BORING D1

DATE DRILLED: 12/17/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								3" Asphalt Paving - 4" Aggregate Base
							SC	CLAYEY SAND - fine to medium, medium dense, completely weathered, moist, some gravel, light reddish brown 39% Passing #200 sieve
	2.5	ND	5.7	116	27			
		ND	10.3	121	59			GRANITE - highly weathered, coarse grained, very dense, moist, light brown and yellowish brown
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated.
It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D2

DATE DRILLED: 12/17/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SM	3-1/2" Asphalt Paving SILTY SAND - fine to medium, medium dense to dense, moist, light reddish brown
							SC	SAND, slightly Clayey- fine to coarse, dense, brown
		ND	7.2	112	32			
	2.5							
		ND	5.5	114	100			GRANITE - highly weathered, coarse grained, hard, moist, light brown and grey
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

LOG OF BORING

BORING D3

DATE DRILLED: 12/17/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SM	4" Asphalt Paving SILTY SAND - fine to medium, dense, moist, some Clay, light reddish brown
		ND	2.8	121	39			GRANITE - completely to highly weathered, coarse grained, hard, moist, light brown and greenish grey
	2.5							
		ND	5.6	115	91			Brown and dark greyish brown
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D4

DATE DRILLED: 12/17/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SC	3-1/2" Asphalt Paving CLAYEY SAND - fine, dense, moist, light yellowish brown 24% Passing #200 sieve
		ND	11.8	93	47			Porous, traces of caliche
	2.5							GRANITE - highly to moderately weathered, coarse grained, very dense to hard, moist, light yellowish brown and white
		ND	18.9	--	65			
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D5

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								1-1/2" Asphalt Paving - 8" Aggregate Base
							CL	SANDY CLAY - fine, medium dense, moist, abundant caliche, brown and yellowish brown
		ND	14.1	111	29			
	2.5						SC	CLAYEY SAND - fine to coarse, dense, moist, light brown and reddish brown
		ND	6.6	124	100			GRANITE - highly weathered, coarse grained, very dense, moist, light brown
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D6

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								4-1/2" Asphalt Paving - 6" Aggregate Base
							SC	CLAYEY SAND - fine to medium, medium dense to dense, moist, some gravel, reddish brown
	2.5	ND	4.8	122	30			
		ND	14.2	117	100			GRANITE - moderately weathered, coarse grained, hard, moist, dark grey and brown
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D7

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								1" Asphalt Paving - 6" Aggregate Base
							SC	CLAYEY SAND - fine to medium, dense, moist, abundant gravel, light brown
		ND	5.4	119	97			30% Passing #200 sieve
	2.5							GRANITE - moderately weathered, coarse grained, hard, light grey and brown
					100			
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D8

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SM	4" Asphalt Paving FILL - SILTY SAND - fine, dense, dry to moist, light brown
								GRANITE - moderately weathered, medium to coarse grained, very dense to hard, light grey and light brown
	2.5	ND	19.8	105	79			
								Light yellowish brown and light grey
		ND	3.2	111	100			
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D9

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								2" Asphalt Paving - 4" Aggregate Base
							SC	CLAYEY SAND - coarse, very dense, moist, light reddish brown
								GRANITE - moderately weathered, coarse grained, very dense to hard, light grey
		ND	10.9	114	75			
	2.5							
		ND			100			
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

LOG OF BORING

BORING D10

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SC	4" Asphalt Paving CLAYEY SAND - fine to medium, medium dense, moist, light reddish brown
	2.5	ND	6.1	123	20			
		ND	8.2	122	84			Dense, some gravel
	5							NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D11

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
							SM	5" Asphalt Paving FILL - SILTY SAND - fine, medium dense, moist, some Clay, light yellowish brown
							SC	CLAYEY SAND - fine to coarse, medium dense, moist, light brown
	2.5	ND	5.1	117	21			
							SW	SAND - well graded, dense, moist, mottled brown and dark brown
		ND	8.6	121	77			
	5							GRANITE - moderately weathered, coarse, very dense to hard, light grey and light brown
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

LOG OF BORING

BORING D12

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.	
							6" Asphalt Paving GRANITE - moderately weathered, coarse grained, very dense to hard, dry, brownish grey
	2.5	ND	2.0	104	100		Moderately weathered, light grey
		ND	1.9	105	100		
	5						NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.
	7.5						
	10						
	12.5						
	15						
	17.5						
	20						

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D13

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								3" Asphalt Paving - 3" Aggregate Base
							SM	SILTY SAND - fine to coarse, medium dense, moist, porous, light reddish brown
		ND	4.0	119	19			
	2.5							
		ND	4.8	113	100			GRANITE - highly weathered, coarse grained, very dense, moist, light brown and light grey
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

LOG OF BORING

K2 ENGINEERING, INC.

BORING D14

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								2-1/2" Asphalt Paving - 7" Aggregate Base
							SC	CLAYEY SAND - fine to medium, dense, moist, light brown
		ND	8.0	116	37			
	2.5							Medium to coarse
		ND	8.7	127	34		SP-SC	SAND, slightly Clayey - medium to coarse, dense, moist, light brown
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

LOG OF BORING

BORING D15

DATE DRILLED: 12/16/09
EQUIPMENT USED: 8-Inch Diameter Hollow-stem-auger

ELEVATION (ft.)	DEPTH (ft.)	PID READINGS (ppm)	MOISTURE (% of dry wt.)	DRY DENSITY (lbs./cu. ft.)	BLOWS/FOOT	SAMPLE LOC.		
								2" Asphalt Paving - 6" Aggregate Base
							SP	SAND - fine to coarse, dense, moist, light yellowish brown
		ND	3.9	124	49			
	2.5							Some Clay
		ND	19.6	108	61		SM	SILTY SAND - fine, medium dense, moist, some Clay, light brown
	5							
	7.5							
	10							
	12.5							
	15							
	17.5							
	20							

NOTES: Groundwater not encountered. No caving. Boring backfilled with soil cuttings.

JOB G29013-1 DATE 1/29/2010 F.T. SK BY KSL ENGR. SK REV.

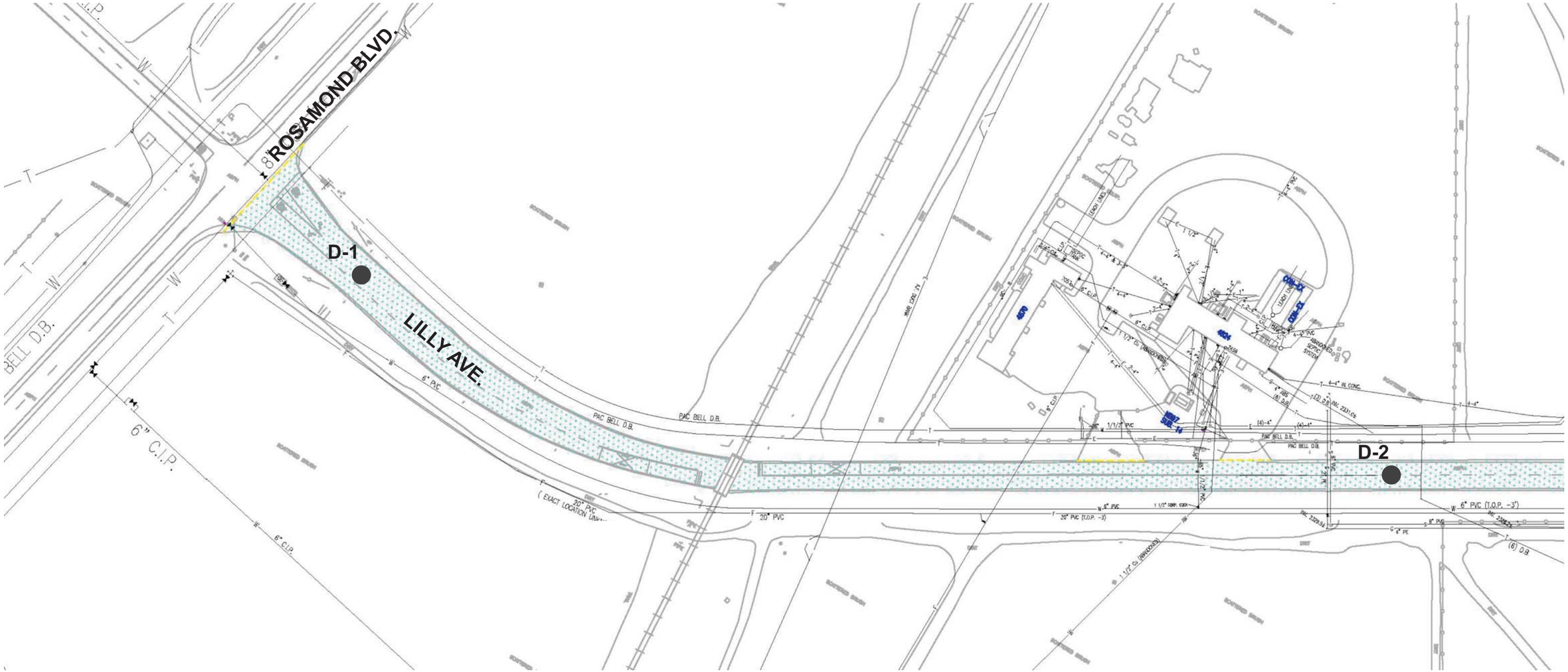
Note: The log of subsurface conditions shown hereon applies only at the specific boring location and at the date indicated. It is not warranted to be representative of subsurface conditionsat other locations and times.

