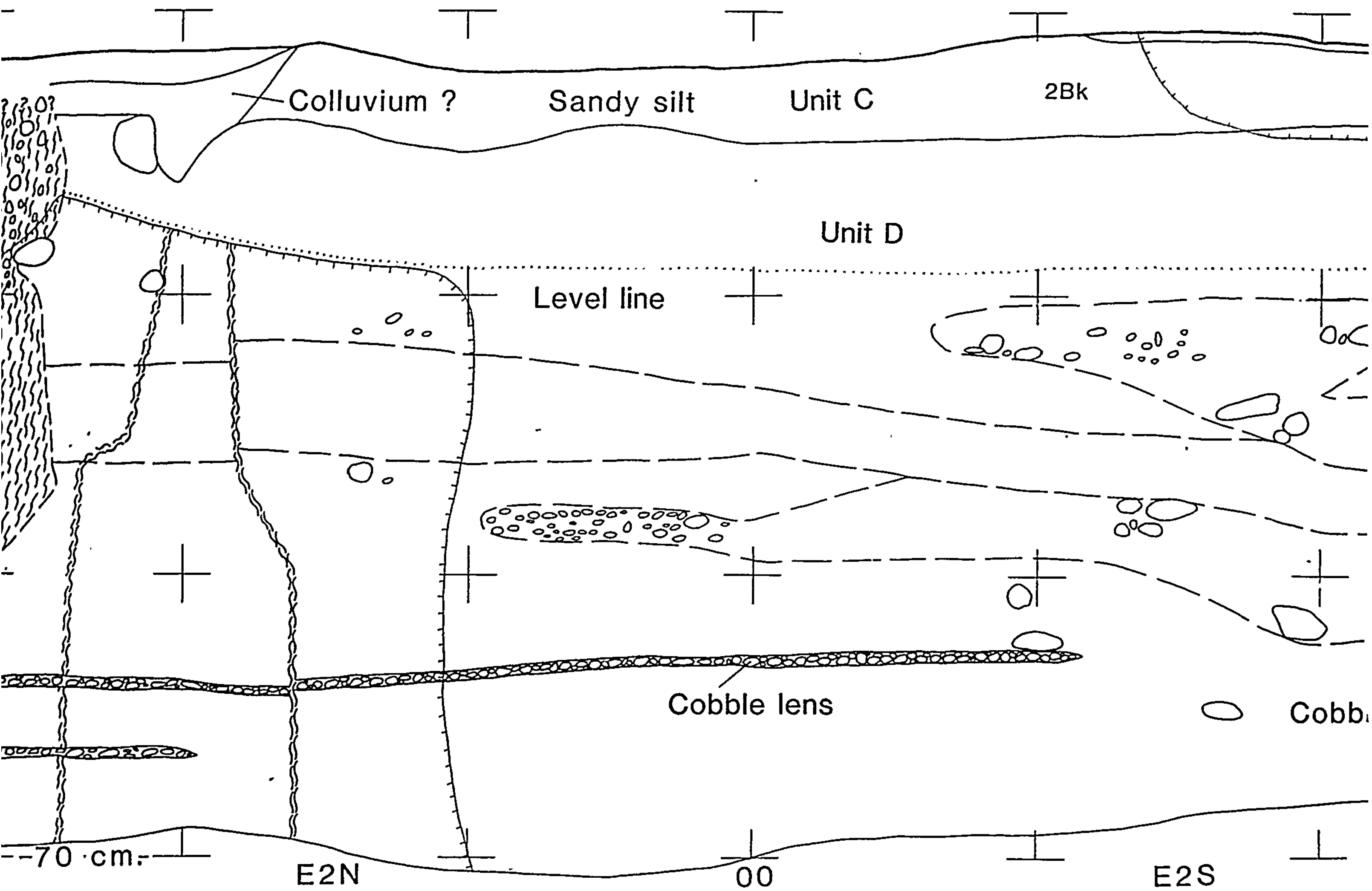
Av
2Btk
Unit D
3K
ɔbly coarse sand
3Bk/K
Unit D
Pebbly sar
Floor of trench
3
E10N
E8N
Ground surface
3K


Ground surface
Unit A
Unit C
RV-1R1
Unit D
RV-1R2
RV-1R3
Pebbly sand
?
Pebbly sand
Cobbly coarse sand
E6N
E4N
70 cm.


nd surface
Av
2Btk
3K

ROCK VALLEY TRENCH 1

EAST WALL



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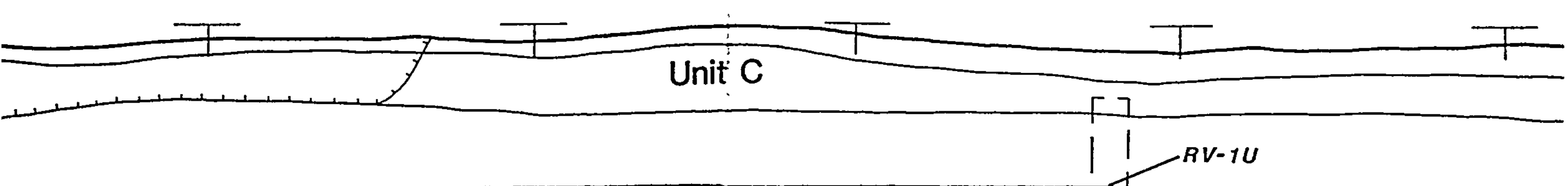

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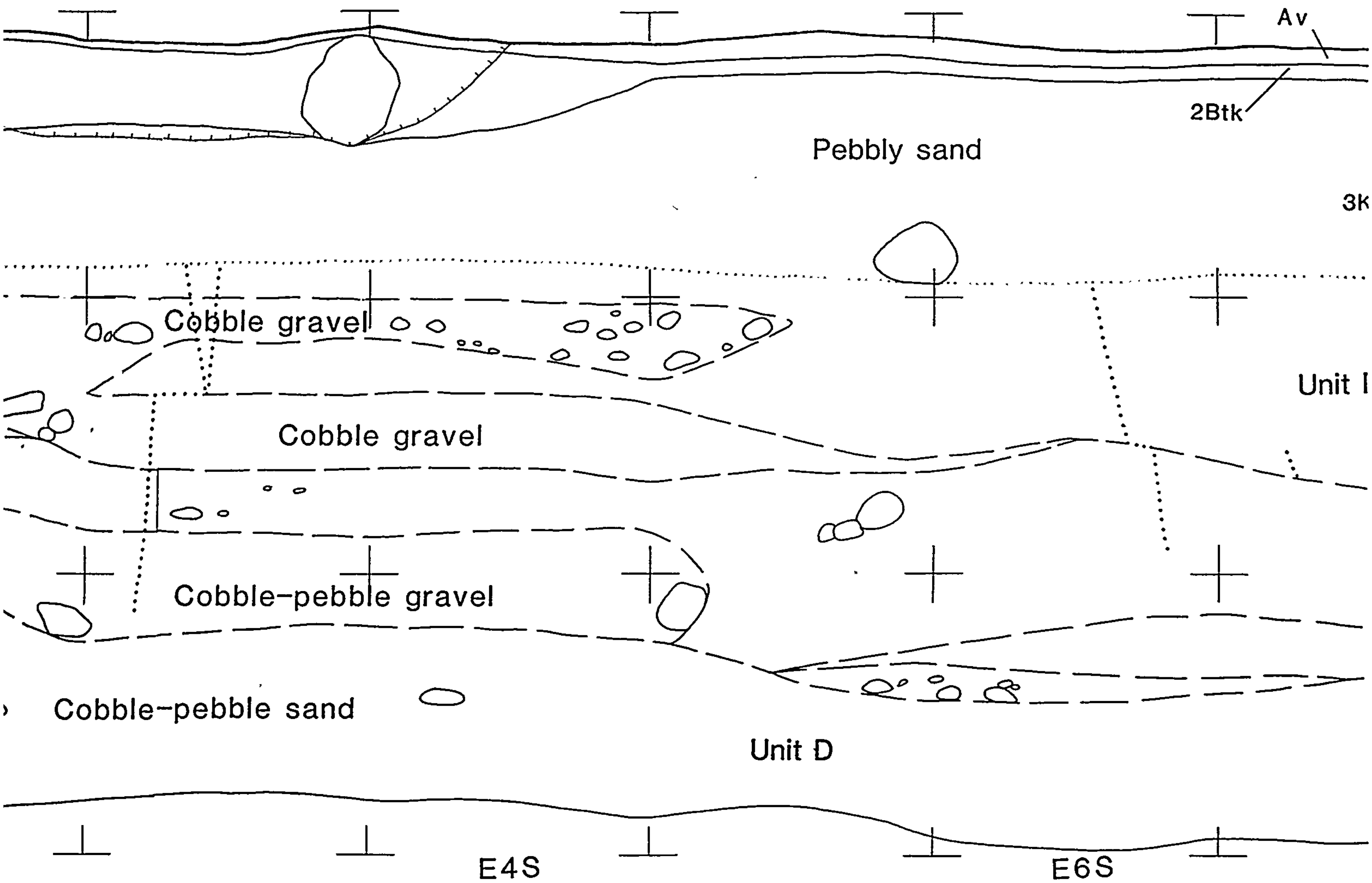
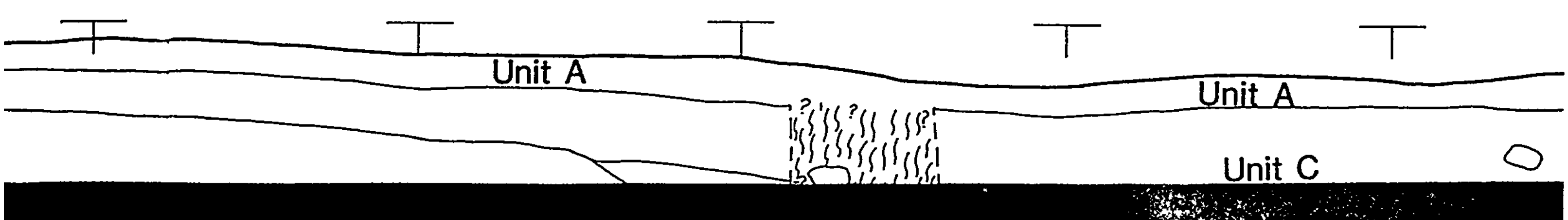
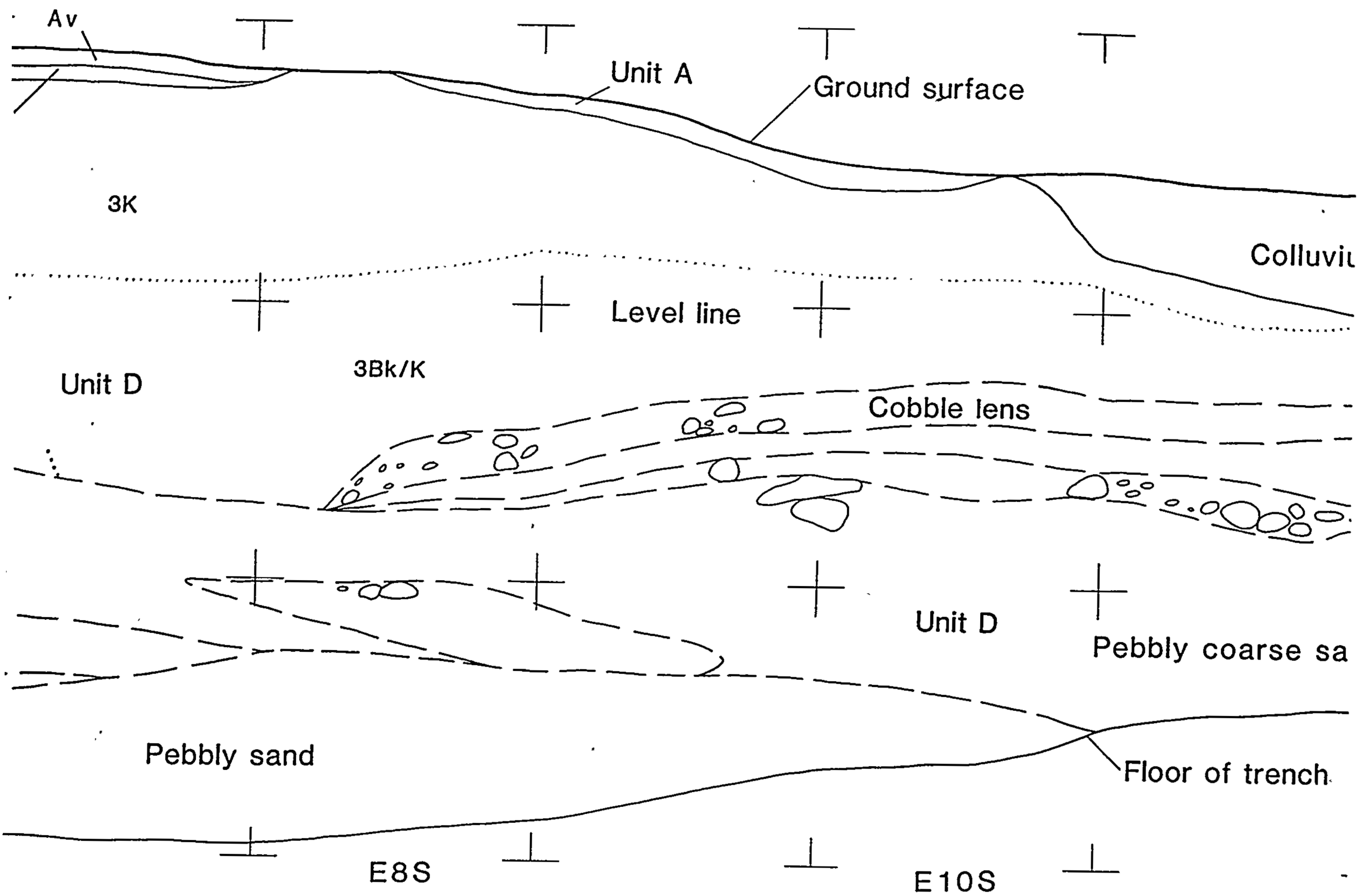
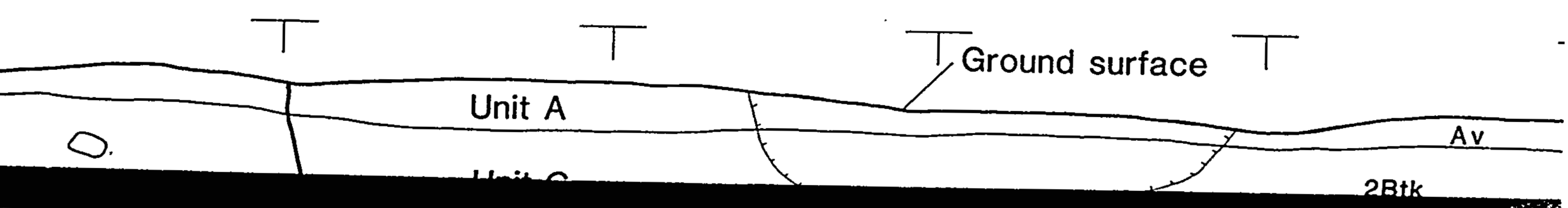
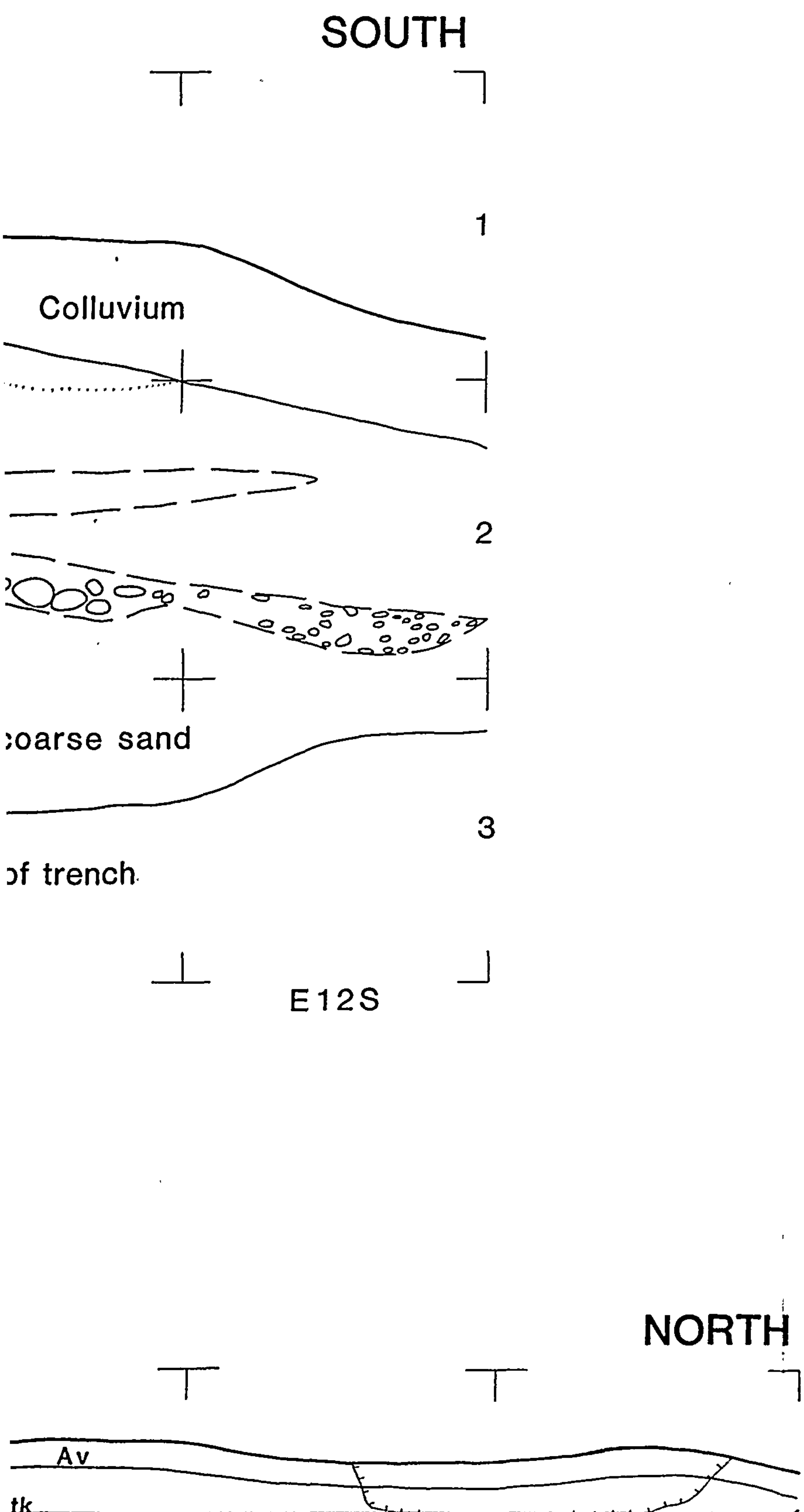





Av
Unit A
Ground surface
3K
Colluvi
Level line
Unit D
3Bk/K
Cobble lens
Unit D
Pebbly coarse sa
Pebbly sand
Floor of trench
E8S
E10S


Ground surface
Unit A
Av
2Btk



DESCRIPTION OF LITHOLOGIC UNITS EXPOSED IN

UNIT A—Very pale brown (10YR 7/3), slightly compact, vesicular silt. Contains moderately sorted, subangular to subrounded sand, subangular pebbles and cobbles, and scarce boulders. Burrows an Very scarce secondary carbonate that forms small veinlets and th Irregular basal contact. Open fractures commonly terminate at t although some (RV-2, E1S1, E6S1) continue downward into older

UNIT B—(Exposed only in RV-2) Light-yellowish-brown (10YR 6/4 6/4), loose to slightly compact, poorly sorted, pebbly, sandy silt. massive; a poorly defined, north-dipping pebble line marks the to Faint eolian(?) ripple in E6S1. Contains common pebbles and cob boulders. Burrows and roots common. Occasional carbonate veir pebbles. Basal contact distinct and irregular.