LOG OF BORING

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



N

PROJECT NORTH

(SCALE 1" = 100')

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

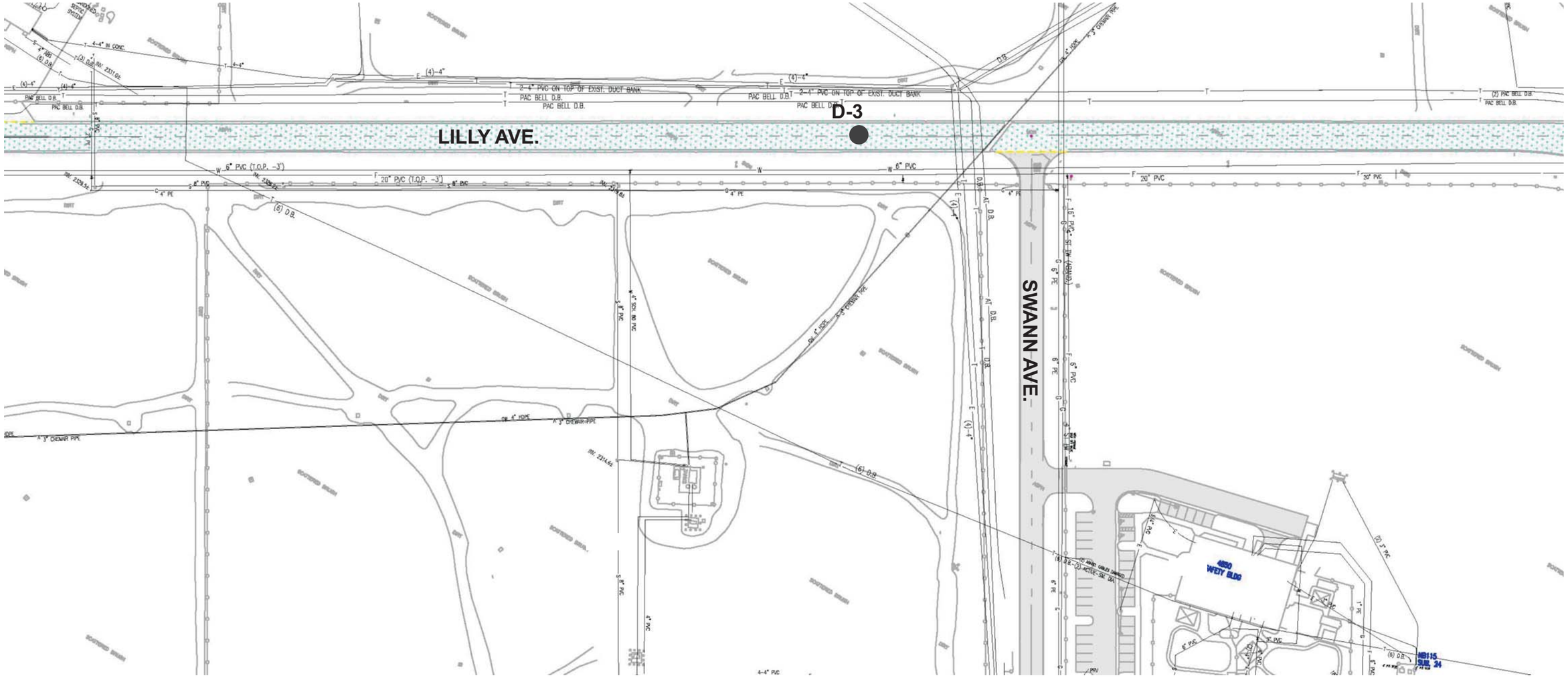
D-1 ● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



N

PROJECT NORTH

(SCALE 1" = 100')

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

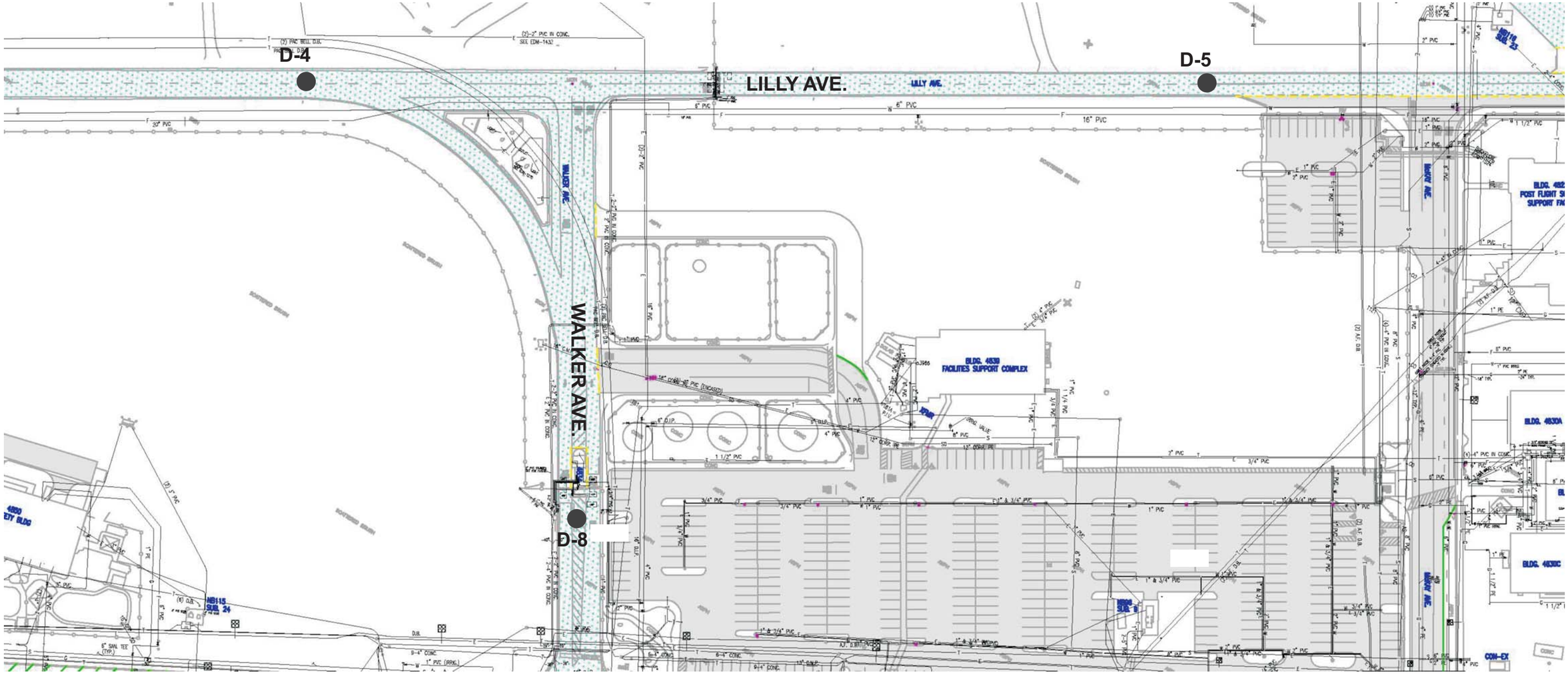
D-3 ● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

K2 ENGINEERING, INC.

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

N

PROJECT NORTH

(SCALE 1" = 100')

KEY:

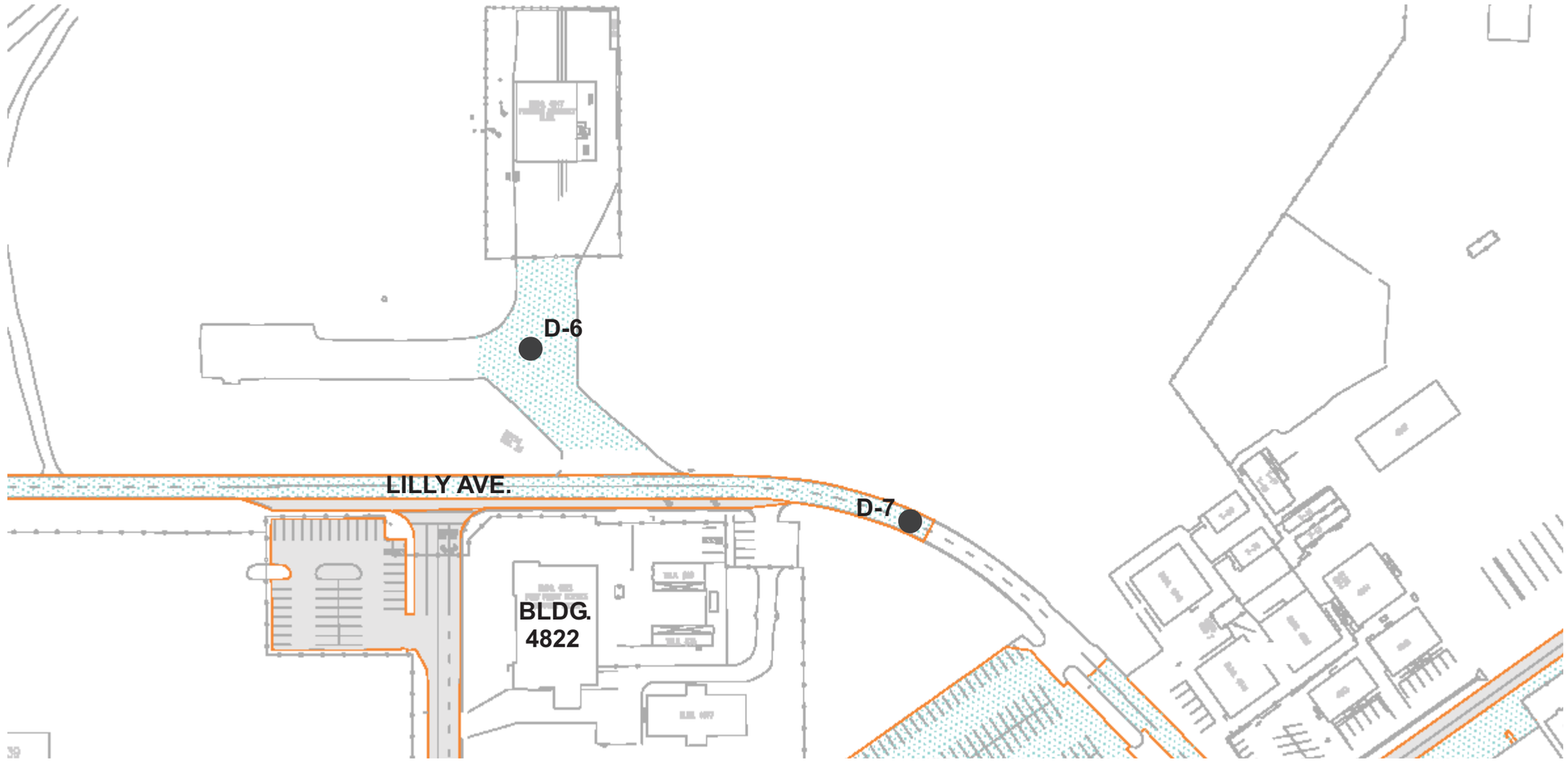
D-4
● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

K2 ENGINEERING, INC.

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



PROJECT NORTH

(SCALE 1" = 120')

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

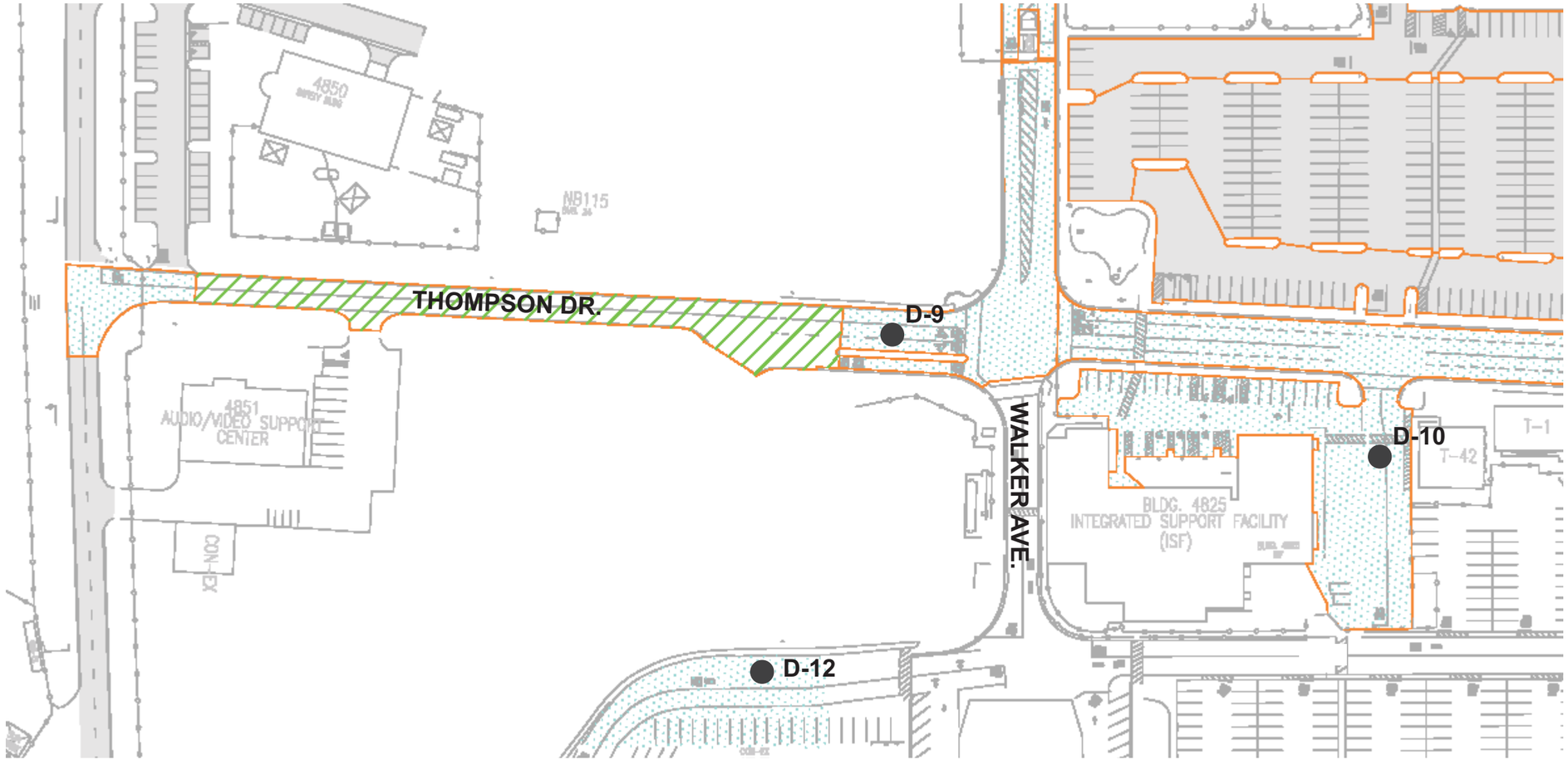
D-6 ● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



N

PROJECT NORTH

(SCALE 1" = 100')

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

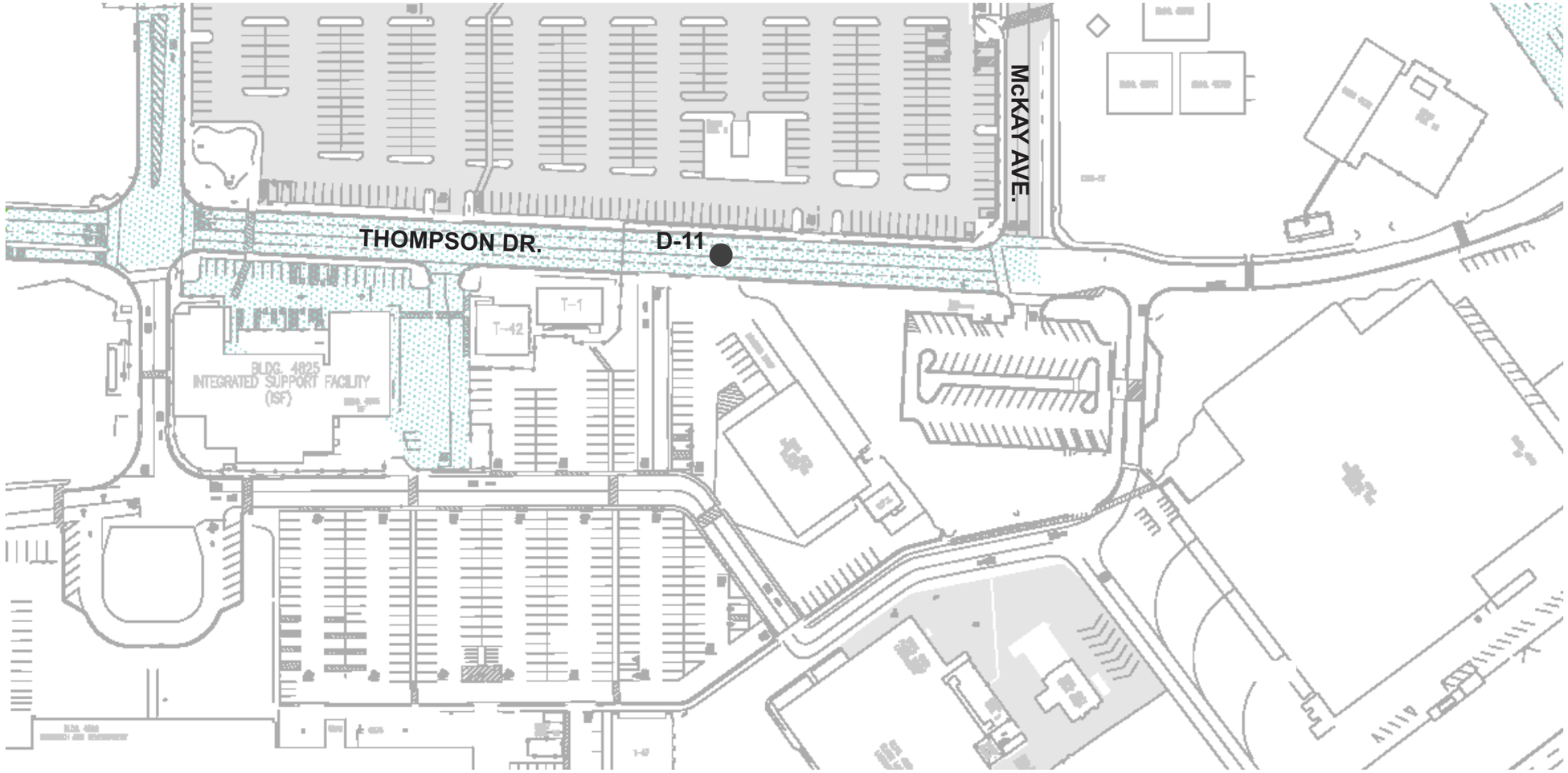
D-9 ● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