UNIT C—Reddish-yellow (5YR 7/6), compact, poorly sorted, sligh silt to pebbly silty sand. Pebbles subangular to subrounded. Cobl scarce. Massive, although unit breaks along sub-horizontal plane structure. No burrows; roots scarce. Contact with underlying u and irregular. Minor carbonate laminae in lower part of unit. Ur the uranium-trend method as 31,000±10,000 to 32,000±24,000 yea 36,000±20,000 to 38,000±10,000 years old in RV-2 (J.N. Rosholt, (table 4).

UNIT D—Light-gray (10YR 7/1), loose to indurated (carbonate ce (RV-2) to moderately sorted (RV-1), interbedded boulder-cobble sand. In RV-2 cobble beds have faint horizontal bedding (E2N2, moderately to well developed in RV-1, with some crossbedding. to well cemented by carbonate and rare opaline(?) silica. Carbon fracture surfaces that are subparallel to shear zones (fig. 4) is co less common in RV-1. Long axes of cobbles and boulders dip stee (fig. 3) indicating southwestward transport directions. Contact w sharp and undulatory. Unit D has been dated in both RV-1 and R trend method. In RV-1, the 3K soil horizon (RV-1R_2, table 4) dat years old and the 3Bk/K soil horizon dates as 270,000±30,000 (RV years old (RV-1L) (table 4). The 4Bkb soil horizon in RV-2 dates years old (J.N. Rosholt, written commun., 1984) (307L, table 4). corresponds to unit Q2c of Hoover and others (1981); equivalents figure 2 as unit 2bc.

UNIT E—(Exposed only in RV-2) Reddish-yellow (7.5YR 7/6) to p indurated, poorly sorted, clayey, sandy, cobble gravel with scarce subrounded to subangular, matrix supported. Matrix is massive w fissility. East-northeast-dipping long axes of clasts (fig. 3) indice direction. Unit E most likely corresponds to unit QTa of Hoover 2).

INTRODUCTION

The Rock Valley fault system trends northeasterly through the Nevada Test Site (fig. 1). The system records left-lateral off Tertiary rocks (Hinrichs, 1968; Sargent and Stewart, 1971), althou to only a few kilometers (Barnes and others, 1982). Distinct scar Quaternary age (Carr, 1974) and a concentration of seismicity, pe end (Rogers and others, 1983), suggest that the Rock Valley fault Two trenches were excavated by backhoe in 1978 across a 0.5-m- a strand of the Rock Valley fault system (fig. 2). Preliminary dat in Szabo and others (1981, fig. 9) and Ander and others (1984, Sto of these initial descriptions and the above-mentioned seismicity, two Rock Valley fault trenches was undertaken during the spring presents: (1) logs of both walls of the two trenches, (2) a general lithologic units and the soils formed in these units that are expose trenches, (3) observations of the clast fabric of unfaulted and fau the trench walls, and (4) a map of the surficial deposits in the vici (fig. 2).

Procedures

The eastern of the two trenches (RV-2, fig. 2) was cleaned u and brushes in April 1984. The lower meter of the west wall had approximately one-half meter since initial excavation. Both tren 1-m squares with polypropylene rope (see grid system in explanati Field sketches were made on graph paper at a scale of 4 in. to the scale 1:10). The western trench (RV-1, fig. 2) was more severely minor re-excavation by a small bulldozer before cleaning and log

ITHOLOGIC UNITS EXPOSED IN TRENCHES

7/3), slightly compact, vesicular, sandy to very sandy
l, subangular to subrounded sand, a few angular to
and scarce boulders. Burrows and small roots common.
that forms small veinlets and thin coatings on pebbles.
actures commonly terminate at the contact with unit B,
l) continue downward into older units.

Light-yellowish-brown (10YR 6/4) to light-brown (7.5YR
poorly sorted, pebbly, sandy silt. Bedding is mostly
-dipping pebble line marks the top of the unit in E6N1.
ontains common pebbles and cobbles and scarce
nmon. Occasional carbonate veinlets and coating on
nd irregular.

/6), compact, poorly sorted, slightly clayey, pebbly sandy
subangular to subrounded. Cobbles and boulders
reaks along sub-horizontal planes. Faint columnar
arce. Contact with underlying unit gradational to sharp
aminae in lower part of unit. Unit C has been dated by
000±10,000 to 32,000±24,000 years old in RV-1 and
years old in RV-2 (J.N. Rosholt, written commun., 1984)

loose to indurated (carbonate cemented), poorly sorted
-1), interbedded boulder-cobble gravel and cobbly pebbly
faint horizontal bedding (E2N2, E3N2). Bedding is
RV-1, with some crossbedding. Sandy matrix is weakly
nd rare opaline(?) silica. Carbonate cementation along
rallel to shear zones (fig. 4) is common in RV-2 and is
of cobbles and boulders dip steeply to the northeast
transport directions. Contact with underlying unit is
s been dated in both RV-1 and RV-2 by the uranium-
oil horizon (RV-1R_2, table 4) dates as 180,000±40,000
zon dates as 270,000±30,000 (RV-1R_3) to 310,000±40,000
4Bkb soil horizon in RV-2 dates as 390,000±100,000
commun., 1984) (307L, table 4). Unit D most likely
er and others (1981); equivalents of unit D are shown on

Reddish-yellow (7.5YR 7/6) to pink (7.5YR 8/4),
sandy, cobble gravel with scarce boulders. Clasts
supported. Matrix is massive with a faint subhorizontal
long axes of clasts (fig. 3) indicate westerly transport
rresponds to unit QTa of Hoover and others (1981) (fig.

INTRODUCTION

em trends northeasterly through the southeast corner of
e system records left-lateral offset of Paleozoic and
argent and Stewart, 1971), although total offset amounts
and others, 1982). Distinct scarps in alluvial deposits of
a concentration of seismicity, particularly at its north
ggest that the Rock Valley fault system may be active.
backhoe in 1978 across a 0.5-m-high scarp produced by
system (fig. 2). Preliminary data for these trenches are
and Ander and others (1984, Stop 6, fig. 9). On the basis
the above-mentioned seismicity, a detailed logging of the
vas undertaken during the spring of 1984. This report
the two trenches, (2) a general description of the
ned in these units that are exposed in and near the fault
clast fabric of unfaulted and faulted deposits exposed in
f the surficial deposits in the vicinity of the trenches

Procedures

nches (RV-2, fig. 2) was cleaned using shovels, trowels,
ower meter of the west wall had sloughed back
nce initial excavation. Both trench walls were gridded in
ope (see grid system in explanation of trench logs).
ph paper at a scale of 4 in. to the meter (approximate
RV-1, fig. 2) was more severely eroded and required
ulldozer before cleaning and logging in May 1984, in a

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TABLE 2.--Selected grain-size data and calcium-carbonate content of soils in trench RV-2.[1]

Horizon	Percent Sand	Percent Silt	Percent Clay[2]	Texture[3]	Percent Calcium Carbonate
Av	70.0	19.0	11.0	SL	2.4
2Bk1[4]	73.0	14.9	12.1	SL	1.3
2Bk2[4]	66.1	21.4	12.5	SL	2.1
3Btkb1	58.3	23.2	18.5	fiSL	1.0
3Btkb2	68.7	22.3	9.0	SL	1.2
4Kqb	80.9	11.0	8.1	LcoS	19.9
4Bk/Kb	87.1	7.5	5.4	LcoS	8.4
4Bkb	91.0	5.4	3.6	coS	8.5
5Btb	75.5	16.0	8.5	SL	1.9
5Kb	62.7	23.5	13.8	SL	25.0

[1]All analyses were performed on material less than 2 mm in size.

[2]Values for sand, silt, and clay are based on sieve and pipette analyses. Particle-size limits are: sand, 2 to 0.05 mm; silt, 0.05 to 0.002 mm; clay, less than 0.002 mm.

[3]Textural classes are based on grain-size analyses; co, coarse; fi, fine;

MISCELLANEOUS FIELD STUDIES
MAP MF—1824

OSED IN TRENCHES

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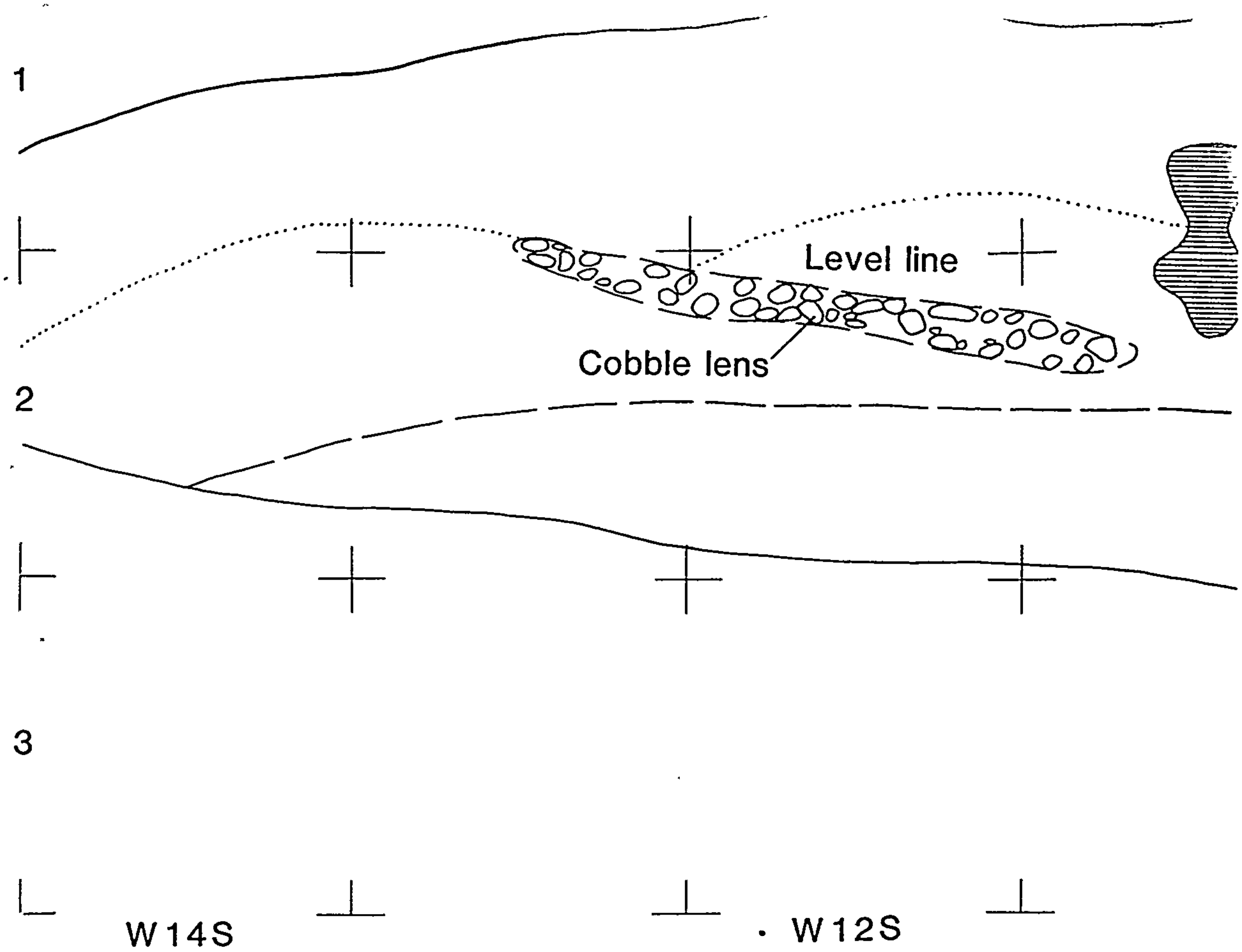
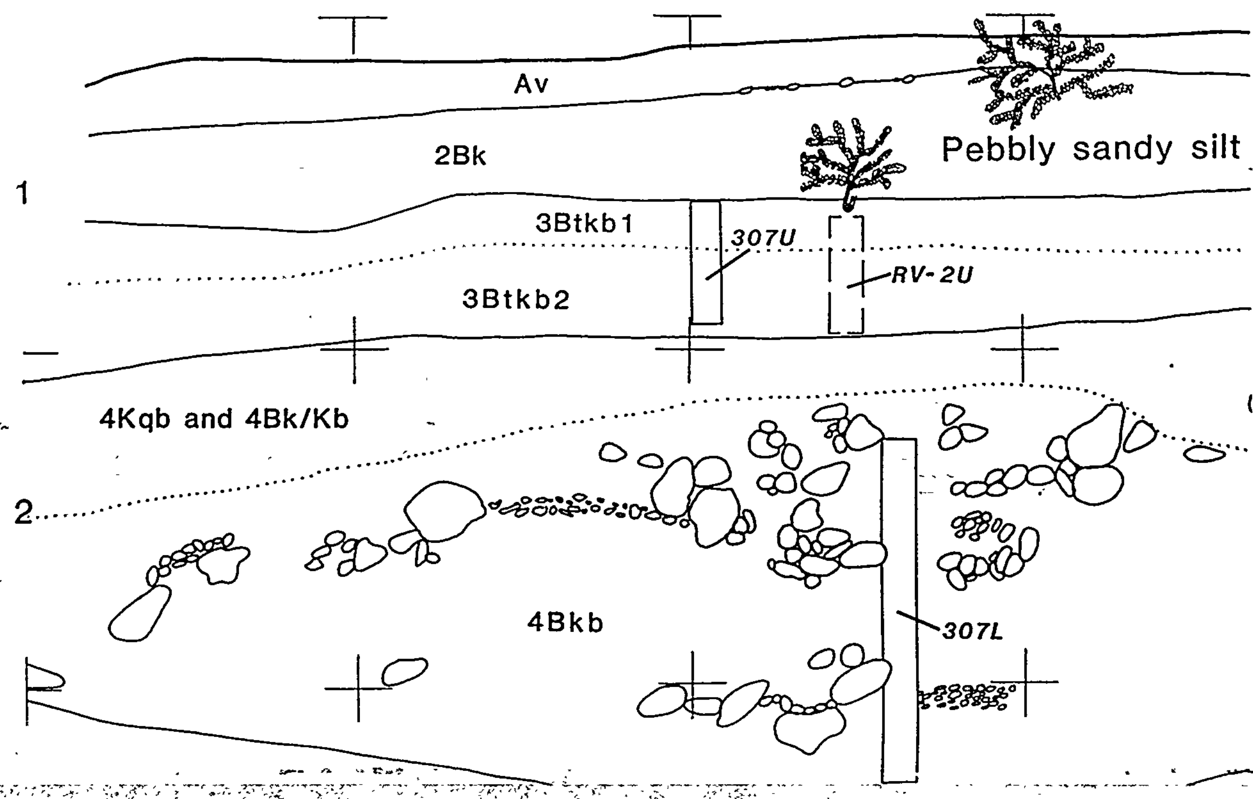
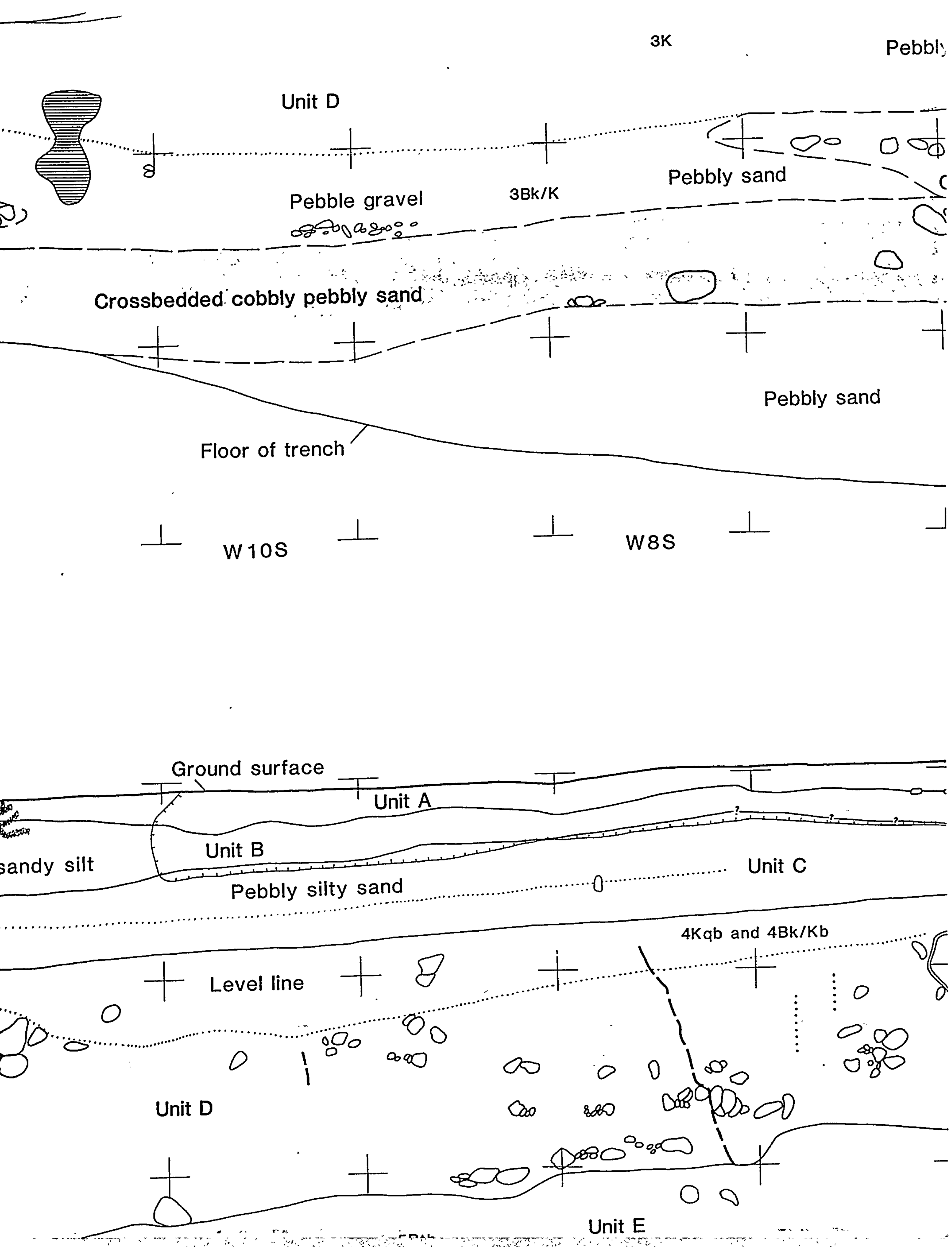
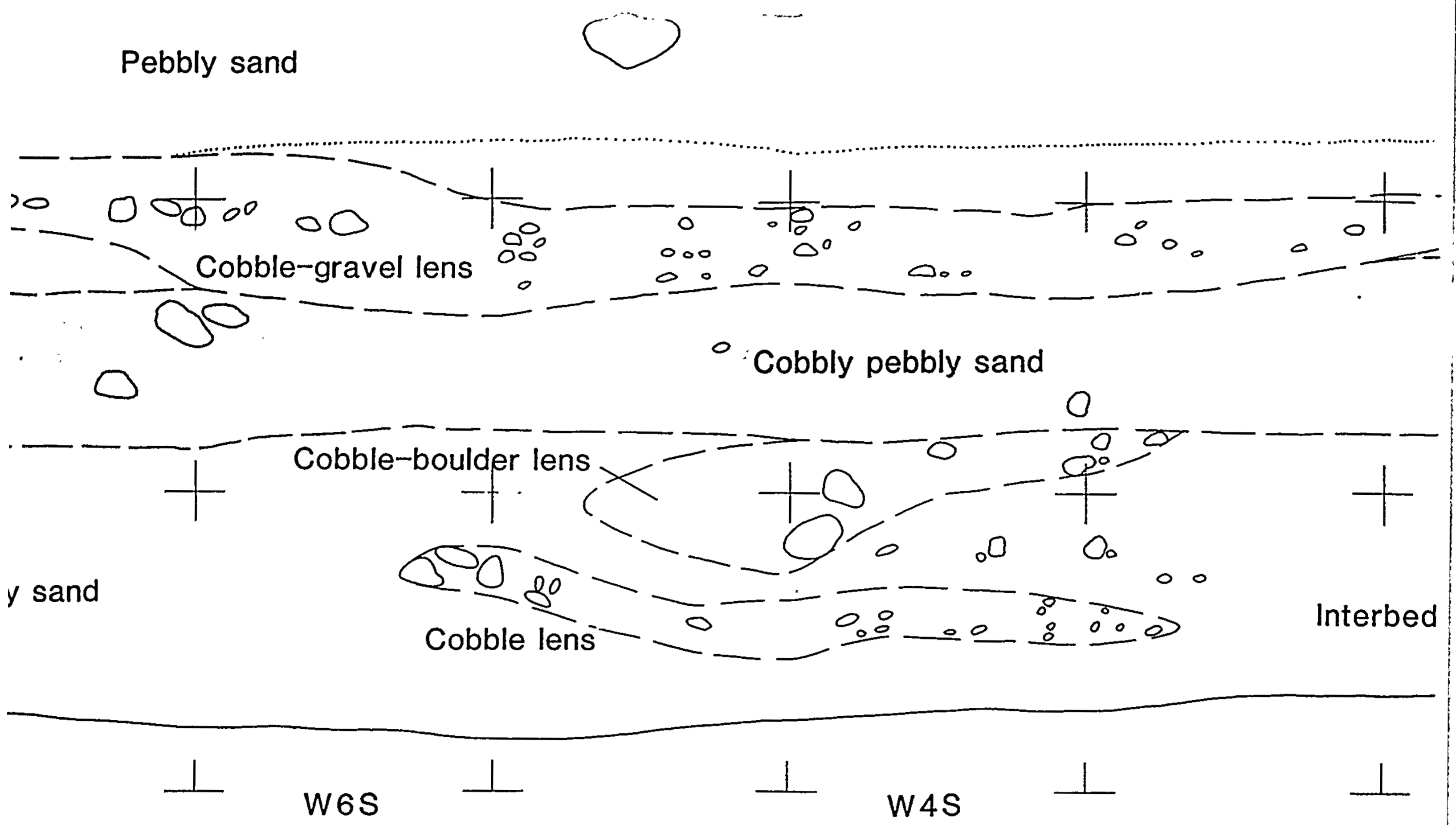
[3]Textural classes are based on grain