N

PROJECT NORTH

(SCALE 1" = 120')

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

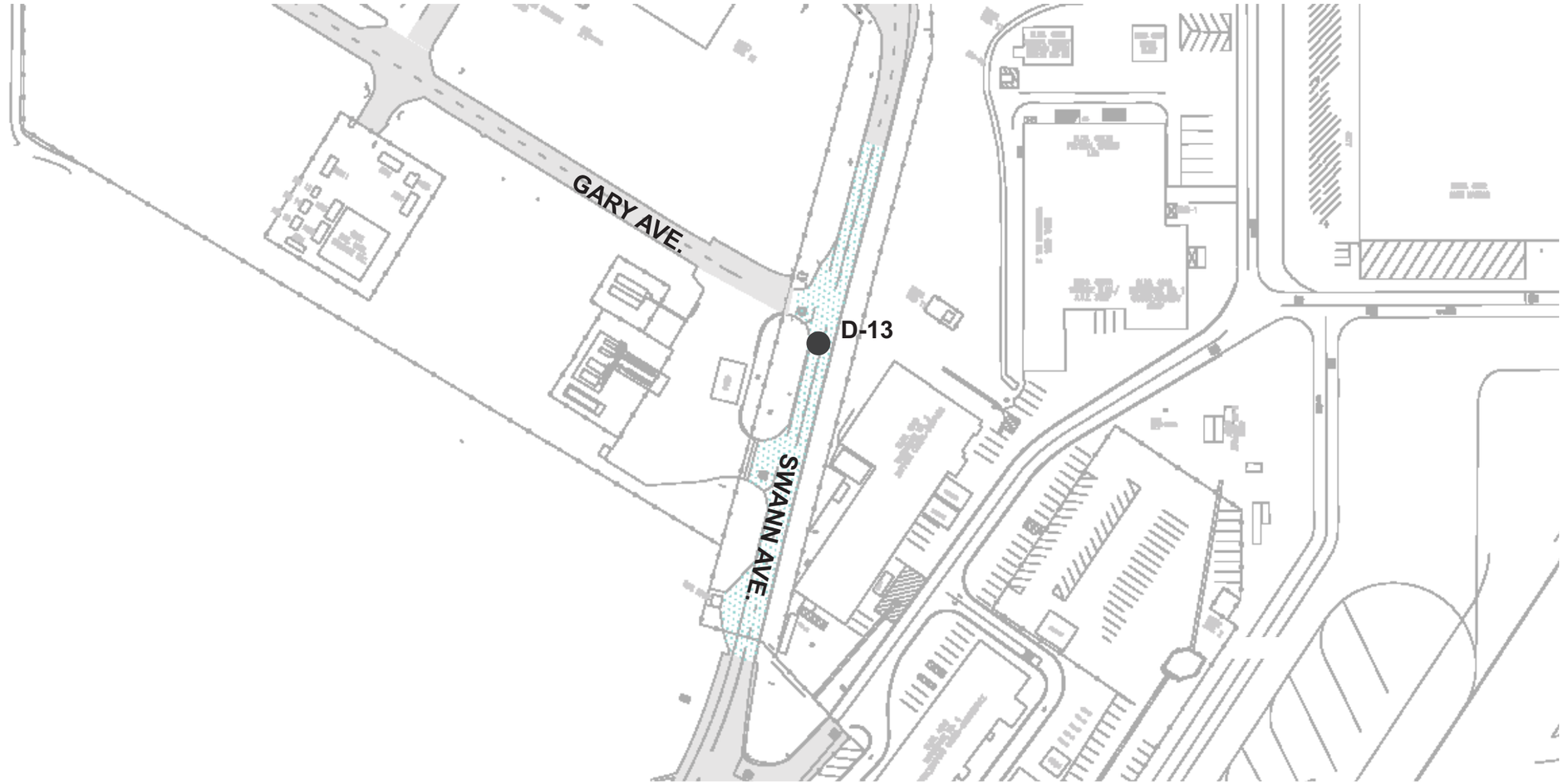
D-11 ● Approximate Boring Location and Number

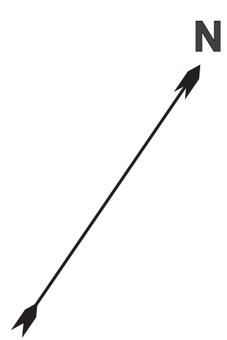
NND12415466E
Amendment 1
Attachment 10

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

K2 ENGINEERING, INC.

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV





PROJECT NORTH

(SCALE 1" = 120')

REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

SITE PLAN

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

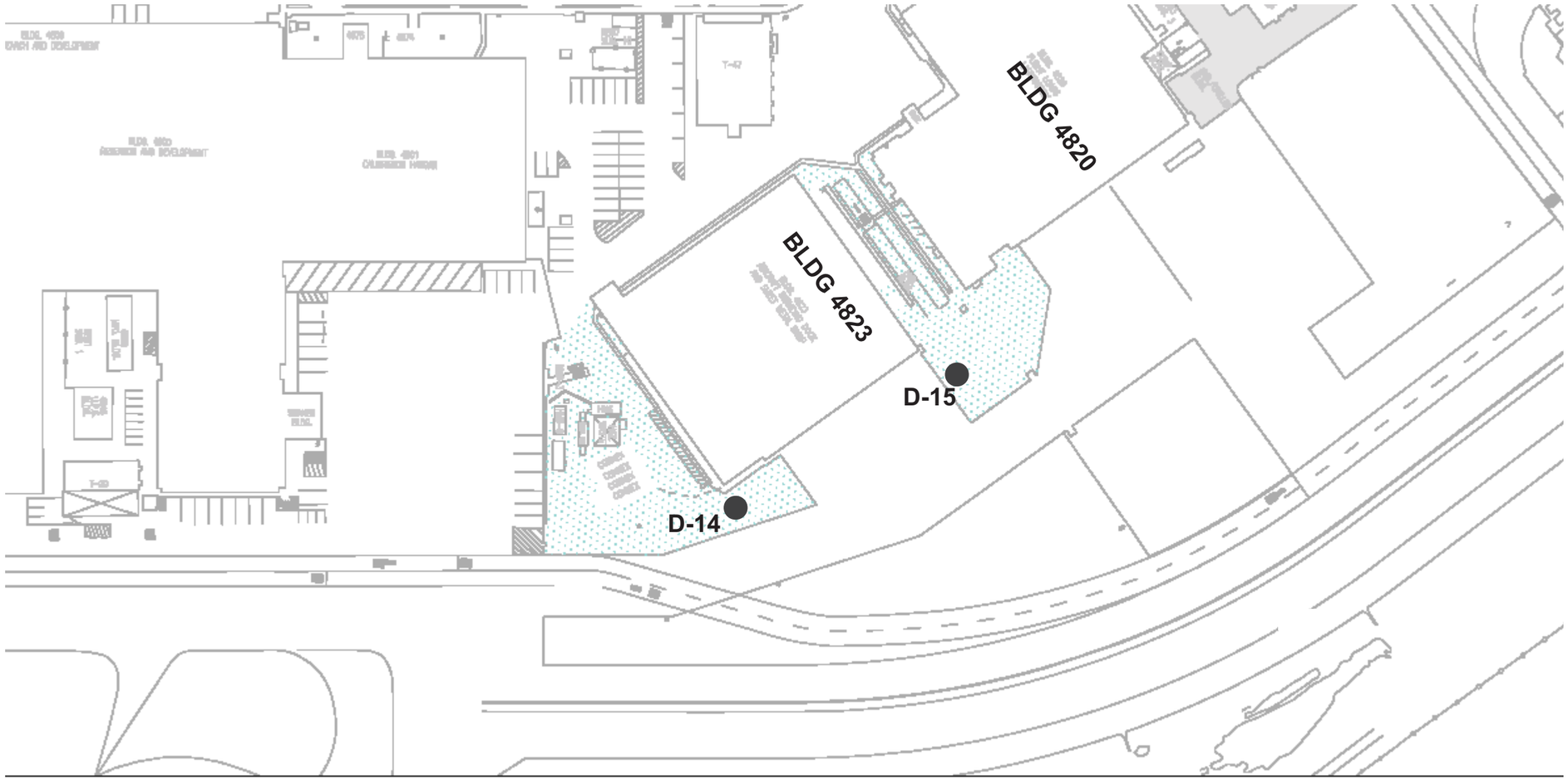
KEY:

D-13 ● Approximate Boring Location and Number

NND12415466E
Amendment 1
Attachment 10

K2 ENGINEERING, INC.