1
Level line
Cobble lens
2
3
W14S
W12S

NORTH

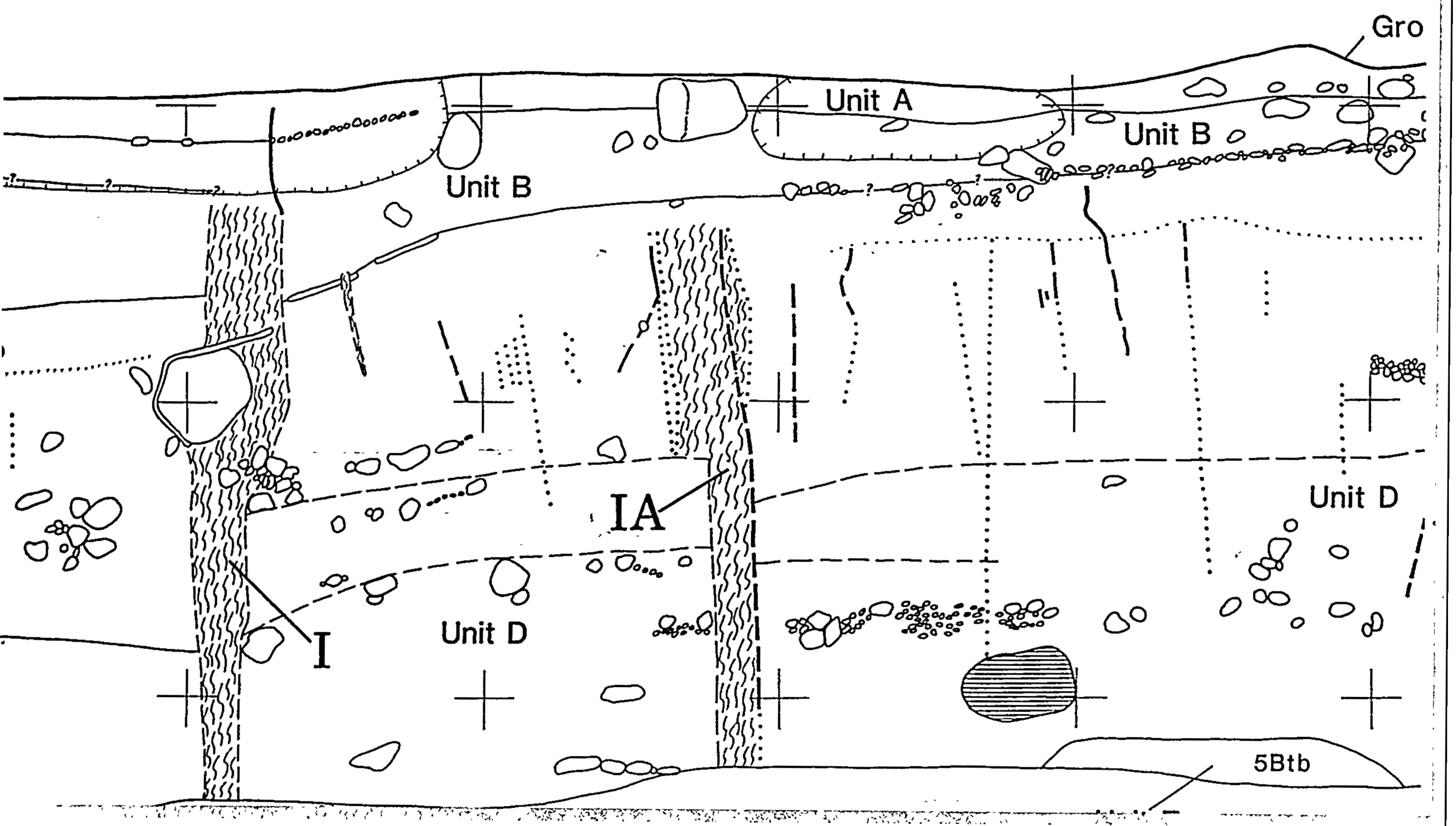

Av
2Bk
Pebbly sandy silt
1
3Btkb1
307U
RV-2U
3Btkb2
4Kqb and 4Bk/Kb
2
4Bkb
307L

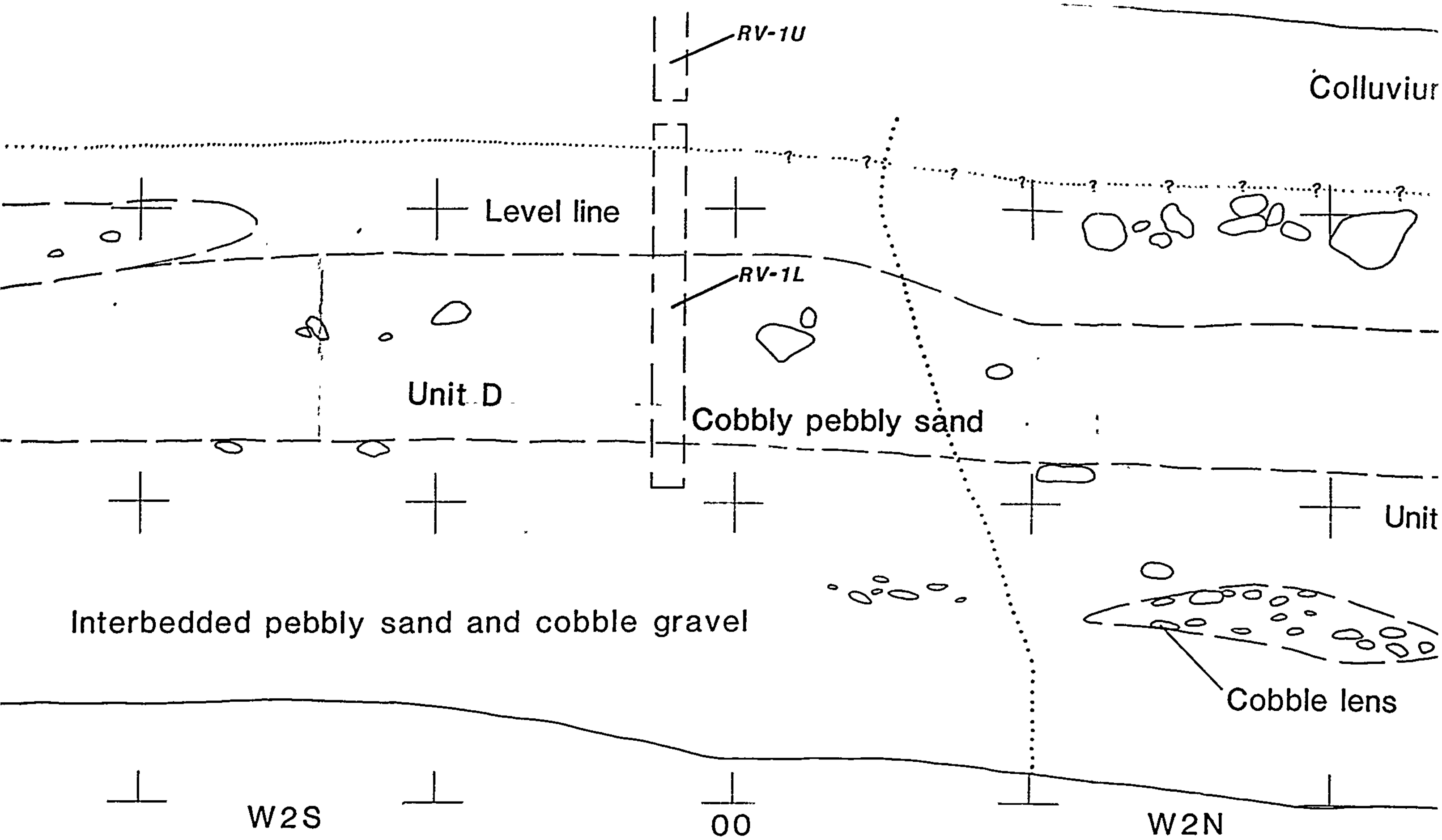

3K
Unit D
Pebbly sand
Pebble gravel
3Bk/K
Crossbedded cobbly pebbly sand
Pebbly sand
Floor of trench
W10S
W8S
Ground surface
Unit A
Unit B
sandy silt
Unit C
Pebbly silty sand
4Kqb and 4Bk/Kb
Level line
Unit D
Unit E