JOB G29013-1 DATE 1/29/2010 BY KSL ENGR SCK REV



SITE PLAN

N

PROJECT NORTH

(SCALE 1" = 100')

PROPOSED
PAVING IMPROVEMENTS
NASA
DRYDEN FLIGHT RESEARCH CENTER
EDWARDS AIR FORCE BASE
LANCASTER, CALIFORNIA

KEY:

D-14 ● Approximate Boring Location and Number

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REFERENCE: Site Plan (Dated 10/21/09) provided by J. B. Young and Associates

K2 ENGINEERING, INC.

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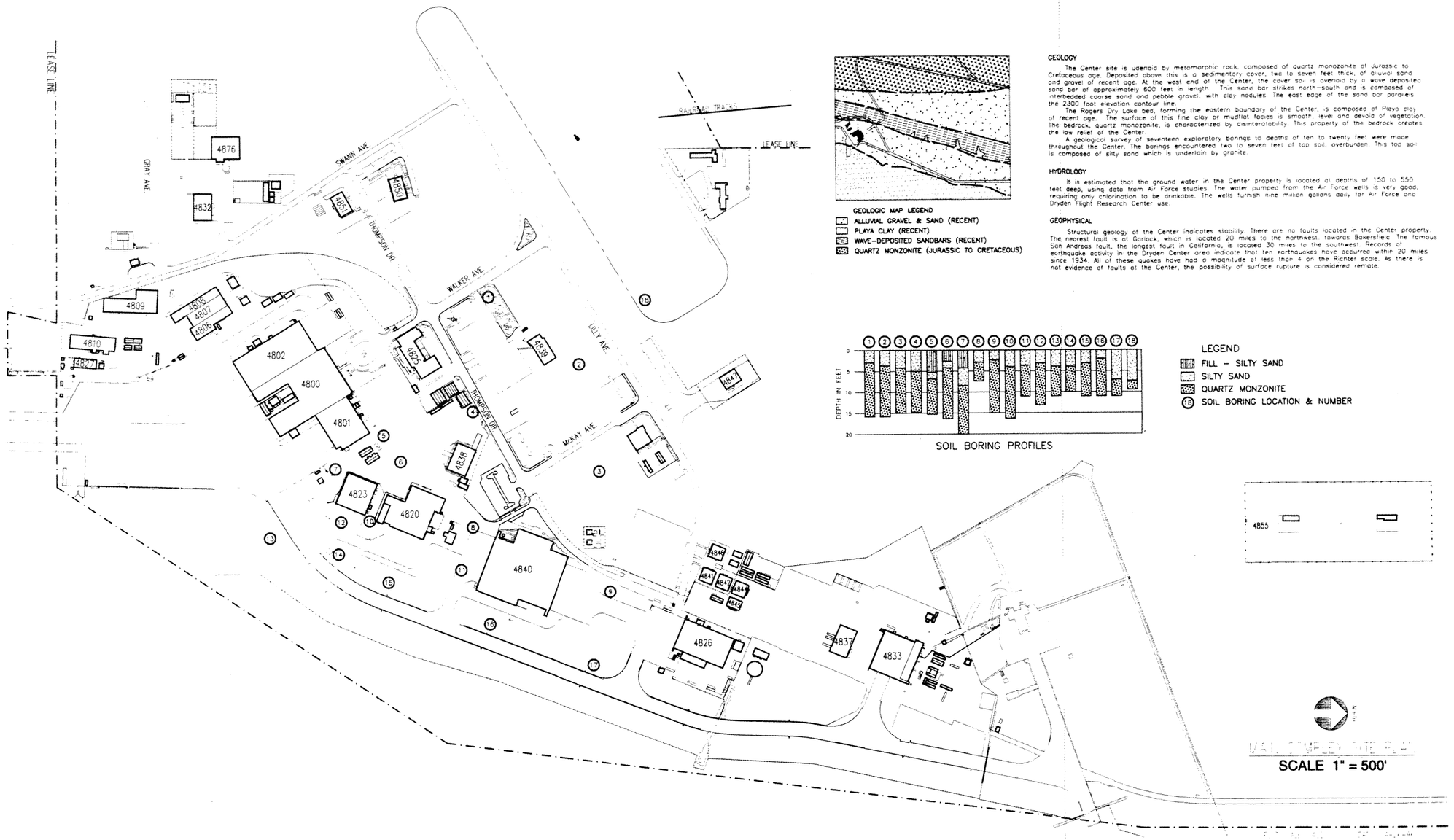

GEOLOGY

The Center site is underlaid by metamorphic rock, composed of quartz monozonite of Jurassic to Cretaceous age. Deposited above this is a sedimentary cover, two to seven feet thick, of alluvial sand and gravel of recent age. At the west end of the Center, the cover soil is overlaid by a wave deposited sand bar of approximately 600 feet in length. This sand bar strikes north-south and is composed of interbedded coarse sand and pebble gravels, with clay nodules. The east edge of the sand bar parallels the 2300 foot elevation contour line.

The Rogers Dry Lake bed, forming the eastern boundary of the Center, is composed of Playa clay of recent age. The surface of this fine clay or mudflat facies is smooth, level and devoid of vegetation. The bedrock, quartz monzonite, is characterized by disintegratability. This property of the bedrock creates the low relief of the Center.

A geological survey of seventeen exploratory borings to depths of ten to twenty feet were made throughout the Center. The borings encountered two to seven feet of top soil, overburden. This top soil is composed of silty sand which is underlain by granite.

HYDROLOGY

It is estimated that the ground water in the Center property is located at depths of 150 to 550 feet deep, using data from Air Force studies. The water pumped from the Air Force wells is very good, requiring only chlorination to be drinkable. The wells furnish nine million gallons daily for Air Force and Dryden Flight Research Center use.

GEOPHYSICAL

Structural geology of the Center indicates stability. There are no faults located in the Center property. The nearest fault is at Garlock, which is located 20 miles to the northwest, towards Bakersfield. The famous San Andreas fault, the longest fault in California, is located 30 miles to the southwest. Records of earthquake activity in the Dryden Center area indicate that ten earthquakes have occurred within 20 miles since 1934. All of these quakes have had a magnitude of less than 4 on the Richter scale. As there is not evidence of faults at the Center, the possibility of surface rupture is considered remote.

Figure 5 - 2

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Dryden Flight Research Center
Soil Borings

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United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with
NASA Ames - Dryden
Flight Research
Center

SOIL SURVEY OF EDWARDS AIR FORCE BASE CALIFORNIA

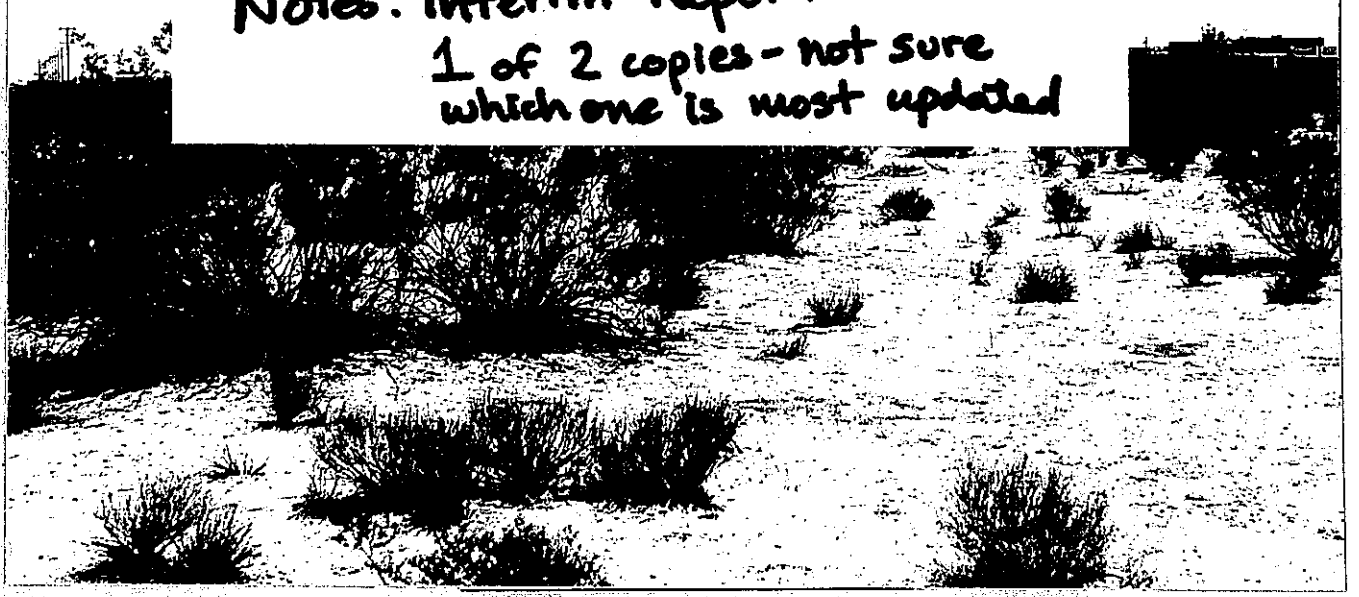
NASA Ames - Dryden Flight Research Facility Part

INTERIM REPORT

DFRC 1989

"Soil Survey of EAFB CA; NASA Ames - DFRC Part"

Notes: Interim Report
1 of 2 copies - not sure which one is most updated



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This is the Interim Report for the Edwards Air Force Base, NASA Part, Soil Survey which is part of the National Cooperative Soil Survey. The Soil Conservation Service (SCS) has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture Policies, all SCS programs and services are offered on a nondiscriminative basis, without regard to race, color, national origin, sex, age, religion, marital status, or handicap.