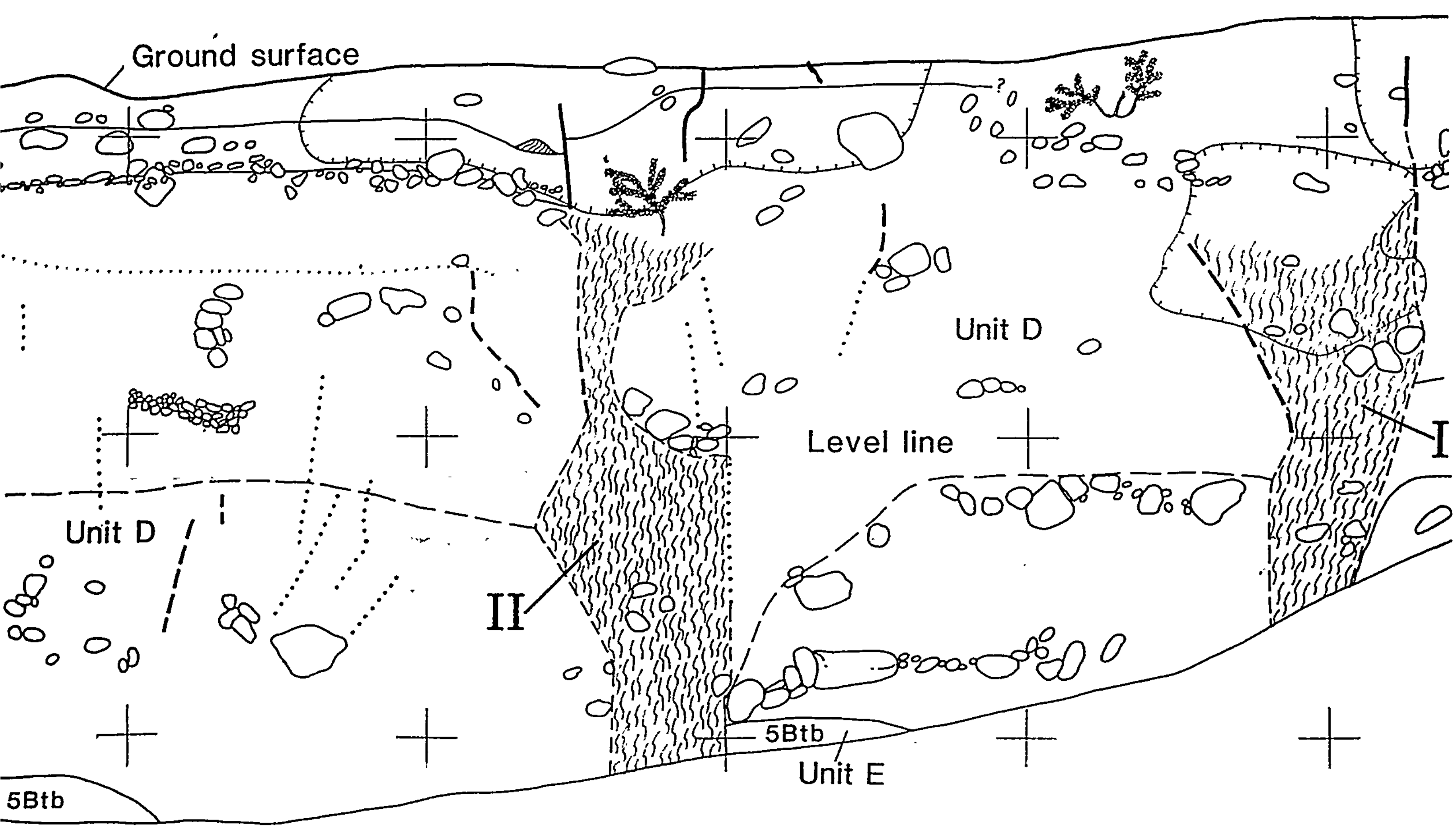


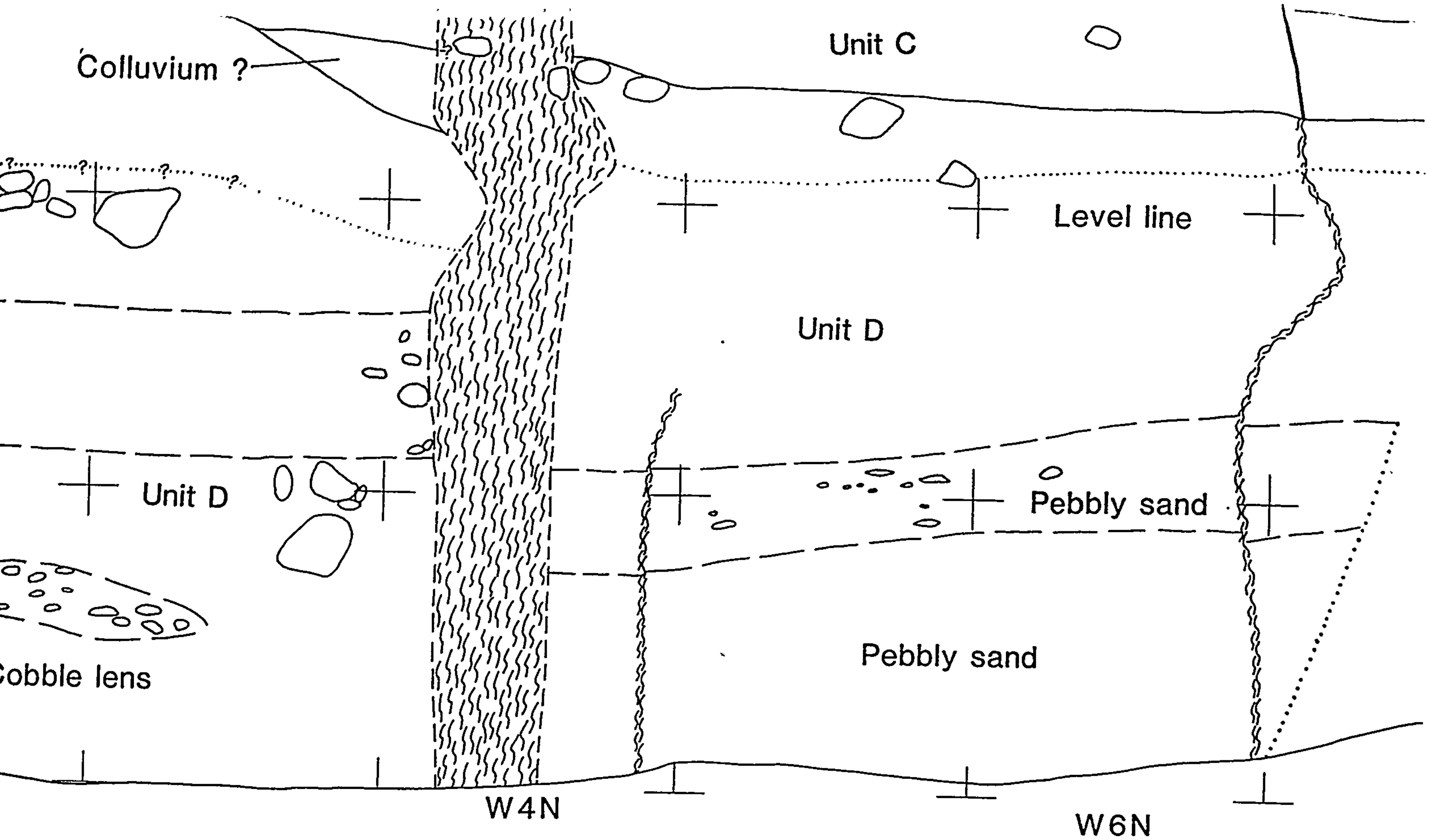
ROCK VALLEY TRENCH 2

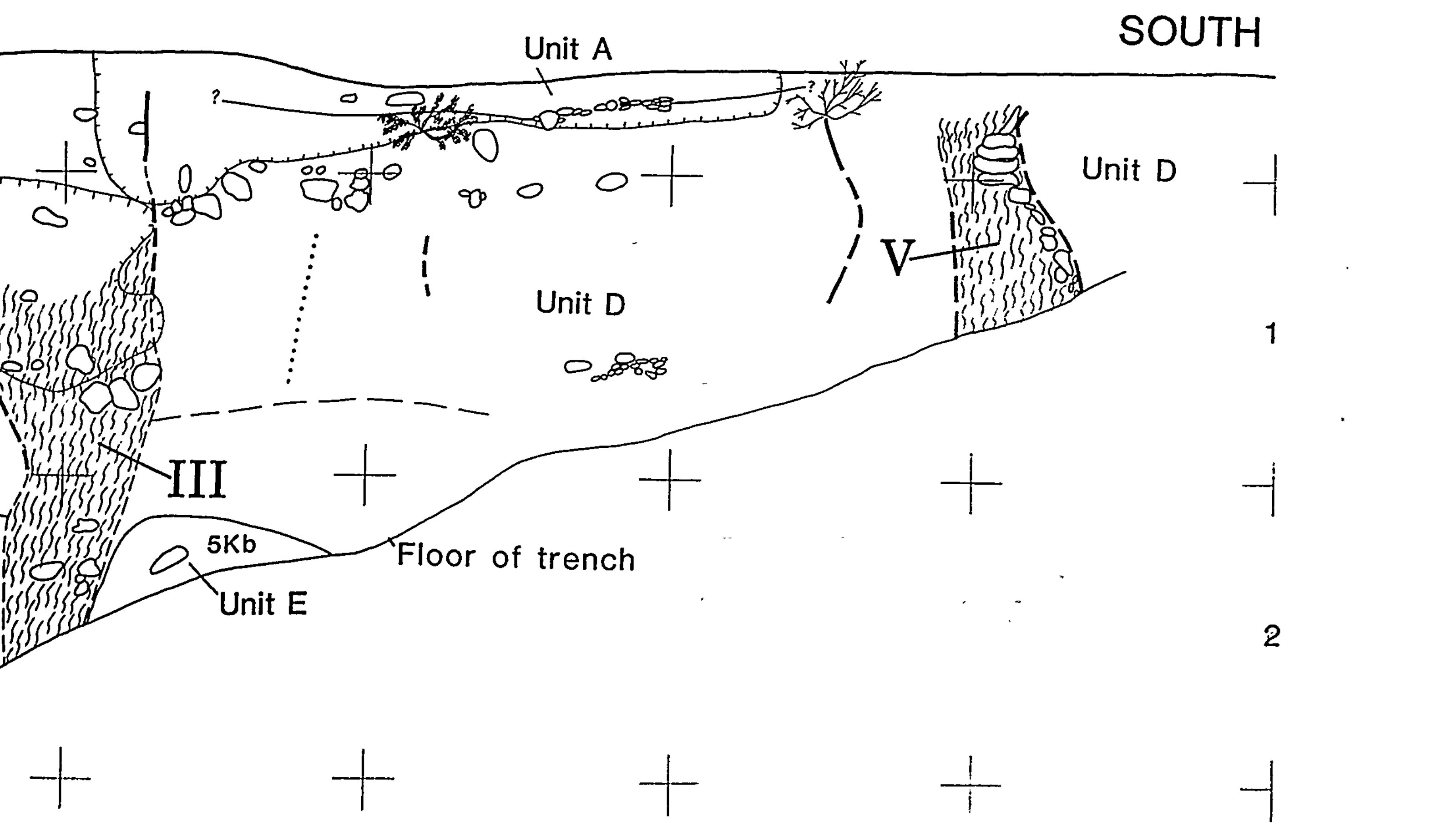
EAST WALL

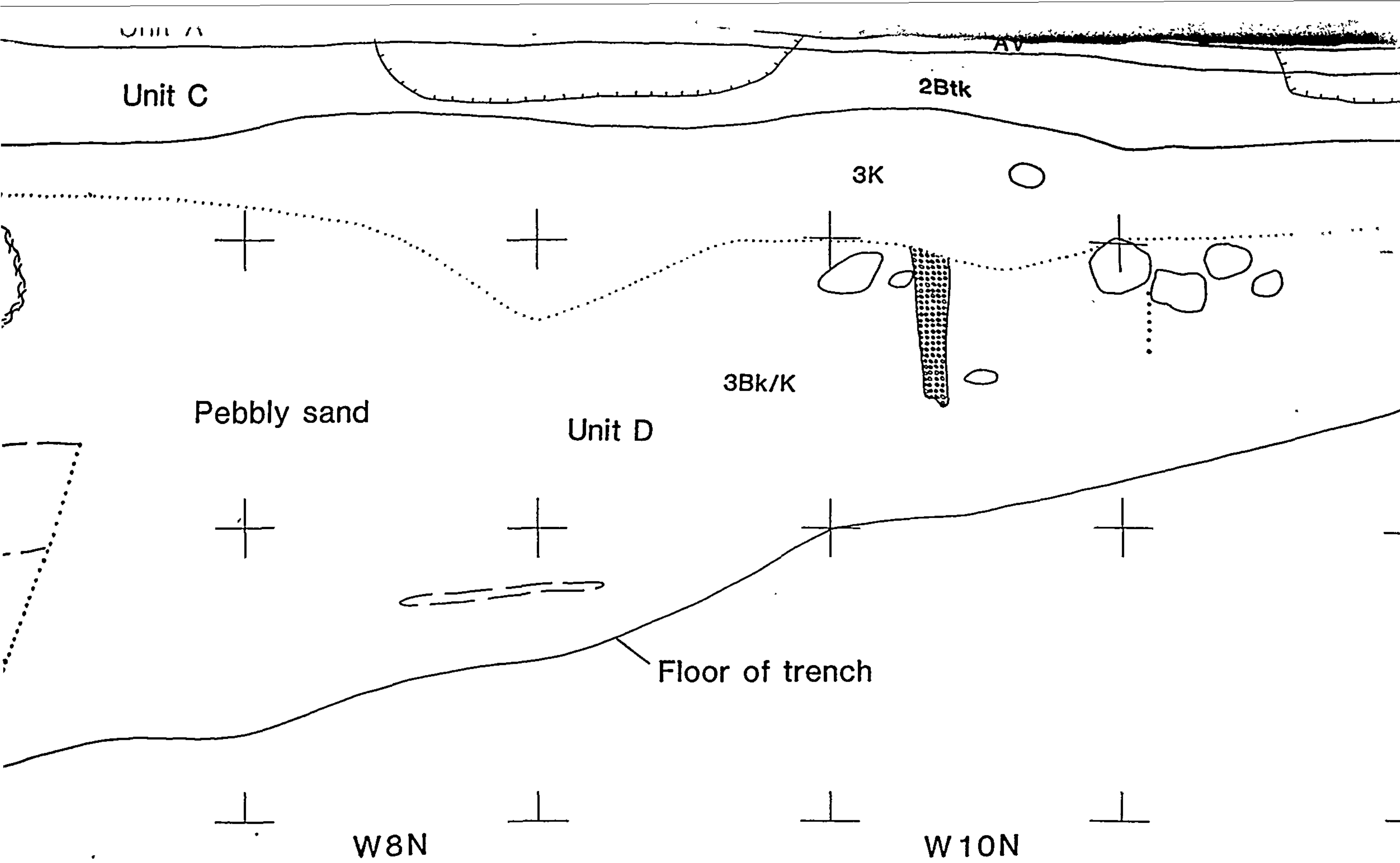



RV-1U
Colluviur
Level line
RV-1L
Unit D
Cobbly pebbly sand
Unit
Interbedded pebbly sand and cobble gravel
Cobble lens
W2S
00
W2N


Ground surface
Unit D
Level line
Unit D
II
I
5Btb
Unit E
5Btb


Colluvium ?
Unit C
Level line
Unit D
Unit D
Pebbly sand
Pebbly sand
Cobble lens
W4N
W6N


SOUTH
Unit A
Unit D
V
Unit D
1
III
5Kb
Floor of trench
Unit E
2



EXPLANATION

GRID PATTERN USED FOR MAPPING WALLS OF TRENCHES RV-1 AND RV-2

EAST WALL

NORTH — ↓ Center of wall (or ~ trace of main fault) — SOUTH

E12N1	E11N1	E10N1	E9N1	E8N1	E7N1	E6N1	E5N1	E4N1	E3N1	E2N1	E1N1	E1S1	E2S1	E3S1	E4S1	E5S1	E6S1	E7S1	E8S1	E9S1	E10S1	E11S1	E12S1
E12N2	E11N2	E10N2	E9N2	E8N2	E7N2	E6N2	E5N2	E4N2	E3N2	E2N2	E1N2	E1S2	E2S2	E3S2	E4S2	E5S2	E6S2	E7S2	E8S2	E9S2	E10S2	E11S2	E12S2
E12N3	E11N3	E10N3	E9N3	E8N3	E7N3	E6N3	E5N3	E4N3	E3N3	E2N3	E1N3	E1S3	E2S3	E3S3	E4S3	E5S3	E6S3	E7S3	E8S3	E9S3	E10S3	E11S3	E12S3
E12N4	E11N4	E10N4	E9N4	E8N4	E7N4	E6N4	E5N4	E4N4	E3N4	E2N4	E1N4	E1S4	E2S4	E3S4	E4S4	E5S4	E6S4	E7S4	E8S4	E9S4	E10S4	E11S4	E12S4

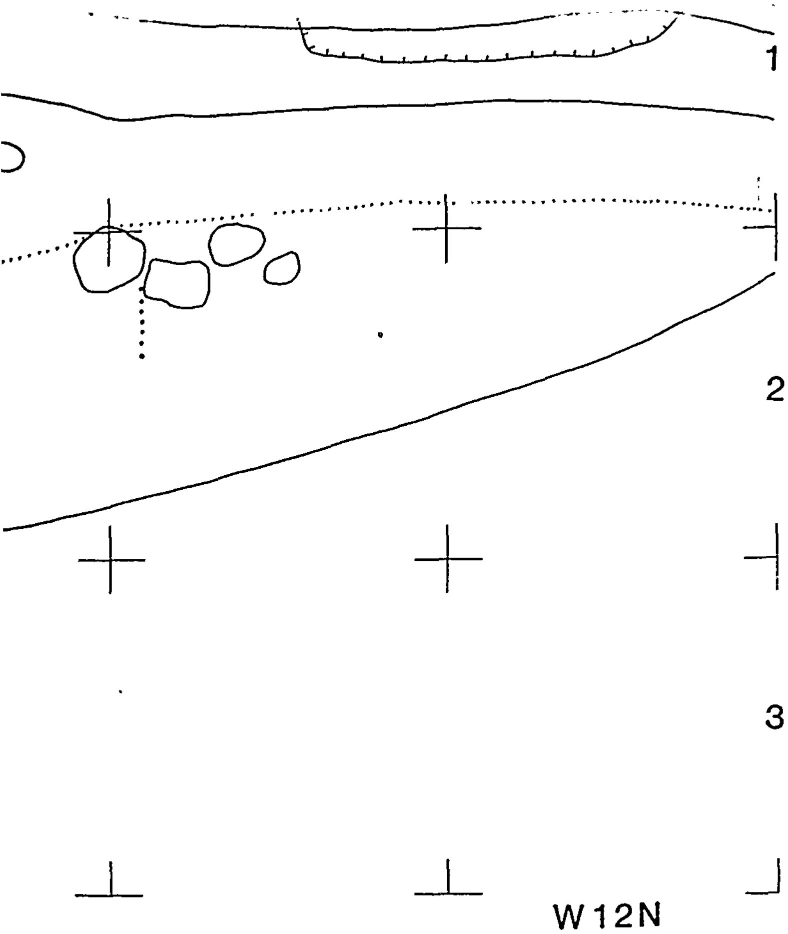
—L

WEST WALL

SOUTH — ↓ Center of wall (or ~ trace of main fault) — NORTH

W12S1	W11S1	W10S1	W9S1	W8S1	W7S1	W6S1	W5S1	W4S1	W3S1	W2S1	W1S1	W1N1	W2N1	W3N1	W4N1	W5N1	W6N1	W7N1	W8N1	W9N1	W10N1	W11N1	W12N1
W12S2	W11S2	W10S2	W9S2	W8S2	W7S2	W6S2	W5S2	W4S2	W3S2	W2S2	W1S2	W1N2	W2N2	W3N2	W4N2	W5N2	W6N2	W7N2	W8N2	W9N2	W10N2	W11N2	W12N2
W12S3	W11S3	W10S3	W9S3	W8S3	W7S3	W6S3	W5S3	W4S3	W3S3	W2S3	W1S3	W1N3	W2N3	W3N3	W4N3	W5N3	W6N3	W7N3	W8N3	W9N3	W10N3	W11N3	W12N3
W12S4	W11S4	W10S4	W9S4	W8S4	W7S4	W6S4	W5S4	W4S4	W3S4	W2S4	W1S4	W1N4	W2N4	W3N4	W4N4	W5N4	W6N4	W7N4	W8N4	W9N4	W10N4	W11N4	W12N4

—L



OF

main fault) SOUTH

E6S1	E7S1	E8S1	E9S1	E10S1	E11S1	E12S1	—LEVEL LINE—
E6S2	E7S2	E8S2	E9S2	E10S2	E11S2	E12S2	
E6S3	E7S3	E8S3	E9S3	E10S3	E11S3	E12S3	
E6S4	E7S4	E8S4	E9S4	E10S4	E11S4	E12S4	

main fault) NORTH

W6N1	W7N1	W8N1	W9N1	W10N1	W11N1	W12N1	—LEVEL LINE—
W6N2	W7N2	W8N2	W9N2	W10N2	W11N2	W12N2	
W6N3	W7N3	W8N3	W9N3	W10N3	W11N3	W12N3	
W6N4	W7N4	W8N4	W9N4	W10N4	W11N4	W12N4	

scale 1:10). The western trench (RV-1, fig. 2) was mor[illegible] minor re-excavation by a small bulldozer before cleaning and logging in a similar manner as for RV-2. Both trenches trend northwest-southeast; thev the trench logs as north-south for simplicity.

Descriptions of bedding features and textures follow guidelines of Co and Folk (1968). The soil-horizon nomenclature and the procedures used to soils (tables 1 and 2) conform to those of Birkeland (1984). Because of scal only the most prominent burrows have been depicted, and minor cracks for shrinkage have not been shown. Clast fabrics were determined by measurin of the long axes (a axes) of clasts and orientation of the plane enclosing the intermediate axes (ab plane). Measurements were made in the field with a compass following procedures described by Karlstrom (1952). Fabric data (analyzed by eigenvalue and eigenvector techniques, which yield mean azim inclination, and cone of confidence estimates for directional data (Schuene others, 1972).

Acknowledgments

We thank John Tinsley, Ed Helley, W C Swadley, Will Carr, and Ernie their thoughtful comments and observations in the field. Suzanne Fouty ass description of RV-1. Bruce Rogers and Ed Helley assisted greatly in prepar logs. We thank John Downing of Pan Am for providing photographic support Oxbourgh of REECO for arranging for re-excavation of the lower part of R Swadley, Malcolm Clark, and John Tinsley made valuable suggestions regard logic.

NATURE AND AMOUNTS OF FAULT DISPLACEMENTS

Faulting is expressed by disruption of alluvial clast fabric (fig. 3) in ne zones 10 cm to 1 m wide; all such zones vertically separate some units and l Bedding within unit D is separated along thin (1-2 cm) shear zones in both w 1. Fractures, with no visible separation across them, are common in both tr trend approximately parallel to the major shear zones (fig. 4).

Amounts of vertical separation across the major shear zones in both t listed in Table 3. Total vertical separation of unit E from within RV-2 is 12 down to the north; however, the 5Kb soil horizon of unit E is exposed at the surface approximately 10 m south of the south end of the trench. Using this the top of unit E, the total vertical separation of unit E would be 257 to 295 the north. The base of unit C is separated less than 5 cm to as much as 25 c shear zone in RV-1 and less than 10 cm to as much as 32 cm along shear zon RV-2. The sense of separation is down to the north in both trenches.

The vesicular silt of unit A caps the shear zone in RV-1. Unit A and t sandy silt of unit B extend across shear zones I, IA, and II in the east wall of apparent thickening of unit B just south of shear zone I may represent infilli fault plane by colluvium. Unit A caps all shear zones in the west wall of RV is truncated by shear zones II and III. Colluvial material cuts down through shear zones I and IA, indicating some period of local dissection and backfilli deposition of unit B.

Open fractures extend over shear zones into unit A in RV-1 (W7N1) an and B in RV-2 (E1S1, E6S1, and possibly E9S1). With the possible exception fracture in E6S1 of RV-2, no offset of these units can be demonstrated along fractures. The thinness of units A and B (10-30 cm total thickness) and the burrowing and cracking within these units make it doubtful that any record disturbance would be recognizeable within them.

The poorly developed bedding and coarse-grained character of the exp make it difficult to assess the amount of strike-slip motion that may have t along shear zones. No slickensides, mullion structures, or gouge marks have observed along the surfaces bounding the zones of shear. The clast fabric w zones II and IV (RV-2) is dominated by subhorizontal northwest-trending orie long axes; the fabric within shear zones I and IA is strongly vertical. One in of this difference in fabric orientation is that the slip direction for shear zo differed from the slip direction in shear zones II and IV. Continued excavati shear planes and detailed study of clast fabrics that developed where sense o known are required to further evaluate the direction and magnitude of obliq recorded on this strand of the Rock Valley fault.

AGE OF FAULTING

Unit D, dated as 180,000±40,000 to 390,000±100,000 years old (table 4), shear zones transecting RV-1 and RV-2. Unit C, dated as 31,000±10,000 to 3 years old (table 4), is cut by the shear zone in RV-1 and shear zone I in RV-2. thin to the south of the shear zone in RV-1 (west wall) and exists only as resi fragments lying above the 4Kqb soil horizon south of shear zone IA in RV-2. presumed that unit C has been stripped off the elevated (south) block after f shear zones I and IA. Additionally, fragments of unit C, too small to be show are found within shear zone I in RV-2. These observations indicate that fault shear zone in RV-1 and shear zones I and IA in RV-2 took place sometime aft 31,000±10,000 to 38,000±10,000 years ago. The presence of clay-rich fragme in shear zone I requires that faulting took place after the development of an horizon in unit C. Because the uranium-trend technique dates the time of se (Rosholt, 1980), the 31,000 to 38,000-year date could be regarded as a maxim the most recent faulting on the shear zone in RV-1 and shear zones I and IA i

An episode of faulting that preceded the offset of unit C can be deduce fact that the total vertical displacement [illegible]

›› ›t 1 m, to the meter (approximate
'as more severely eroded and required
cleaning and logging in May 1984, in a
d northwest-southeast; they are shown on

res follow guidelines of Compton (1962)
and the procedures used to describe the
.nd (1984). Because of scale limitations,
cted, and minor cracks formed by soil
ere determined by measuring orientation
n of the plane enclosing the long and
e made in the field with a Brunton
strom (1952). Fabric data (fig. 3) were
ies, which yield mean azimuth, mean
directional data (Schuenemeyer and

nents

idley, Will Carr, and Ernie Anderson for
ie field. Suzanne Fouty assisted in the
r assisted greatly in preparation of the
viding photographic support and Ned
tion of the lower part of RV-1. W C
valuable suggestions regarding form and

AULT DISPLACEMENTS

al clast fabric (fig. 3) in near-vertical
y separate some units and bedding.
cm) shear zones in both walls of RV-
cm, are common in both trenches and
ones (fig. 4).

najor shear zones in both trenches are
t E from within RV-2 is 125 to 142 cm
of unit E is exposed at the ground
d of the trench. Using this elevation as
unit E would be 257 to 295 cm down to
an 5 cm to as much as 25 cm along the
h as 32 cm along shear zones I and IA in
th in both trenches.

one in RV-1. Unit A and the pebbly
, and II in the east wall of RV-2. The
one I may represent infilling along the
nes in the west wall of RV-2, but unit B
aterial cuts down through unit B along
al dissection and backfilling following

unit A in RV-1 (W7N1) and into units A
th the possible exception of the
can be demonstrated along any of these
n total thickness) and the abundance of
doubtful that any record of tectonic

ined character of the exposed deposits
o motion that may have taken place
ires, or gouge marks have been
shear. The clast fabric within shear
al northwest-trending orientations of
strongly vertical. One interpretation
slip direction for shear zones I and IA
id IV. Continued excavation along the
t developed where sense of motion is
on and magnitude of oblique-slip

ING

00,000 years old (table 4), is cut by all
ated as 31,000±10,000 to 38,000±10,000
and shear zone I in RV-2. Unit C is
all) and exists only as residual
of shear zone IA in RV-2. It is
ated (south) block after faulting along
it C, too small to be shown on the log,
vations indicate that faulting on the
took place sometime after
sence of clay-rich fragments of unit C
er the development of an argillic B
lique dates the time of sedimentation
d be regarded as a maximum date for
and shear zones I and IA in RV-2.

t of unit C can be deduced from the
of unit C is 1 to 2.5 m less than the

[3]Textural classes are based on grain-size analyses: co, coarse; fi, fine; LS, loamy sand; SL, sandy loam; S, sand.

[4]Horizons 2Bk1 and 2Bk2 are not shown as seperate horizons on the trench logs for RV-2. They are shown as one horizon designated 2Bk.

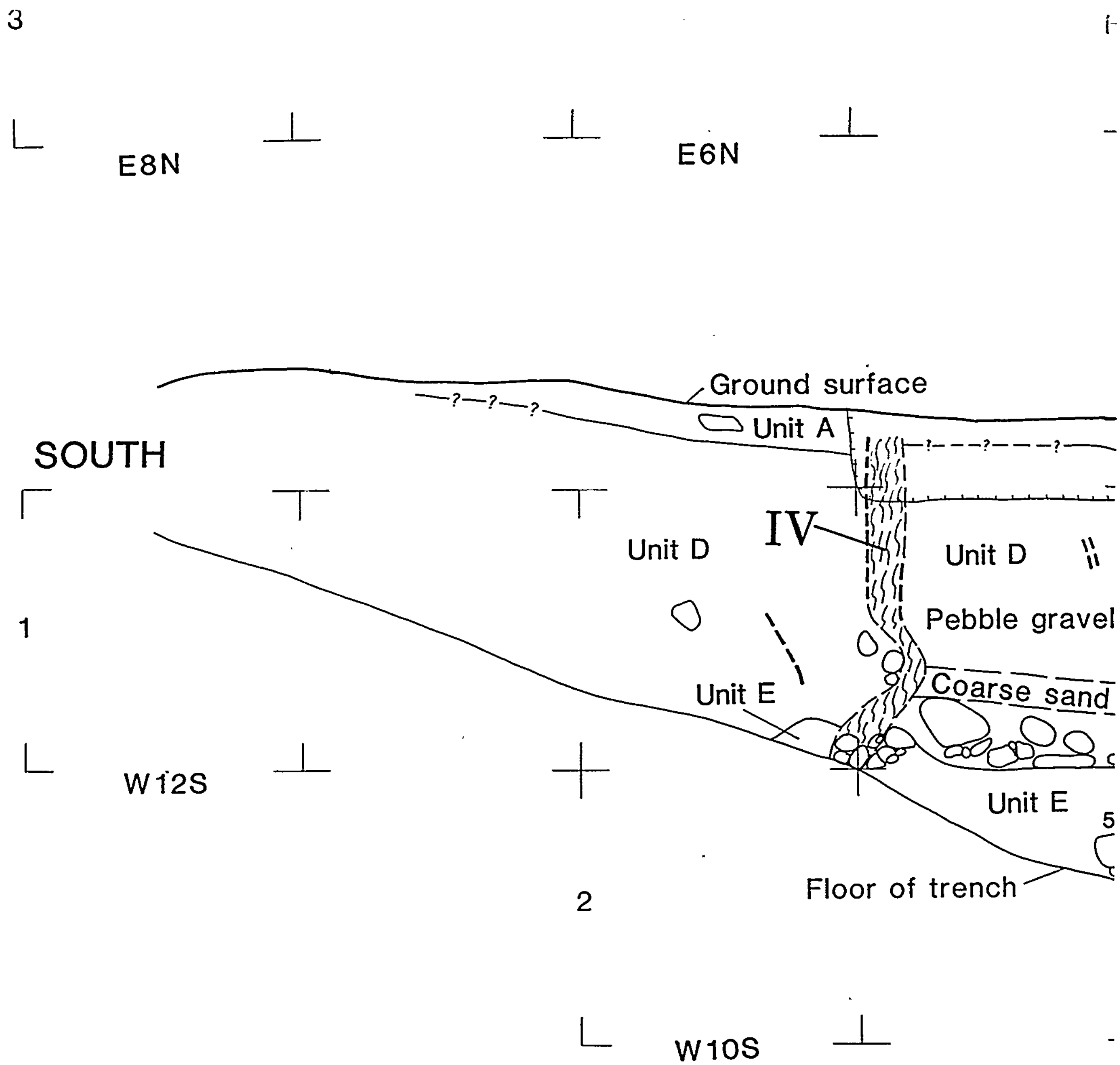
TABLE 3.--Vertical separation of stratigraphic contacts and bedding elements across shear zones

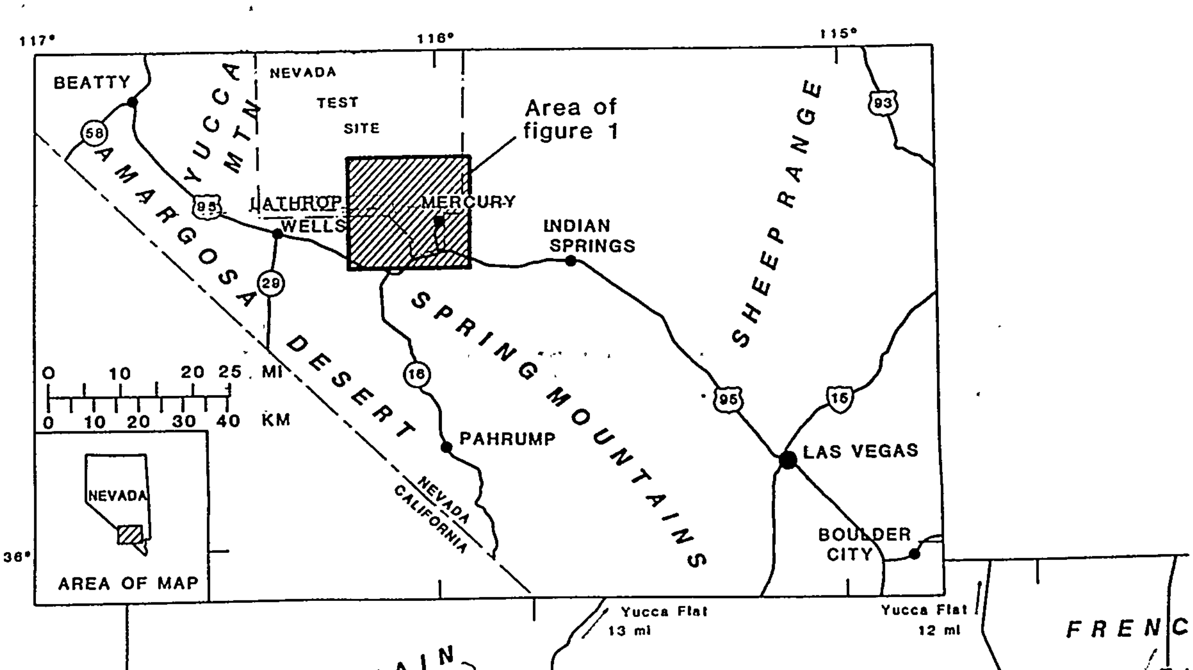
Location	Shear Zone	Stratigraphic Contact or Bedding Element	Vertical Separation	Sense of Motion
		Trench RV-1		
East wall		Base unit C	25 cm	Down to north
West wall		Base unit C	< 5 cm	Down to north?
		Base pebbly sand within unit D	38 cm	Down to north
		Trench RV-2		
East wall	I	Base unit C	< 10 cm	Down to north
	I + IA	Base unit D	39 cm	Down to south
	II	Base unit D	22 cm	Down to north
	III	Base unit D	80 cm	Down to north
	V	Base unit D	At least 79 cm	Down to north
	V to unit E at ground surface 10 m south of south end of trench	Top unit E	153 cm	Down to north
Total vertical separation of base of unit D, 142 cm within trench; 295 cm to bring unit E to its ground-surface elevation south of trench.				
West wall	I + IA	Base unit C	32 cm	Down to north
	I + IA + II	Base unit D	18 cm	Down to north
	III	Base unit D	89 cm	Down to north
	IV	Base unit D	18 cm	Down to north
	IV to unit E at ground surface 10 m south of south end of trench	Top unit E	132 cm	Down to north
Total vertical separation of base of unit D, 125 cm within trench; 257 cm to bring unit E to its ground-surface elevation south of trench.				

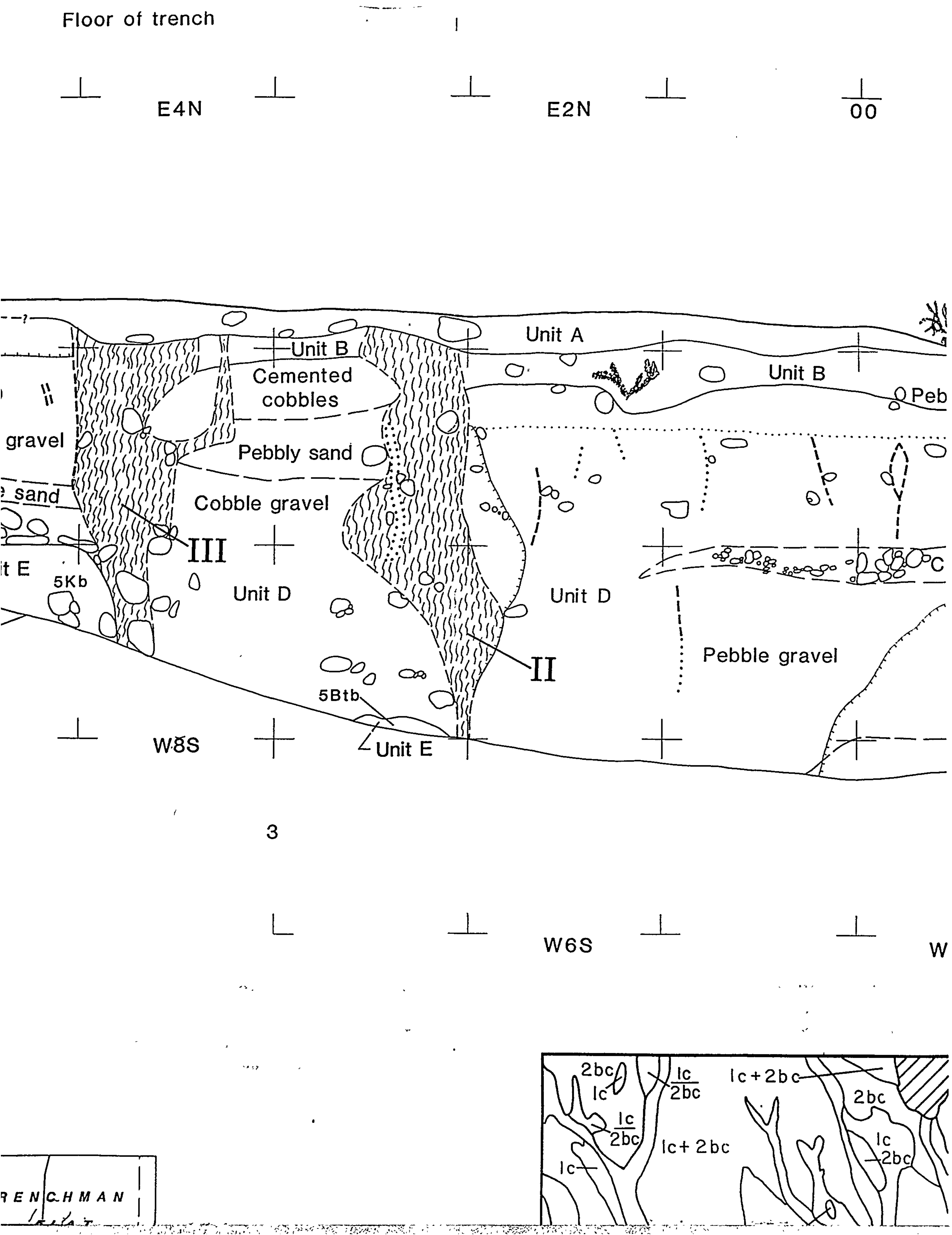
TABLE 4.-- Uranium-trend ages from trenches RV-1 and RV-2

Sample No.	Lithologic Unit	Grid Coordinate	Age (Years B.P.)
		Trench RV-1	
RV-1U	Unit C and unit D	W1S1	31,000±10,000[1,2]
RV-1L	Unit D	W1S1 - W1S2	310,000±80,000[1,2]
RV-1R$_1$	Unit C	E5N1	32,000±24,000[3]
RV-1R$_2$	Unit D	E5N1	180,000±40,000[3]
RV-1R$_3$	Unit D	E5N2	270,000±30,000[3]
		Trench RV-2	
RV-2U	Unit C	E6N1	36,000±20,000[3]
307U	Unit C	E6N1	38,000±10,000[2]
307L	Unit D	E6N2	390,000±100,000[3]

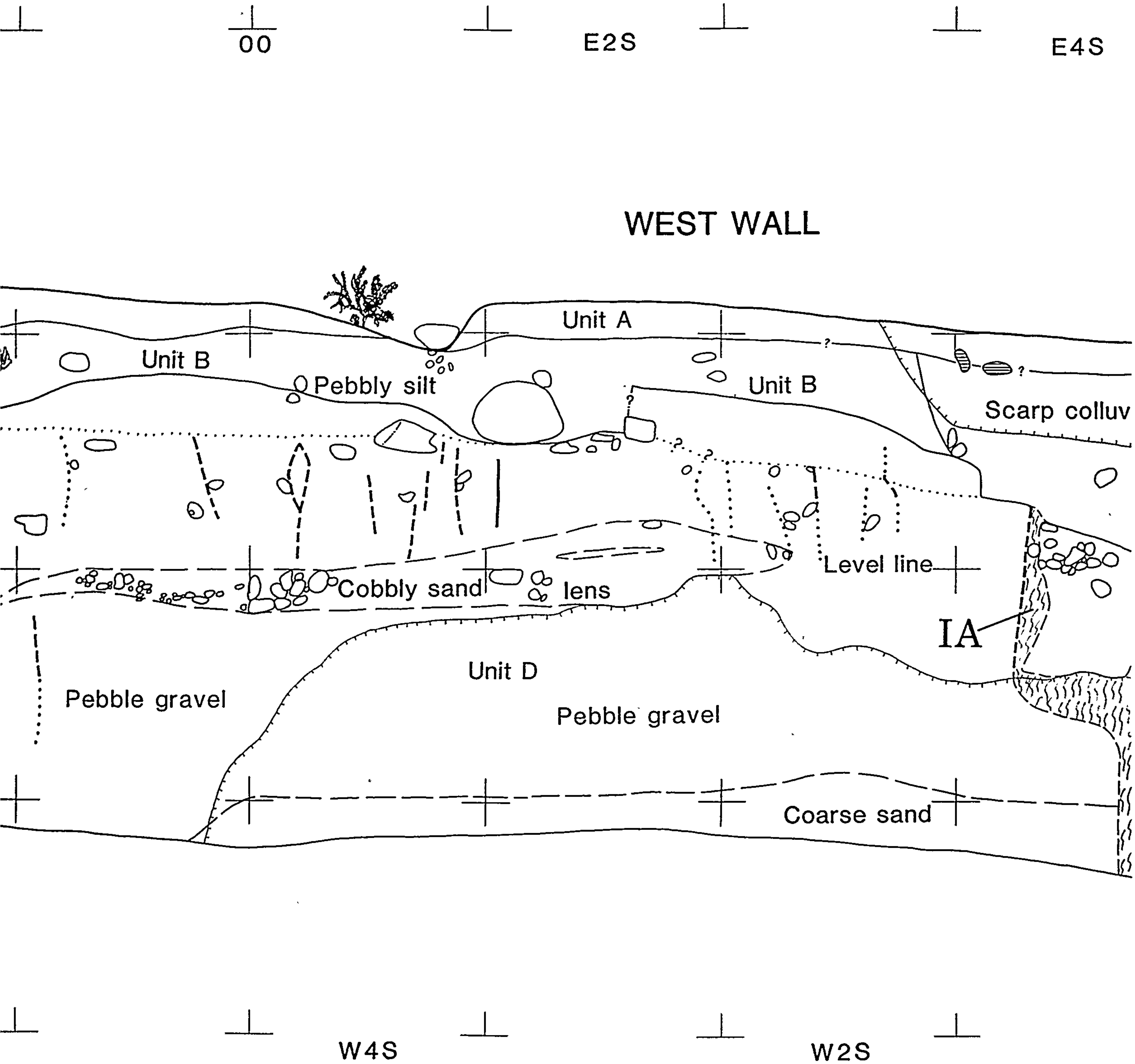
[1]Error [illegible]