ALL TEXT AND MAPS IN THIS REPORT ARE BASED ON PRELIMINARY INFORMATION AND ARE SUBJECT TO CHANGE

Should the Edwards Air Force Base Soil Survey be completed, the concepts of some map units, and the names of some soils may change. This, however, should not take away from the value of this report in the use and management of areas already mapped.

JULY, 1989
Soil Conservation Service

Cover Photograph: An east-facing view of the main facilities at the NASA Ames-Dryden Flight Research Facility. Rogers Dry Lake can be seen behind the buildings. Creosote bush, which dominates much of the vegetation in the survey area, is the taller shrub in the foreground.

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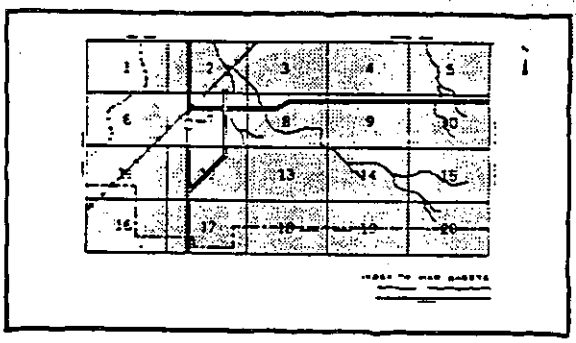
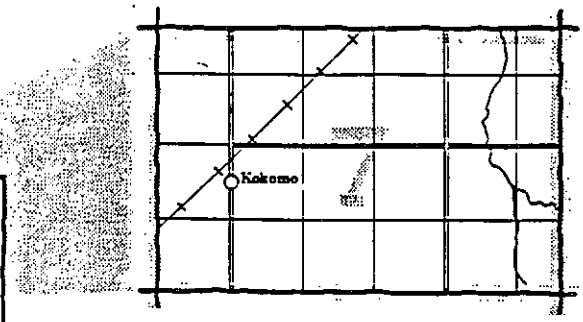
HOW TO USE THIS SOIL SURVEY

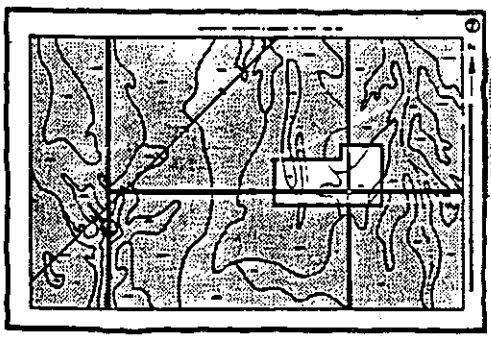
1. Locate your area of interest on the "Index to Map Sheets."

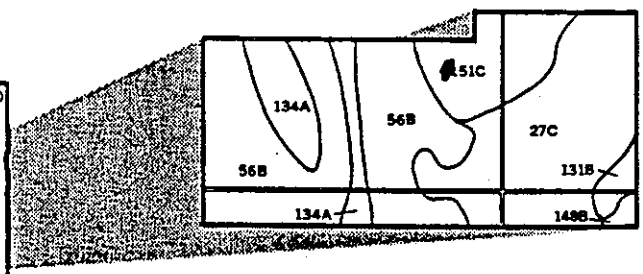




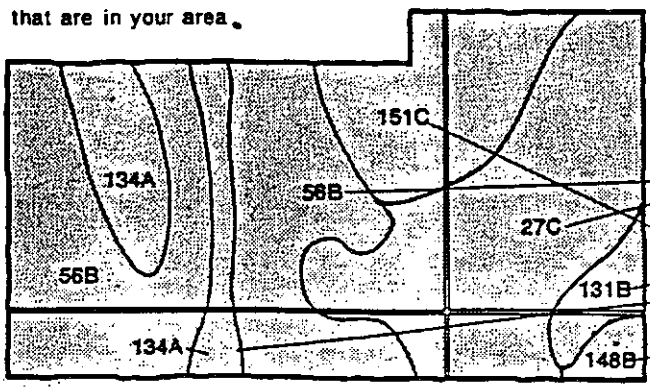
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.





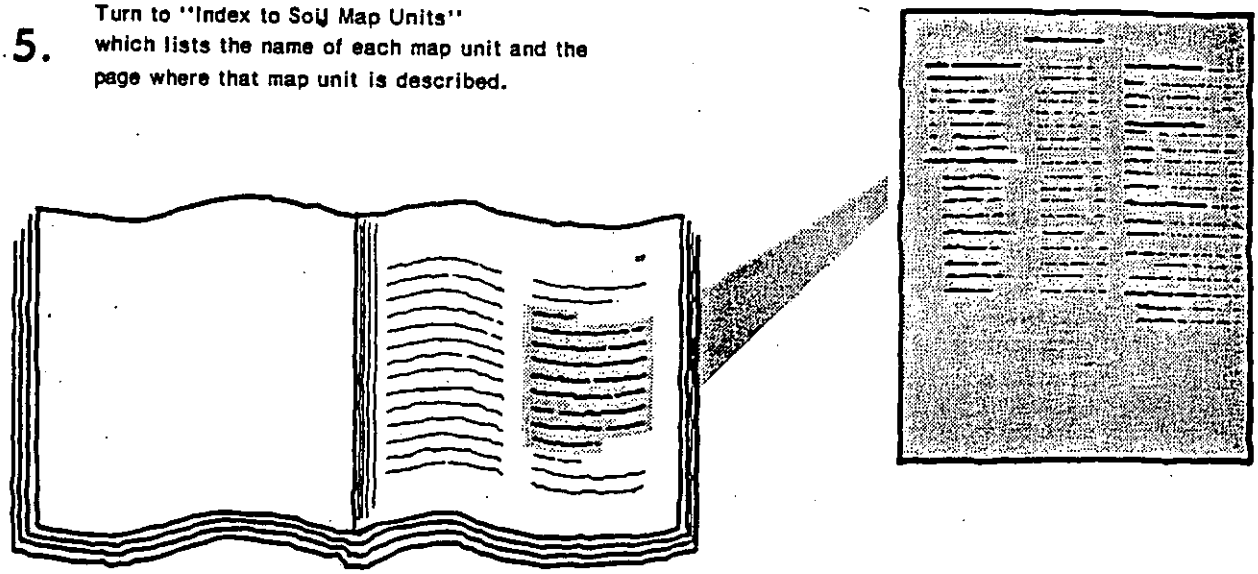
4. List the map unit symbols that are in your area.



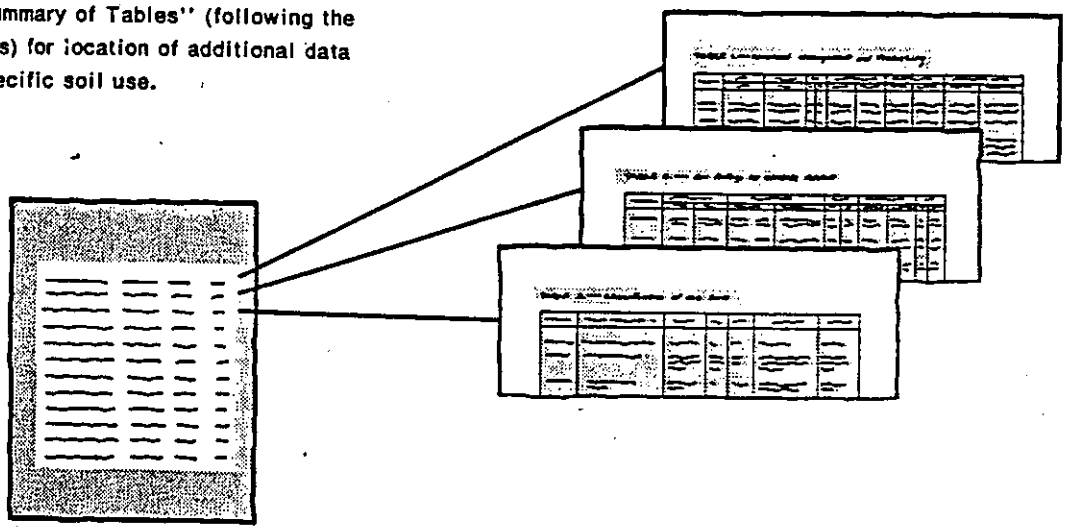
Symbols

27C
56B
131B
134A
148B
151C

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers; foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

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Location of Edwards Air Force Base, California

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Soil Survey of
EDWARDS AIR FORCE BASE, CALIFORNIA
NASA Ames-Dryden Flight Research Facility Part

INTERIM REPORT

By Paul W. Benedict, Soil Conservation Service

United States Department of Agriculture,
Soil Conservation Service
In cooperation with the
National Aeronautics and Space Administration
Ames-Dryden Flight Research Facility
Edwards Air Force Base

The Ames-Dryden Flight Research Facility is located at Edwards Air Force Base in the western part of the Mojave Desert of California, in southeastern Kern County. The entire base occupies an area of 300,700 acres, or about 470 square miles. This report covers an area of 3,200 acres in the north-central part of Edwards Air Force Base that were mapped between June and August, 1988 (see map on page 113 for the area included in this report).