3
E8N
E6N
Ground surface
Unit A
SOUTH
IV
Unit D
Unit D
Pebble gravel
1
Coarse sand
Unit E
W12S
Unit E
5
Floor of trench
2
W10S

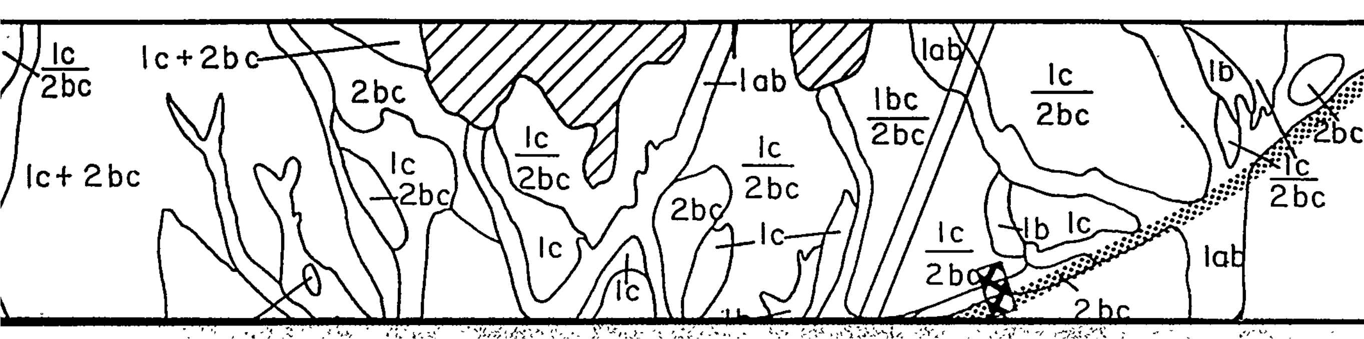

117°
116°
115°
BEATTY
NEVADA
TEST
SITE
YUCCA MTN
Area of
figure 1
58
95
LATHROP
WELLS
MERCURY
INDIAN
SPRINGS
SHEEP RANGE
93
AMARGOSA
29
DESERT
SPRING MOUNTAINS
16
95
15
0 10 20 25 MI
0 10 20 30 40 KM
PAHRUMP
LAS VEGAS
NEVADA
NEVADA
CALIFORNIA
BOULDER
CITY
36°
AREA OF MAP
Yucca Flat
13 mi
Yucca Flat
12 mi
FRENC



Floor of trench
E4N
E2N
00
Unit A
Unit B
Unit B
Cemented cobbles
gravel
Peb
Pebbly sand
sand
Cobble gravel
III
t E
5Kb
Unit D
Unit D
C
II
Pebble gravel
5Btb
W8S
Unit E
3
W6S
W
2bc
lc
lc/2bc
lc+2bc
2bc
lc/2bc
lc+2bc
lc
lc/2bc
RENCHMAN



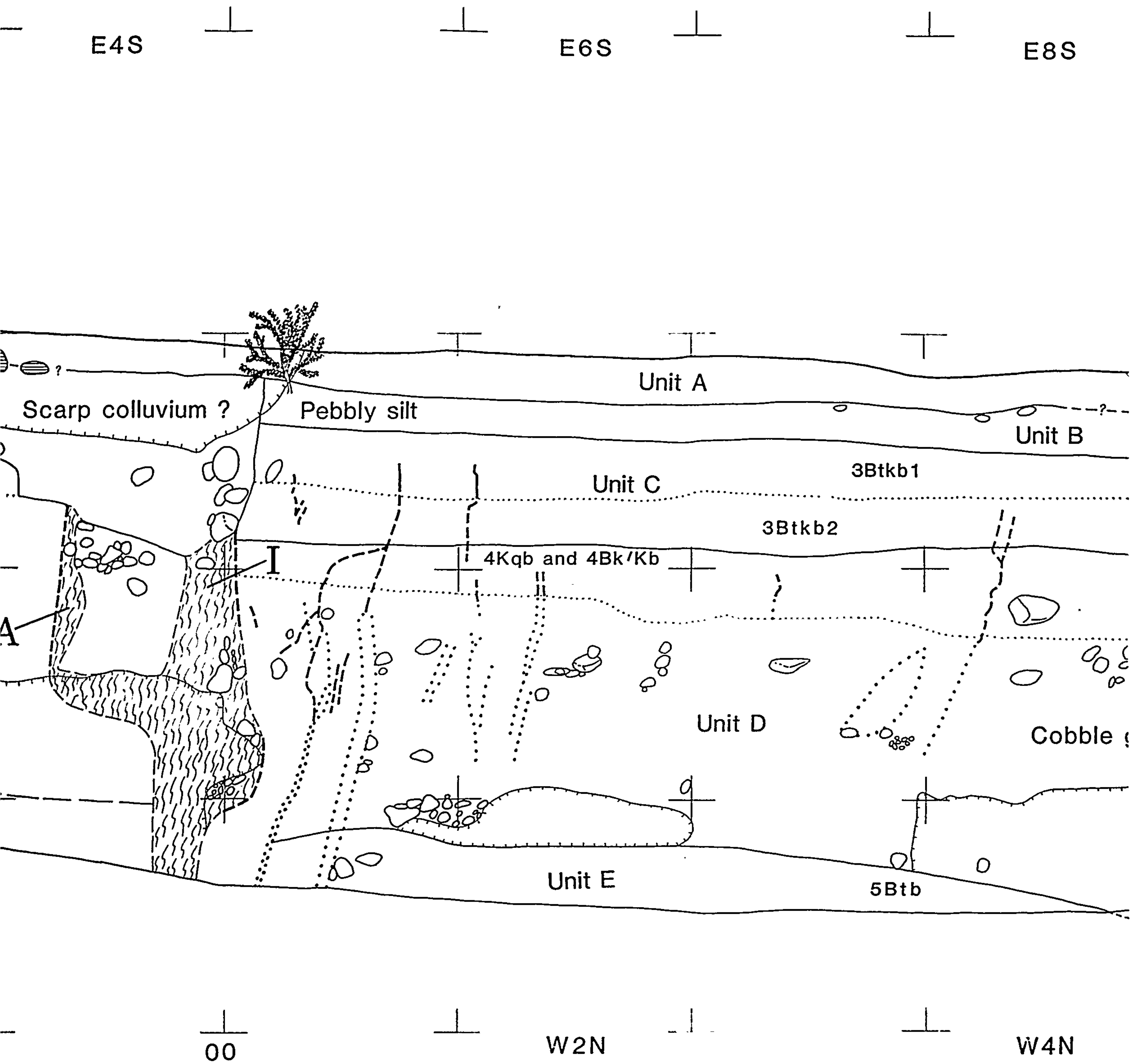
116° 07'30"



Quaternary
which gives
these deposi
leading Q.
separately a
1c/2bc) indi
the underlyi

Mc

1a Ac

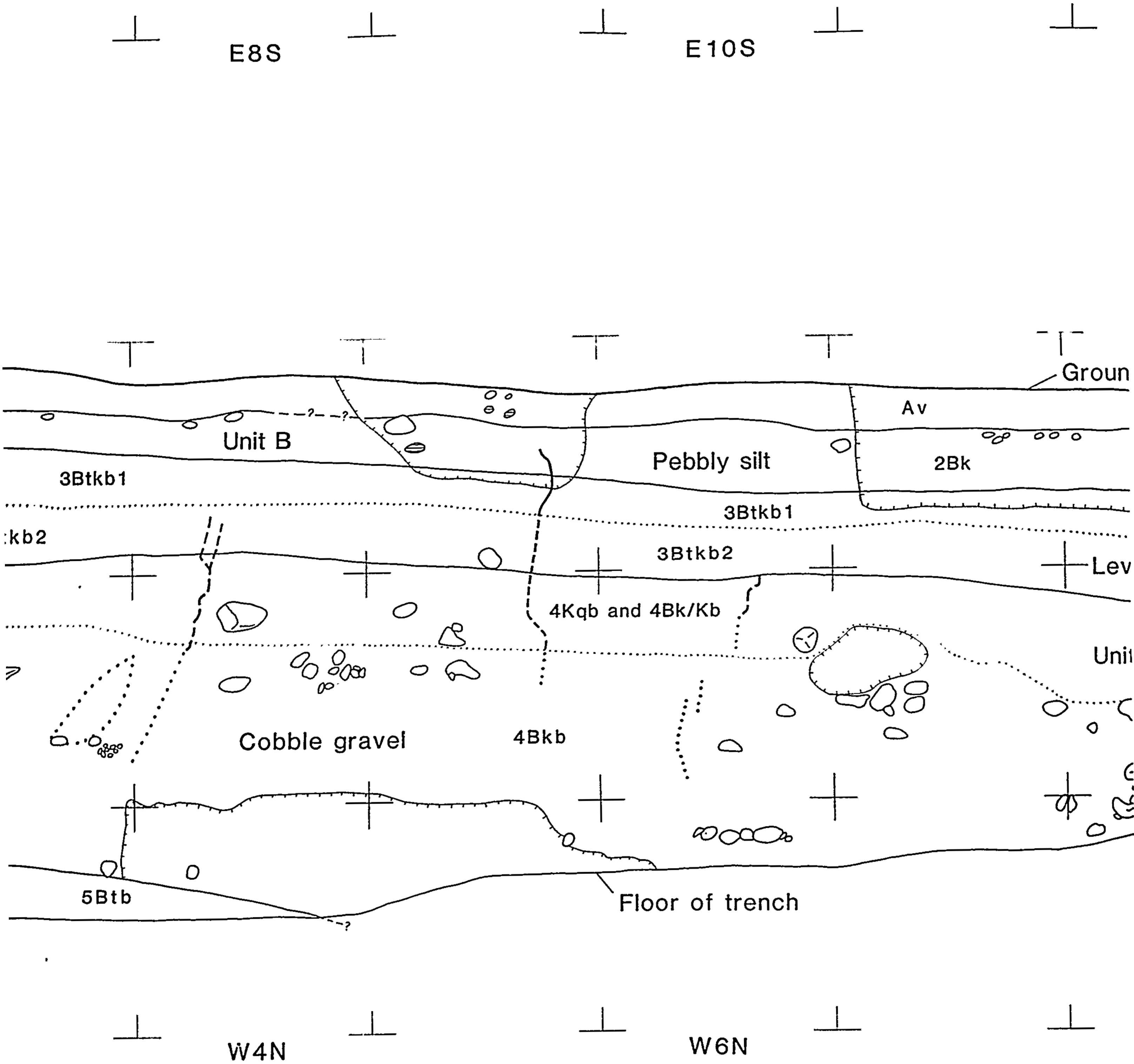


EXPLANATION FOR FIGURE 2
DESCRIPTION OF MAP UNITS

Quaternary map units shown on figure 2 are modified from Hoover and others (1981), which gives a more detailed discussion of the nomenclature and stratigraphic relations of these deposits. With the exception of unit QTa, unit designators are shown without the leading Q. Compound units (such as 1ab) indicate that the two units cannot be delineated separately at the scale of mapping (1:12,000). Fractional unit designators (such as 1c/2bc) indicate a veneer of a young deposit that masks but does not completely conceal the underlying older deposit.

[hatched box] Modified land—Modified by construction, filling, or excavation

1a Active wash deposits—Loose sand and gravel occupying well-defined channel floors. Unvegetated, lacks pavement. Channel form is unmodified. Unit Q1a of Hoover and others (1981)



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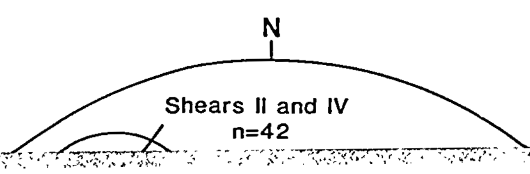
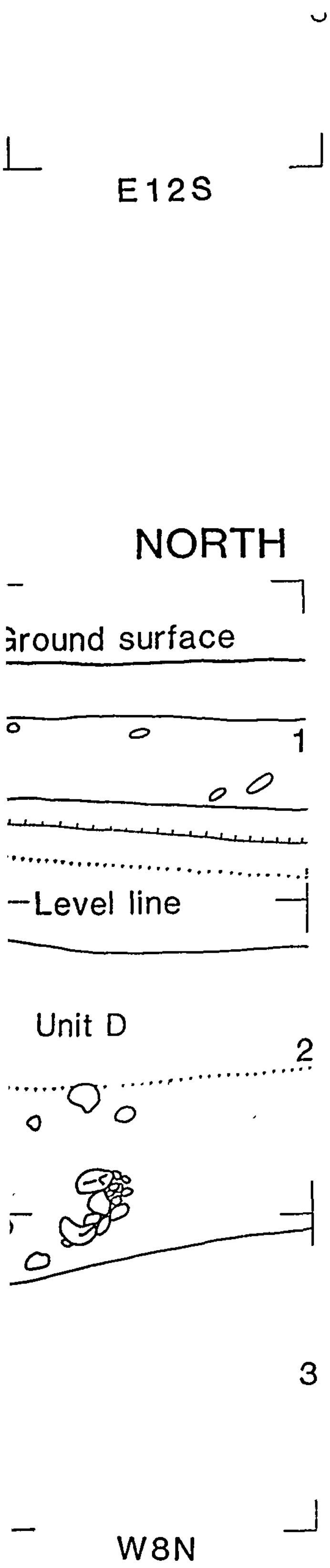




ed in cooperation with the
ent of Energy, Nevada Nuclear
e Investigations Project
agreement DE-AI08-44802).

LITHOLOGIC UNIT BOUNDARY--Dashed wh approximately located; queried where uncertain

SOIL-HORIZON BOUNDARY—Within lithologic u most soil horizon boundaries correspond wit lithologic unit boundaries. Queried where un

INTERNAL BEDDING

FRACTURES

Open fractures

Carbonate-coated fractures

Carbonate-cemented fractures

IA SHEAR ZONE--Numbers refer to text and table 3

RECESS IN WALL--Due to collapse or to excavation

COBBLES AND BOULDERS

BURROWS

PELLETS--Carbonate-rich concretions

UNIT D — UNIT DESIGNATION

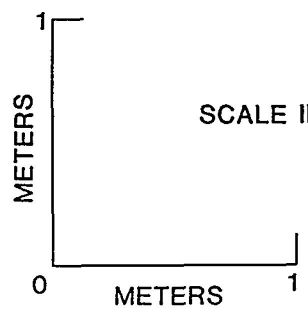
2Bk — SOIL-HORIZON DESIGNATION--See table 1

KEY MARKER BED--Bed used for measurin relative fault displacement

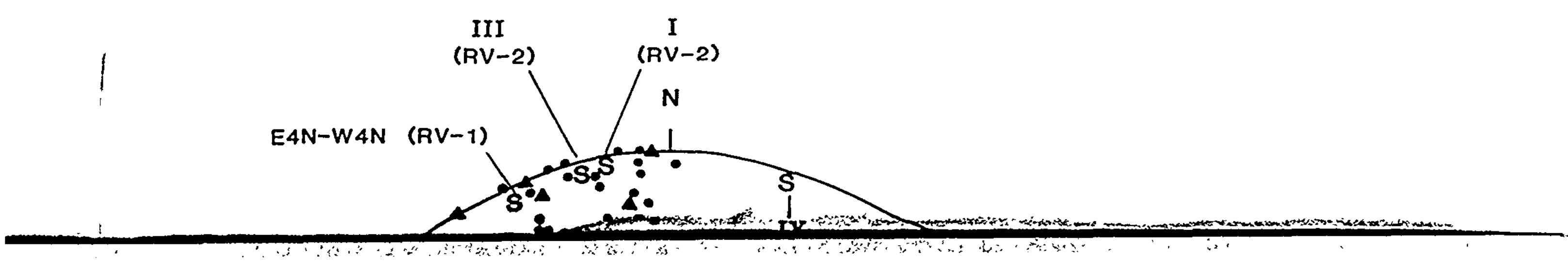
RV-1U — SAMPLE INTERVAL FOR URANIUM-TREND DATING--Dashed where location uncert numbers refer to text and table 4

PLANT

CARBONATE LAMINAE--Stage IV secondary carbonate accumulation



SCALE IN METERS--Vertical equals horizon



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fact that the total vertical displacement of the base of unit C is 1 to 2.5 m less t total vertical offset of the top of unit E along the length of RV-2 (table 3). The c to preclude an early phase of faulting is to demonstrate an appreciable northerly the upper surface of unit E prior to faulting. Natural exposure of the upper conta unit E in the wash approximately 0.5 km east of RV-2 (see arrow, fig. 2) indicate this contact is horizontal. Subsurface investigation with a sledge-hammer source refraction system demonstrated that the upper contact of unit E dips less than 5° area 100 to 500 m north of the north end of RV-2. Therefore, it is inferred that t upper contact of unit E exposed in RV-2 was nearly horizontal before faulting.

Further support for multiple movement on shear zones I and IA comes from difference in sense of motion required along those zones to explain the position of C and E. Unit E is displaced up to the north across shear zones I and IA. Possibly shear zones behaved antithetically during faulting on shear zones II through V, downdropping a small block of unit E between shear zones IA and II. Unit C, on th hand, is down to the north across shear zone I. If motions are dominantly dip slip only a second period of faulting, restricted to shear zones I and IA, could explain reversal of movement sense. A simpler explanation, not necessarily requiring mul periods of faulting, would be that significant strike-slip displacement has taken pl this strand of the Rock Valley fault. An evaluation of the amount of strike-slip displacement will require continued excavation along the fault planes exposed in t trenches.

No clasts of unit E matrix or wedges of unit E material appear near the base D in the vicinity of the shear zones that cut both unit D and unit E. Hence, an ea period of faulting may postdate the deposition of unit D, rather than being contin active during the deposition of unit D. All shear zones in RV-2 appear to cut the soil horizon at the top of unit D. Assuming this horizon to be equivalent to the da soil horizon in RV-1 (RV-1R_2, table 4), this indicates that some faulting postdates 180,000 years.

Units A and B have not been dated. They are younger than the 31,000- to 38 year-old unit C, which underlies them. Owing to the equivocal evidence for faulti within units A and B and the uncertainty about their age, no constraining date you than 31,000 to 38,000 years can be assigned to faulting along any shear zones in R RV-2.

In summary, deposition of unit D on an irregular, but nearly horizontal surf unit E was followed by a total of 1.4 to 2.9 m of vertical separation along five she zones in RV-2 sometime after 180,000 years ago. The sense of separation was dov the north on shear zones II through V, while approximately 50 cm of antithetic sep that was down to the south took place on shear zones I and IA. Deposition of unit followed by a second episode of faulting that produced 10 to 32 cm of vertical sep along shear zones I and IA sometime after 31,000 to 38,000 years ago. The sense motion was down to the north. Offset of unit C in RV-1 is similar in amount and s the offset of unit C found in RV-2. It appears that only the younger period of faul recorded in RV-2 was responsible for the deformation observed in RV-1.

TABLE 1. -- Field descr

[Most of the soils data were collected in the east and west walls of tre to describe the various soil properties are those recommended by Birkela observed]

Lithologic unit	Horizon[1]	Thickness[2] (cm)	Color[3] dry	Color[3] moist	Percent larger 4 mm
A	Av	10-15	7.5YR 8/4	7.5YR 5/4	20
B	2Bk1	10-35	7.5YR 7/4	7.5YR 5/4	35
B	2Bk2		7.5YR 7/4	7.5YR 5/4	15
C	3Btkb1	20-30	7.5YR 7/4	7.5YR 5/4	20
C	3Btkb2	20-25	7.5YR 7/4	7.5YR 5/4	20
D	4Kqb	30-40	7.5YR 8/2	7.5YR 6/4	30
D	4Bk/Kb	25-35	7.5YR 8/2	10YR 6/4	30

ıf the top of unit E along the length of RV-2 (table 1). The only way
ıhase of faulting is to demonstrate an appreciable northerly dip to
ınit E prior to faulting. Natural exposure of the upper contact of
ıroximately 0.5 km east of RV-2 (see arrow, fig. 2) indicates that
ıtal. Subsurface investigation with a sledge-hammer source seismic
ıonstrated that the upper contact of unit E dips less than 5° in the
'th of the north end of RV-2. Therefore, it is inferred that the
E exposed in RV-2 was nearly horizontal before faulting.

for multiple movement on shear zones I and IA comes from the
motion required along those zones to explain the position of units
splaced up to the north across shear zones I and IA. Possibly these
ıntithetically during faulting on shear zones II through V,
block of unit E between shear zones IA and II. Unit C, on the other
orth across shear zone I. If motions are dominantly dip slip then
ıf faulting, restricted to shear zones I and IA, could explain this
sense. A simpler explanation, not necessarily requiring multiple
ould be that significant strike-slip displacement has taken place on
k Valley fault. An evaluation of the amount of strike-slip
ıire continued excavation along the fault planes exposed in both

E matrix or wedges of unit E material appear near the base of unit
e shear zones that cut both unit D and unit E. Hence, an early
' postdate the deposition of unit D, rather than being continually
sition of unit D. All shear zones in RV-2 appear to cut the 4Kqb
of unit D. Assuming this horizon to be equivalent to the dated 3K
RV-1R$_2$, table 4), this indicates that some faulting postdates

ıve not been dated. They are younger than the 31,000- to 38,000-
ı underlies them. Owing to the equivocal evidence for faulting
nd the uncertainty about their age, no constraining date younger
years can be assigned to faulting along any shear zones in RV-1 or

osition of unit D on an irregular, but nearly horizontal surface of
' a total of 1.4 to 2.9 m of vertical separation along five shear
ıe after 180,000 years ago. The sense of separation was down to
es II through V, while approximately 50 cm of antithetic separation
outh took place on shear zones I and IA. Deposition of unit C was
pisode of faulting that produced 10 to 32 cm of vertical separation
ı IA sometime after 31,000 to 38,000 years ago. The sense of
ıe north. Offset of unit C in RV-1 is similar in amount and sense to
ınd in RV-2. It appears that only the younger period of faulting
responsible for the deformation observed in RV-1.

hose reported in Ander and [illegible]
Rosholt, written commun., 1984)

[2] From Ander and others (1984)

[3] J.N. Rosholt (written commun., 1984)

TABLE 1. -- Field description of soils in trench RV-2

ata were collected in the east and west walls of trench RV-2 north of the vertical grid line 00. The procedures and criteria used
ous soil properties are those recommended by Birkeland (1984). The soils in RV-1 were examined, but were not described; no, none

[1]	Thickness[2] (cm)	Color[3] dry	Color[3] moist	Percentage[4] larger than 4 mm	Texture[5]	Structure[6]	Clay films[7]	Secondary carbonate[8] stage	Secondary carbonate[8] dominant morphology	Effervescence[9]
	10-15	7.5YR 8/4	7.5YR 5/4	20	L	m, vl vf-m sbk	no	0	no	str
	10-35	7.5YR 7/4	7.5YR 5/4	35	L	m, vl vf-m sbk	no	I	ncc	str
		7.5YR 7/4	7.5YR 5/4	15	SL	m, vl vf-m sbk	no	I	ncc	str
	20-30	7.5YR 7/4	7.5YR 5/4	20	SCL	2 f-c abk	2 n-mk br gc pf	I	f	sl
	20-25	7.5YR 7/4	7.5YR 5/4	20	SL	m, 1 vf-m abk	1-2 n-mk br gc pf	I	f	ne-vsl
	30-40	7.5YR 8/2	7.5YR 6/4	30	LS	m, 1 m-vc pl	no	III	cal sil pl	vi
	25-35	7.5YR 8/2	10YR 6/4	30	LS	m-sg	no	II-III[10]	mmg cal	vi
	80-110	10YR 8/2	10YR 6/3	45	S	m-sg	no	II	cm fcm	str

ıgth of RV-2 (table 3). The only way
ıte an appreciable northerly dip to
l exposure of the upper contact of
2 (see arrow, fig. 2) indicates that
vith a sledge-hammer source seismic
ct of unit E dips less than 5^{o} in the
herefore, it is inferred that the
orizontal before faulting.

r zones I and IA comes from the
nes to explain the position of units
ıear zones I and IA. Possibly these
shear zones II through V,
ones IA and II. Unit C, on the other
tions are dominantly dip slip then
ones I and IA, could explain this
not necessarily requiring multiple
lip displacement has taken place on
f the amount of strike-slip
the fault planes exposed in both

naterial appear near the base of unit
D and unit E. Hence, an early
D, rather than being continually
s in RV-2 appear to cut the 4Kqb
on to be equivalent to the dated 3K
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Color[3] moist	Percentage[4] larger than 4 mm	Texture[5]	Structure[6]	Clay films[7]	Secondary carbonate[8] stage	Secondary carbonate[8] dominant morphology	Effervescence[9]
7.5YR 5/4	20	L	m, vl vf-m sbk	no	0	no	str
7.5YR 5/4	35	L	m, vl vf-m sbk	no	I	ncc	str
7.5YR 5/4	15	SL	m, vl vf-m sbk	no	I	ncc	str
7.5YR 5/4	20	SCL	2 f-c abk	2 n-mk br gc pf	I	f	sl
7.5YR 5/4	20	SL	m, 1 vf-m abk	1-2 n-mk br gc pf	I	f	ne-vsl
7.5YR 6/4	30	LS	m, 1 m-vc pl	no	III	cal sil pl	vi
10YR 6/4	30	LS	m-sg	no	II-III[10]	mmg cal	vi
10YR 6/3	45	S	m-sg	no	II	[illegible]	[illegible]

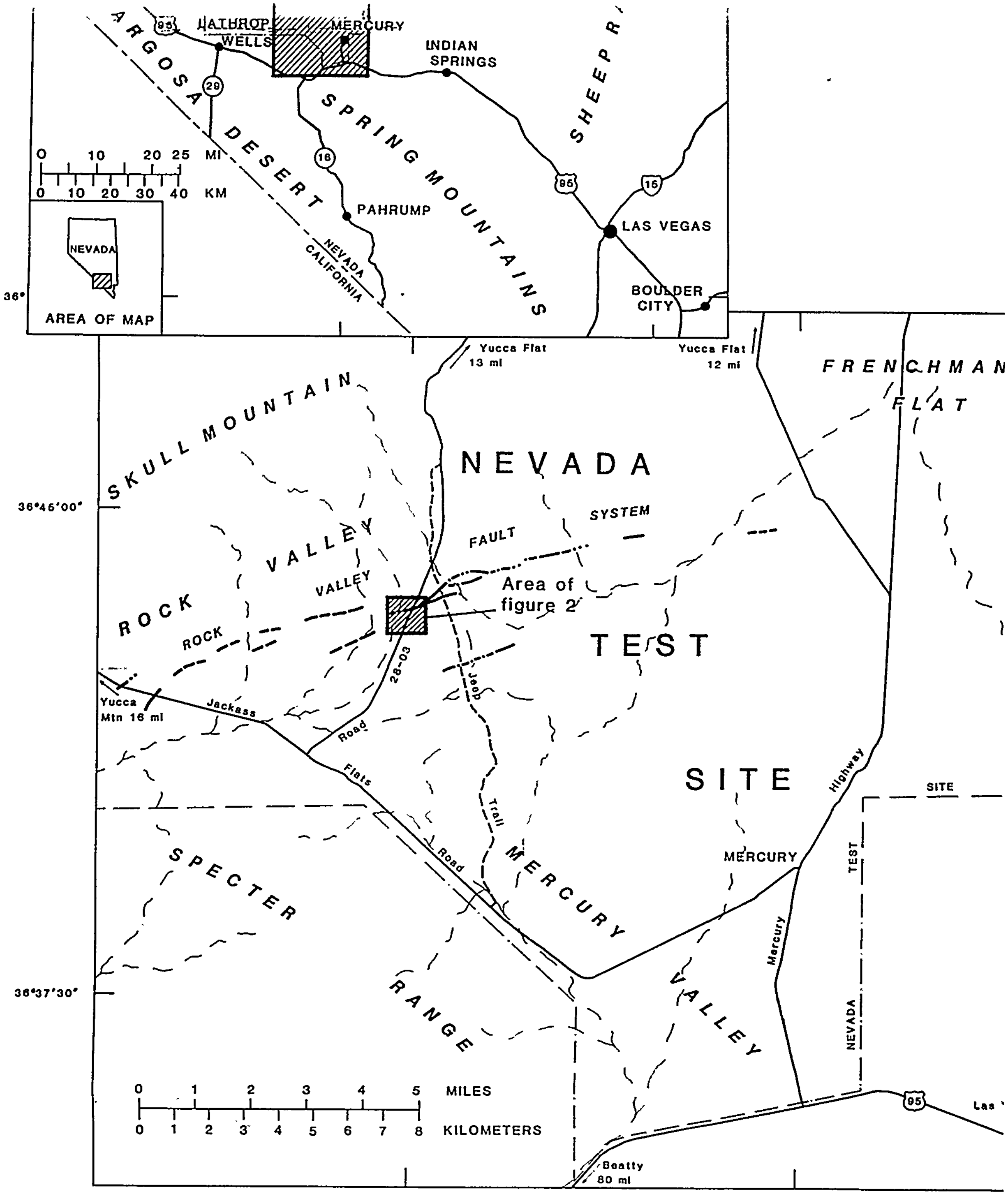
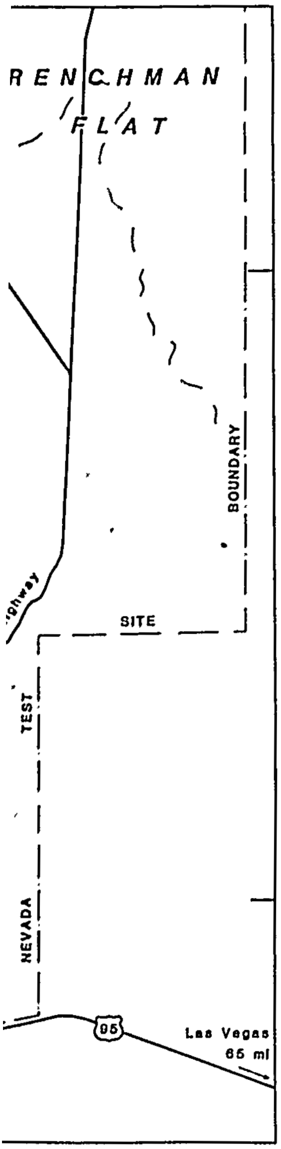


Figure 1.—Index map of Rock Valley area. Rock Valley fault system shown by solid and dotted-dashed line where a physiographic scarp is present in Quaternary deposits and by dashed line where the fault trace is marked by vegetation line or offset drainage.



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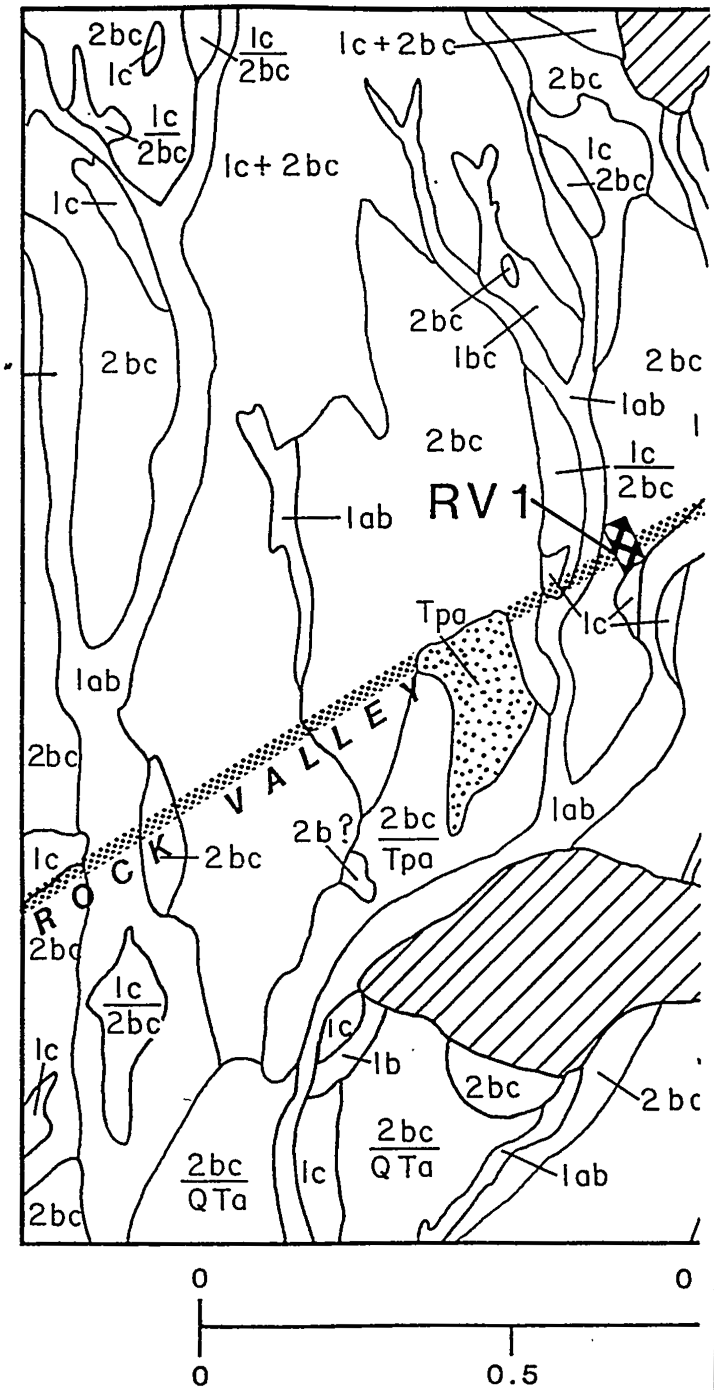
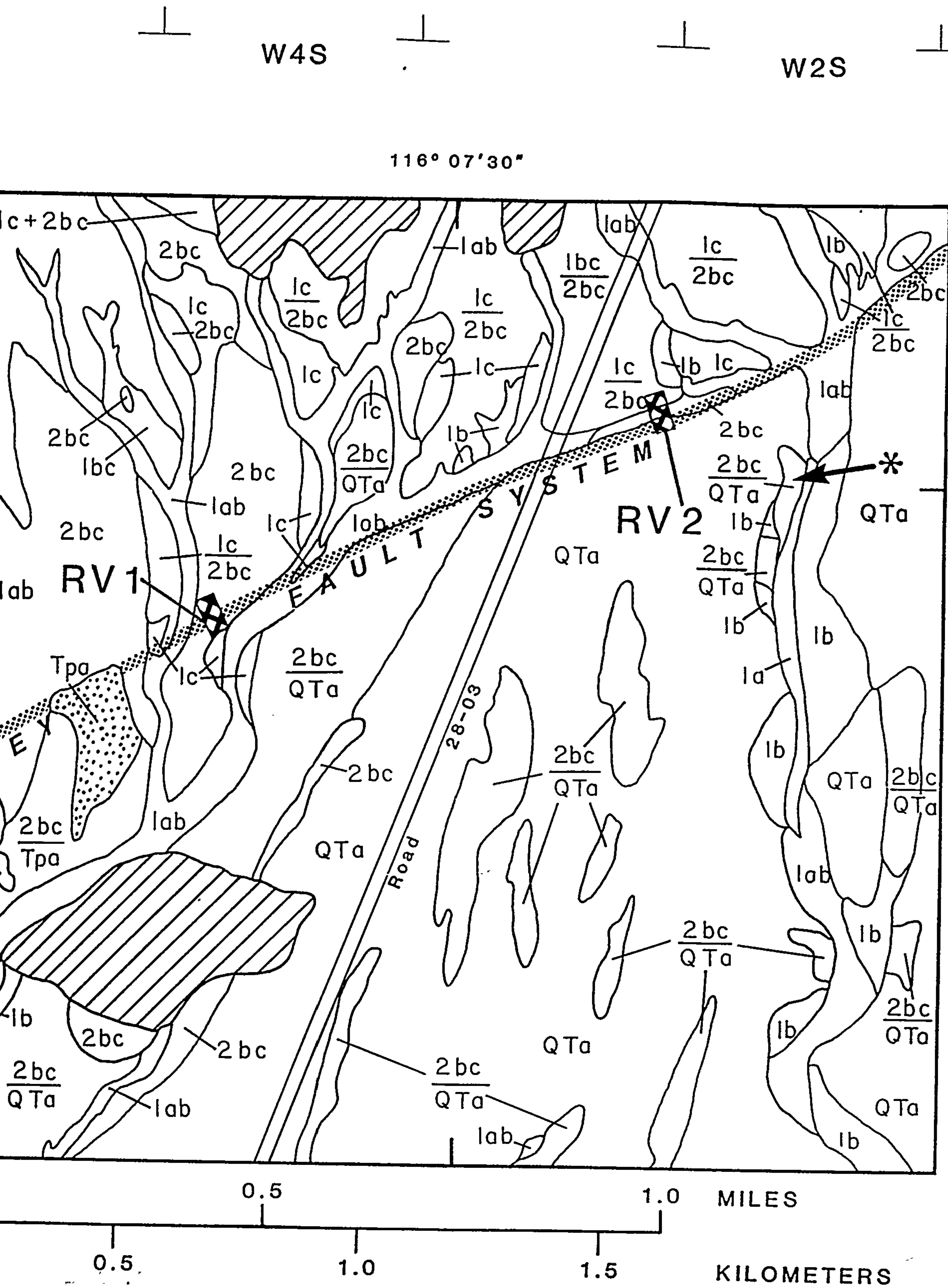


Figure 2.—Geologic map of vicinity of Rock Valley fault tren
RV-1, Rock Valley trench 1; RV-2, Rock Valley trench 2. Ast
and arrow point to locality mentioned in text.