General Nature of the Survey Area

History and Development

More than 450 prehistoric cultural sites have been recorded by archaeologists on the base. The Indians that occupied the area that is now Edwards AFB were favorably situated in a potential contact area for trading between desert, mountain, and coastal areas. Shell beads, obsidian, and other materials found on base suggest that much long distance trading took place.

The historic occupation of the area did not become significant until the later part of the 19th century. Homesteading became attractive in the 1880's with the completion of the railroad and the availability of plentiful land with a relatively high water table. Through the years, the use of ground water for irrigation lowered the water table and made agriculture less attractive.

Military use of the area began in 1933 with the arrival of the Army Air Corps. The onset of World War II accelerated the expansion of the base. It soon became the nation's primary flight test center for experimental aircraft. Many aerospace firsts have occurred at Edwards AFB, including the landing of the first space shuttle (3,6).

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Physiography, Relief, and Drainage

The NASA part of Edwards AFB occupies part of the Antelope Valley watershed, an enclosed basin. The Antelope Valley watershed is bordered by the Tehachapi Mountains on the northwest, the San Gabriel Mountains on the southwest, and low divide-forming hills around the rest of its perimeter. The low point of the basin, at an elevation of about 2,270 feet, is located on base in the dry lake bed of Rogers Lake. This lake was once part of the much larger ancient Lake Thompson that had a shoreline as high as 2,325 feet. Rainfall on base is minimal and most runoff from the mountains seeps into the ground before reaching the base. However, in wet years, a significant amount of surface runoff may reach the dry lake bed and curtail base operations (2,3).

Climate

The climate of the base is characterized by hot, dry summers, and cool, slightly moist winters. Mean annual precipitation is less than 5 inches. Most precipitation comes as light rainfall during the winter months. Light snowfalls of an inch or two are not uncommon, and rarely, heavy snowfalls may occur. Thunderstorms occasionally bring brief but heavy rains in late summer. Temperatures between 100 and 110 degrees F. are common in summer. Winter temperatures may drop well below freezing. Both winter and summer are characterized by wide fluctuations between daytime and nighttime temperatures brought on by the generally low humidity of the desert. Strong westerly winds are common particularly in spring and early summer. The frost-free season is quite variable from year to year, but, on average it ranges from 200 to 250 days (1,5).

Temperatures at Edwards AFB (degrees Fahrenheit)

month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
mean	44	48	52	58	66	74	82	80	74	62	52	44	62
mean max	57	61	65	73	80	89	99	97	92	79	67	57	76
mean min	30	34	38	44	51	58	66	64	57	46	36	30	46
maximum	82	80	87	97	105	112	114	112	109	99	85	84	114
minimum	3	14	17	27	32	40	51	47	34	19	13	7	3

Precipitation at Edwards AFB (inches)

month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
mean	0.89	0.84	0.58	0.35	0.04	0.02	0.04	0.10	0.15	0.32	0.66	0.87	4.86

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Plant and Animal Life

There are a wide variety of desert shrubs, small trees, and annual grasses and forbs growing on the base. In years of favorable rainfall, the base can become quite colorful in spring with an abundance of wild flowers.

On hillslopes and well drained alluvial fans, and fan terraces the dominant plant is the creosote bush. Other plants growing with it include burro bush, Anderson's desert thorn, schismus, red brome, and filaree.

The saline-sodic basin, and relict basin soils support salt tolerant shrubs such as shadscale, allscale saltbush, and littleleaf horsebrush, and numerous annual grasses and forbs.

The somewhat excessively drained dune soils support Joshua trees, fourwing saltbush, winterfat, Mormon tea, Indian ricegrass and numerous others plants.

There are several species of mammals, reptiles, birds, and invertebrates that live in the area. Common mammals include cottontail rabbit, black-tailed jack rabbit, coyote, and ground squirrels.

Reptiles, particularly lizards, are very common. Lizard species include the kneel-backed lizard, gridiron-tailed lizard, desert whip-tailed lizard, desert night lizard, desert scaly lizard, and flat-nosed lizard. Other reptiles include the Mojave rattlesnake, sidewinder rattlesnake, red racer, desert gopher snake, and the endangered desert tortoise.

A wide variety of birds have been seen in the area. These include "goldfinches, linnets, house wrens, mocking birds, mourning doves, hermit thrushes, ravens, roadrunners, horned larks, Gambel quail, white-rumped shrike, ducks, desert sparrow, Say's phoebe, Texas woodpeckers, English sparrows, Scott orioles, verdins, gnatcatchers, western red-tailed hawks, starlings, owls, falcons, doves, bluejays, western tanagers, and a host of others" (Greenwood and McIntyre, 1980). Some birds, such as ravens, have become a nuisance on base (3,4).

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and

shape of the slopes; the general pattern of drainage; the kinds of plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or modal of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually onto one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil Taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

In March, 1988, an initial review was held for soil mapping on Edwards Air Force Base completed prior to this date. The purpose of this review was to guide the soil survey party at the start of mapping and to complete preparation of the first formal draft of the descriptive legend so that work done on the soil survey would meet the standards of the National Cooperative Soil Survey (NCSS). Mapping for the NASA part of the soil survey was completed after the initial review, but it includes many of the same soils that were included in the initial review and three new soils that have been reviewed by California's SCS state soils staff. It should be remembered that this report on the NASA part is only a small part of the incomplete Edwards Air Force Base Soil Survey. Should this survey be completed, the concepts of some soils and the names of some map units could change after more data is obtained. Some laboratory analysis and engineering tests on soil samples were performed at the National Soil Survey Laboratory in Lincoln, Nebraska. Most references to measured soil properties in this report are based on field measurements of particle-size analysis, electrical conductivity, calcium carbonate equivalent, etc.

Detailed Soil Map Units

The map units delineated on the detailed maps of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils and miscellaneous areas have properties similar to those of the dominant soil or soils in the map unit, and thus do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides

sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a soil series. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They can also differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations. The area mapped for this report contains four complexes and no associations.

A complex consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Muroc-Randsburg complex, 5 to 15 percent slopes is an example.

127 Adelanto coarse sandy loam, 1 to 4 percent slopes

SETTING

LANDFORM: low fan terraces
ELEVATION: 2300 to 2430 feet
SLOPE RANGE: 1 to 4 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Adelanto coarse sandy loam and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

ADELANTO SOIL

PARENT MATERIAL: granitic fan alluvium
TYPICAL PROFILE:

* 0 to 4 inches: light brownish gray coarse sandy loam
* 4 to 17 inches: pale brown coarse sandy loam
* 17 to 28 inches: pale brown gravelly sandy loam
* 28 to 60 inches: light brown sandy loam

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: moderate
POTENTIAL ROOTING DEPTH: 60 inches or more
SURFACE RUNOFF: slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 60 inches or more
SALINITY: The EC is less than 2 mmhos/cm throughout.
SODICITY: The SAR is less than 5 throughout.

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Adelanto soil except with an SAR of 13 to 20 and an EC of 2 to 8 mmhos/cm
* Soils similar to this Adelanto soil except for having a sandy clay loam substratum

SIMILAR INCLUSIONS:

* Popson fine sandy loam

127 Adelanto coarse sandy loam, 1 to 4 percent slopes

CHARACTERISTIC PLANT COMMUNITY

* creosotebush
* filaree
* red brome
* schismus
* burrobush
* fiddleneck

MAJOR USES

* potential for building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* hazard of soil blowing

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.
* Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability unit: IIe-4, irrigated
Capability subclass: VIIe, nonirrigated
MLRA: 30

154 Corum sandy loam, 0 to 5 percent slopes

SETTING

LANDFORM: fan terraces
ELEVATION: 2,270 to 2,300 feet
SLOPE RANGE: 0 to 5 percent
VEGETATION: salt desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Corum sandy loam and similar inclusions: 80 percent
CONTRASTING INCLUSIONS: 20 percent

CORUM SOIL

PARENT MATERIAL: granitic fan alluvium
TYPICAL PROFILE:

* 0 to 12 inches: brown and pale brown sandy loam
* 12 to 15 inches: light yellowish brown sandy clay loam
* 15 to 27 inches: light yellowish brown sandy loam
* 27 to 34 inches: light yellowish brown sandy clay loam
* 34 to 51 inches: strongly weathered granitic rock
* 51 inches: hard granitic rock

DEPTH CLASS: moderately deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderately slow
AVAILABLE WATER CAPACITY: low
POTENTIAL ROOTING DEPTH: 20 to 40 inches
SURFACE RUNOFF: slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: rare
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 20 to 40 inches to strongly weathered granitic rock. 40 to more than 60 inches to hard rock

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Corum soil except having hard rock at a depth of 20 to 40 inches
* Popson fine sandy loam and Popson loamy sand in drainages
* Neuralia sandy loam and Eclipse sand along the western edge of this unit

154 Corum sandy loam, 0 to 5 percent slopes

SIMILAR INCLUSIONS:

* Soils similar to this Corum soil except with a clayey subsoil
* Soils with an SAR that is less than 13 in the subsoil and substratum

CHARACTERISTIC PLANT COMMUNITY

* allscale
* saltbush
* schismus
* filaree
* red brome

MAJOR USES

* building site development

MAJOR MANAGEMENT FACTORS

* rare flooding
* moderate shrink-swell potential
* hazard of soil blowing
* corrosion hazard for steel
* moderately deep to bedrock
* moderately slow permeability
* high salinity and sodicity

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* Reduce the risk of flooding by constructing dikes and channels that have outlets for floodwater or locating structures above the expected flood level.
* Buildings and roads should be designed to offset the effects of shrinking and swelling.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with salt, sodium, and drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing, but they may difficult to establish on this unit without reclamation.
* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used. Surfacing roads with rock or oil or applying water will reduce dustiness.