Quaternary map units show
which gives a more detailed
these deposits. With the ex
leading Q. Compound units
separately at the scale of n
1c/2bc) indicate a veneer o
the underlying older deposit

[hatched box]	Modified land—Mo
1a	Active wash depos floors. Unveget of Hoover and o
1b	Deposits of young floors of active channel form. C of Hoover and o'
1c	Young fan and was elevated terrace Soils have very v subdued channel fronts locally pr
2b	Alluvial fan and wa similar to those -Usually mapped drainage develop ages. Unit Q2b c
2c	Intermediate-age a interbedded coar cementation of s III morphology (t pavement develo original depositic and equivalent, i
QTa	Old alluvial fan dep boulder gravel. I stage III to stage developed owing common than on exposed at or nea interfluves. Unit this report
Tpa	Rocks of Pavit Spri pale-brown (10YR white (10YR 8/2) Siltstone and sand debris locally pre interbeds of fluvi

nity of Rock Valley fault trenches:
-2, Rock Valley trench 2. Asterisk
tioned in text.

TRENCH LOGS FROM A

00 W2N W4N

EXPLANATION FOR FIGURE 2
DESCRIPTION OF MAP UNITS

Quaternary map units shown on figure 2 are modified from Hoover and others (1981), which gives a more detailed discussion of the nomenclature and stratigraphic relations of these deposits. With the exception of unit QTa, unit designators are shown without the leading Q. Compound units (such as 1ab) indicate that the two units cannot be delineated separately at the scale of mapping (1:12,000). Fractional unit designators (such as 1c/2bc) indicate a veneer of a young deposit that masks but does not completely conceal the underlying older deposit.

Modified land—Modified by construction, filling, or excavation

1a Active wash deposits—Loose sand and gravel occupying well-defined channel floors. Unvegetated, lacks pavement. Channel form is unmodified. Unit Q1a of Hoover and others (1981)

1b Deposits of young washes—Similar to 1a. Generally lies 10 to 50 cm above floors of active washes. Sparsely vegetated; slight modification of original channel form. Generally mapped with 1a as 1ab because of scale. Unit Q1b of Hoover and others (1981)

1c Young fan and wash deposits—Sand and gravel comprising small alluvial fans and elevated terraces in washes; located 1 to 2 m above floors of active washes. Soils have very weak A/Cox profiles. Moderately vegetated. Distinctly more subdued channel forms than those of 1a or 1b. Cobble-bearing debris-flow fronts locally present on alluvial fans. Unit Q1c of Hoover and others (1981)

b Alluvial fan and wash deposits with surface and lithologic characteristics similar to those of deposits of Q2 age are nested inside and below 2c deposits--Usually mapped with 2c as 2bc where slight differences in pavement and drainage development indicate the likelihood of deposits of two different ages. Unit Q2b of Hoover and others (1981)

c Intermediate-age alluvial fan and wash deposits—Vesicular silt overlying interbedded coarse gravelly sand and sandy gravel. Slight to moderate cementation of sand and gravel by pedogenic carbonate with stage II to stage III morphology (table 1, as used by Birkeland, 1984). Moderate to strong pavement development and moderate dissection with extensive areas of original depositional surface remaining. Unit Q2c of Hoover and others (1981) and equivalent, in part, to unit D, this report

Ta Old alluvial fan deposits—Indurated, poorly sorted, muddy to sandy cobble and boulder gravel. Moderate to strong cementation by pedogenic carbonate with stage III to stage IV morphology (table 1). Pavement typically moderately developed owing to erosional degradation of the land surface. Boulders more common than on 2b or 2c surfaces. Carbonate-cemented material commonly exposed at or near the ground surface. Surface is dissected with rounded interfluves. Unit Qta of Hoover and others (1981) and equivalent to unit E, this report

a Rocks of Pavit Springs of Hinrichs (1968)—Interbedded light-gray (10YR 7/2) to pale-brown (10YR 6/3) thin- to thick-bedded siltstone and sandstone and white (10YR 8/2) to light-brown (7.5YR 6/4) silicic tuff and tuff breccia. Siltstone and sandstone contain diatoms and thin ash partings. Fish and plant debris locally present. Dominantly lacustrine basin-fill deposits, with minor interbeds of fluvial sandstone and conglomerate

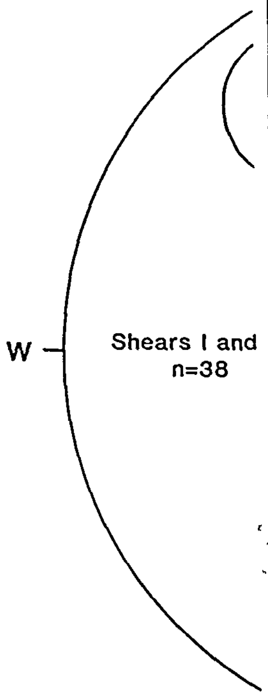


Figure 3.—Lower hemisphe
confidence (see Schueneme
RV-2. n, number of clasts
represent clast fabric of un
shear zones.

ROM A STRAND OF THE ROCK VALLEY FAULT

By

James C. Yount, Ralph R. Shroba, Catherine R. McMasters, W4N W6N W8N

Work performed in cooperation with the U.S. Department of Energy, Nevada Nuclear Waste Storage Investigations Project (Interagency agreement DE-AI08-44802).

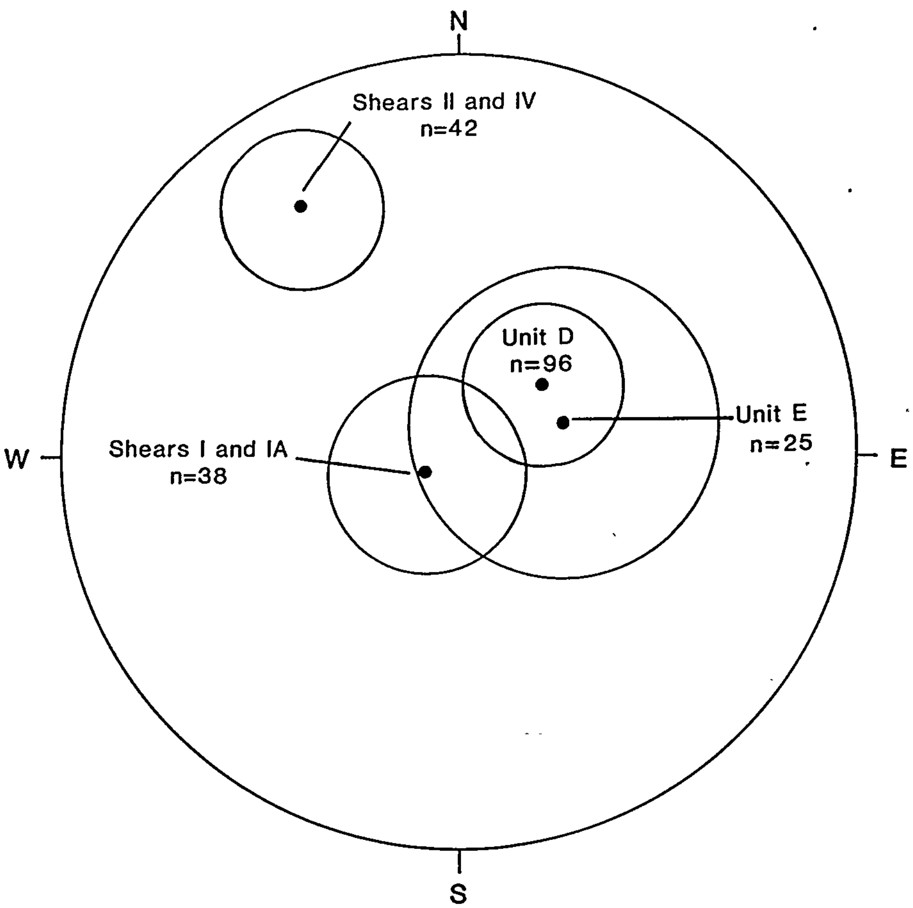


Figure 3.—Lower hemisphere equal-area projection of means and 80 percent cones of confidence (see Schuenemeyer and others, 1972) for long-axis fabric data from trench RV-2. n, number of clasts measured for each category. Values for units D and E represent clast fabric of undisturbed alluvium; measurements taken from sites away from shear zones.

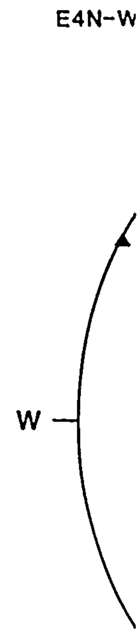


Figure 4.—
fractures i

.EY FAULT SYSTEM, NEVADA TEST SITE, NYE C

By

R. McMasters, Heather E. Huckins, and Eduardo A. Rodriguez

1987

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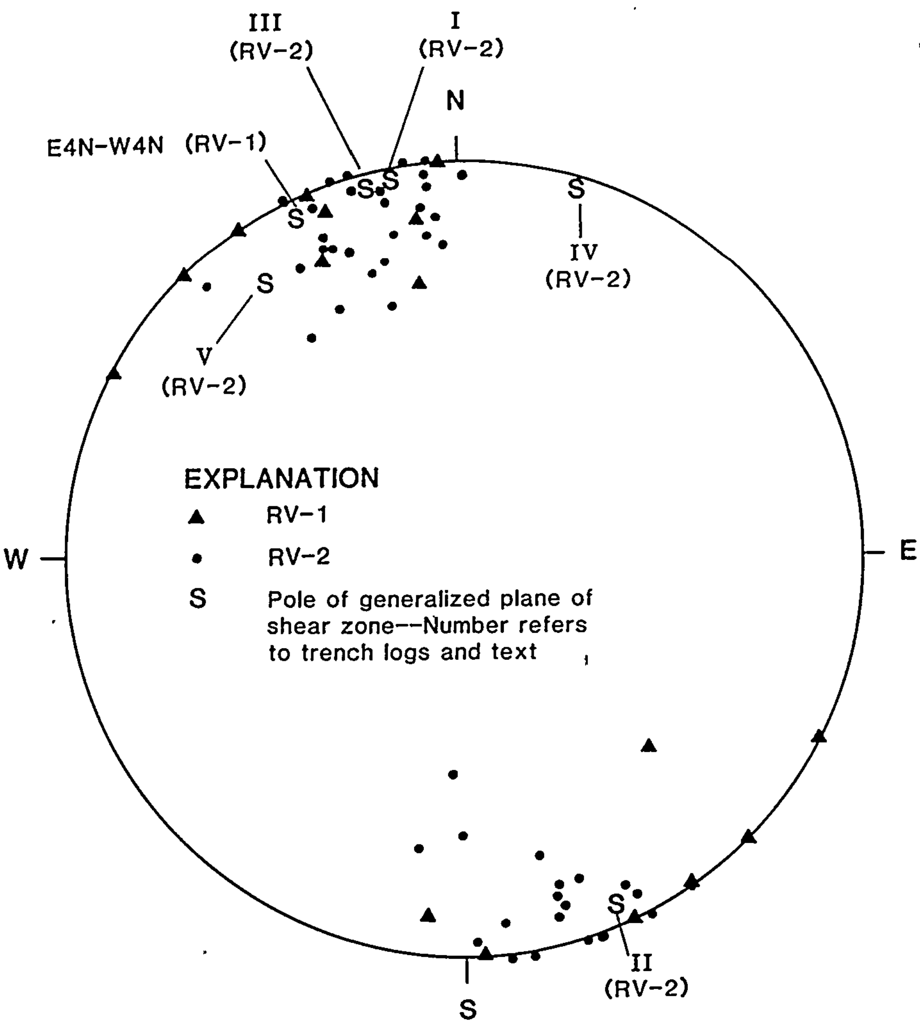

Figure 4.—Lower hemisphere equal-area projection of poles of carbonate-coated fractures in trenches RV-1 and RV-2.

NYE COUNTY, NEVADA

C	3BtKb1	[illegible]	[illegible]
C	3Btkb2	20-25	7.5YR
D	4Kqb	30-40	7.5YR
D	4Bk/Kb	25-35	7.5YR
D	4Bkb	80-110	10YR
E	5Btb[11]	>45	7.5YR
E	5Kb	>30	7.5YR

[1]Horizon designations follow those def
cavities in the matrix of the A horiz
These differences in horizon designat
thickness of the overlying lithologic
for RV-2. They are shown as one hori

[2]Horizon thicknesses are approximate r

[3]Colors were determined for the fine-e

[4]Percentage of pebbles and larger clas

[5]Textural classes were estimated, base
sandy clay loam; SL, sandy loam.

[6]Except for massive (m) and single gra
(2) size: vf, very fine; f, fine; m,

[7]Clay films are given in three parts:
thick; (3) morphology: br, bridges b

[8]Data for secondary carbonate is given
secondary carbonate; (2) dominant mor
fillings; fcm, few cemented clasts; m
clasts; no, none observed; pl, small

[9]Effervescence was determined with dil

[10]About 95 percent of the secondary car

[11]At depth, the 5Btb horizon probably o

Procedure

The eastern of the two trenches (RV-2, fig.
and brushes in April 1984. The lower meter of t
approximately one-half meter since initial excav

2Bk2	10-35	7.5YR 7/4	7.5YR 5/4	15	SL	m, vl vf-m sbk	no	I	ncc	str
3Btkb1	20-30	7.5YR 7/4	7.5YR 5/4	20	SCL	2 f-c abk	2 n-mk br gc pf	I	f	sl
3Btkb2	20-25	7.5YR 7/4	7.5YR 5/4	20	SL	m, 1 vf-m abk	1-2 n-mk br gc pf	I	f	ne-vsl
4Kqb	30-40	7.5YR 8/2	7.5YR 6/4	30	LS	m, 1 m-vc pl	no	III	cal sil pl	vi
4Bk/Kb	25-35	7.5YR 8/2	10YR 6/4	30	LS	m-sg	no	II-III[10]	mmg cal	vi
4Bkb	80-110	10YR 8/2	10YR 6/3	45	S	m-sg	no	II	cm fcm	str
5Btb[11]	>45	7.5YR 7/4	7.5YR 5/4	45	LS	m, 1 m-vc sbk	2 n br gc	0	no	ne
5Kb	>30	7.5YR 8/4	7.5YR 5/6	70	LS	m, 1 vf-m sbk	no	IV	mmg mcm	vi

designations follow those defined by Birkeland (1984), except for the use of "v" which indicates the presence of small, vesicular s in the matrix of the A horizon. Some of the horizon designations are different for the same lithologic units in trenches RV-1 and RV-2. ifferences in horizon designations reflect differences in soil properties, the vertical sequence of lithologic units, and (or) the ss of the overlying lithologic units in the two trenches. Horizons 2Bk1 and 2Bk2 are not shown as seperate horizons on the trench logs 2. They are shown as one horizon designated 2Bk.

thicknesses are approximate ranges.

were determined for the fine-earth (less than 2 mm) fraction with the aid of Munsell color charts (Munsell Color Co., Inc., Baltimore).

age of pebbles and larger clasts was determined with the aid of visual percentage estimation charts.

l classes were estimated, based on the wet consistence and grittiness of the fine-earth fraction: L, loam; LS, loamy sand; S, sand; SCL, lay loam; SL, sandy loam.

for massive (m) and single grain (sg), structure is given in three parts: (1) grade: vl, very weak; 1, weak; 2, moderate; e: vf, very fine; f, fine; m, medium; c, coarse; vc, very coarse; (3) type: pl, platy; sbk, subangular blocky; abk, angular blocky.

lms are given in three parts: (1) frequency: 1, few (5-25 percent); 2, common (25-50 percent); (2) thickness: n, thin; mk, moderately (3) morphology: br, bridges between grains; gc, grain coatings; pf, ped-face coatings; no, none observed.

r secondary carbonate is given in two parts: (1) stage, as used by Birkeland (1984), except for stage 0, which indicates no visible ry carbonate; (2) dominant morphology: cal, thin carbonate laminae; cm, loose calcareous matrix; f, filaments, veinlets, and (or) pore s; fcm, few cemented clasts; mcm, many cemented clasts; mmg, many matrix grains continuously coated; ncc, thin, patchy coatings on no, none observed; pl, small pisolite like grains; sil, thin, discontinuous laminae of opaline(?) silica.

scence was determined with dilute HCl: ne, noneffervescent; vsl, very slight; sl, slight; str, strong; vi, violent.

5 percent of the secondary carbonate has stage II morphology and about 5 percent has stage III morphology.

n, the 5Btb horizon probably overlies the 5Kb horizon, formed in unit E, that is exposed near the south end of trench RV-2.

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5Kb	62.7	23.5	13.8	SL	25.(

Procedures

ern of the two trenches (RV-2, fig. 2) was cleaned using shovels, trowels, April 1984. The lower meter of the west wall had sloughed back one-half meter since initial excavation. Both trench walls were gridded in

[1]All analyses were performed on material less than 2 mm in size.

[2]Values for sand, silt, and clay are based on sieve and pipette an

7.5YR 5/4	15	SL	m, vl vf-m sbk	no	I	ncc	str
7.5YR 5/4	20	SCL	2 f-c abk	2 n-mk br gc pf	I	f	sl
7.5YR 5/4	20	SL	m, 1 vf-m abk	1-2 n-mk br gc pf	I	f	ne-vsl
7.5YR 6/4	30	LS	m, 1 m-vc pl	no	III	cal sil pl	vi
10YR 6/4	30	LS	m-sg	no	II-III[10]	mmg cal	vi
10YR 6/3	45	S	m-sg	no	II	cm fcm	str
7.5YR 5/4	45	LS	m, 1 m-vc sbk	2 n br gc	0	no	ne
7.5YR 5/6	70	LS	m, 1 vf-m sbk	no	IV	mmg mcm	vi

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Interior—Geological Survey, Reston, Va.—1987

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5Kb	62.7	23.5	13.8	SL	25.0

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west wall had sloughed back
ion. Both trench walls were gridded in

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[2]Values for sand, silt, and clay are based on sieve and pipette analyses