154 Corum sandy loam, 0 to 5 percent slopes

* Offset the risk of corrosion to uncoated steel by using corrosion-resistant material for underground utilities.
* Compensate for the restricted permeability by increasing the size of the absorption field or backfilling the trench with porous material, or both, which also compensate for the limited depth to bedrock.

INTERPRETIVE GROUPS

Capability subclass: VIIs, nonirrigated

153 Eclipse loamy sand, 0 to 5 percent slopes

SETTING

LANDFORM: beach terraces
ELEVATION: 2285 to 2310 feet
SLOPE RANGE: 0 to 5 percent
VEGETATION: salt desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Eclipse loamy sand and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

ECLIPSE SOIL

PARENT MATERIAL: beach sediments
TYPICAL PROFILE:

* 0 to 4 inches: pale brown loamy sand
* 4 to 12 inches: pale brown sandy loam
* 12 to 31 inches: light yellowish brown gravelly loamy sand
* 31 to 60 inches: pale yellow gravelly sand

DEPTH CLASS: very deep
DRAINAGE CLASS: somewhat excessively drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: low
POTENTIAL ROOTING DEPTH: 60 inches or more
SURFACE RUNOFF: slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 60 inches or more

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Eclipse soil except with more than 35 percent gravel in the substratum.
* Soils similar to this Eclipse soil except with a sandy clay loam layer at a depth of 40 to 60 inches along margins of this unit.

SIMILAR INCLUSIONS:

* Cajon loamy sand

CHARACTERISTIC PLANT COMMUNITY

* allscale saltbush
* filaree
* schismus
* red brome

153 Eclipse loamy sand, 0 to 5 percent slopes

* fiddleneck

MAJOR USES

* potential for building site development
* research and development operations
* potential source of sand

MAJOR MANAGEMENT FACTORS

* hazard of blowing soil
* low available water capacity
* cutbanks cave
* seepage

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* Excavation for buildings and roads can expose material that is highly susceptible to wind erosion.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing.
* Irrigation water for ornamental plants should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize leaching of plant nutrients. Irrigate frequently because of the limited available water capacity.
* To prevent cutbanks from caving in, excavations should be provided with sloped banks or shoring.
* Because of the rapid permeability in the substratum, septic tank absorption fields function well. However, unfiltered effluent may contaminate ground water or seep out downslope.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability subclass: VIIs, nonirrigated
MLRA: 30

132 Hi Vista sandy loam, 2 to 9 percent slopes

SETTING

LANDFORM: stable hillslopes
ELEVATION: 2300 to 2500 feet
SLOPE RANGE: 2 to 9 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Hi Vista sandy loam and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

HI VISTA SOIL

PARENT MATERIAL: material weathered from granitic rock
TYPICAL PROFILE:

* 0 to 3 inches: light yellowish brown sandy loam
* 3 to 8 inches: reddish brown clay loam
* 8 to 15 inches: reddish brown sandy clay loam
* 15 to 22 inches: yellowish red gravelly sandy clay loam
* 22 inches: hard granitic rock

DEPTH CLASS: moderately deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderately slow
AVAILABLE WATER CAPACITY: low to moderate
POTENTIAL ROOTING DEPTH: 20 to 40 inches to hard granitic rock
SURFACE RUNOFF: slow to medium
HAZARD OF EROSION BY WATER: moderate
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 20 to 40 inches to hard granitic rock

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Hi Vista soil except having 24 to 40 inches of wind-blown sand deposited on the surface in the area around the intersection of Forbes Ave. and Lancaster Blvd.
* Popson loamy sand and Popson fine sandy loam in drainages
* Randsburg and Muroc sandy loams and Rock outcrop on summits
* Machone sandy loam where the subsoil is not as well developed

132 Hi Vista sandy loam, 2 to 9 percent slopes

SIMILAR INCLUSIONS:

* Soils similar to this Hi Vista soil except with a clayey subsoil and slow permeability
* Soils similar to this Hi Vista soil except with soft bedrock at a depth of 20 to 40 inches

CHARACTERISTIC PLANT COMMUNITY

* filaree
* desert needlegrass
* creosotebush
* ephedra
* spiny hopsage
* buckwheat
* white bursage

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* moderate shrink-swell potential in the subsoil
* moderately deep to bedrock
* hazard of soil blowing
* moderately slow permeability

BUILDING SITE DEVELOPMENT

* Buildings and roads should be designed to offset the effects of shrinking and swelling in the subsoil.
* This unit has severe limitations for septic tank absorption fields.
* If cuts over 20 inches deep are made during construction, hard rock may be exposed
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.

132 Hi Vista sandy loam, 2 to 9 percent slopes

* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.
* Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability subclass: VIIe, nonirrigated
MLRA: 30

143 Leuhman complex, 0 to 1 percent slopes

SETTING

LANDFORM: basin floors
ELEVATION: 2270 to 2370 feet
SLOPE RANGE: 0 to 1 percent
VEGETATION: salt desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Leuhman fine sandy loam and similar inclusions: 45 percent
Leuhman clay loam and similar inclusions: 40 percent
CONTRASTING INCLUSIONS: 15 percent

LEUHMAN FINE SANDY LOAM SOIL

POSITION ON LANDSCAPE: on small coppice dunes of basin floors
PARENT MATERIAL: lacustrine sediments
TYPICAL PROFILE:

* 0 to 7 inches: pale brown fine sandy loam
* 7 to 21 inches: pale brown clay loam
* 21 to 30 inches: pale brown sandy clay loam
* 30 to 42 inches: pale brown loamy fine sand
* 42 to 60 inches: light brownish gray sandy loam

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: very slow
AVAILABLE WATER CAPACITY: moderate
POTENTIAL ROOTING DEPTH: Effective rooting depth is 60 inches or more, but many roots do not penetrate deeper than about 10 inches because of the dense natric horizon.
SURFACE RUNOFF: very slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: severe
FLOODING HAZARD: none
PONDING: Up to 6 inches of ponding may occur for a few days after rains in December through March.
DEPTH TO RESTRICTIVE LAYER: 60 inches or more
SALINITY: The EC is less than 4 mmhos/cm in the upper 7 inches; it ranges from 2 to 10 mmhos/cm at 7 to 42 inches; and it ranges from 10 to 25 mmhos/cm at 42 to 60 inches
SODICITY: The SAR ranges from 13 to 50 from 7 to 30 inches and from 3 to 20 at 30 to 60 inches.

LEUHMAN CLAY LOAM SOIL

POSITION ON LANDSCAPE: in low trough areas of basin floors where the surface sands have been blown or washed away
PARENT MATERIAL: lacustrine sediments

143 Leuhman complex, 0 to 1 percent slopes

TYPICAL PROFILE:

* 0 to 10 inches: pale brown clay loam
* 10 to 22 inches: pale brown sandy clay loam
* 22 to 30 inches: very pale brown very fine sandy loam
* 30 to 36 inches: pale olive loamy sand
* 36 to 60 inches: pale brown fine sandy loam

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: very slow
AVAILABLE WATER CAPACITY: moderate
POTENTIAL ROOTING DEPTH: Effective rooting depth is 60 inches or more, but few plants become established because of the dense surface layer.
SURFACE RUNOFF: ponded or very slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING: none
PONDING: Up to 6 inches of ponding may occur for a few days after rains in December through March.
DEPTH TO RESTRICTIVE LAYER: 60 inches or more
SALINITY: The EC ranges from 2 to 10 mmhos/cm at 0 to 20 inches and 10 to 25 mmhos/cm at 20 to 60 inches.
SODICITY: The SAR ranges from 13 to 50 at 0 to 20 inches and from 3 to 20 at 30 to 60 inches.

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Challenger loam on surfaces similar to Leuhman where there is over 40 percent calcium carbonate equivalent in the soil
* sand dunes

SIMILAR INCLUSIONS:

* Soils similar to these Leuhman soils except with a clayey subsoil

CHARACTERISTIC PLANT COMMUNITY

LEUHMAN FINE SANDY LOAM SOIL:

* shadscale
* white bursage
* red brome
* fiddleneck
* schismus

LEUHMAN CLAY LOAM SOIL:

mostly bare with scattered:

* saltgrass
* shadscale
* spinescale saltbush

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143 Leuhman complex, 0 to 1 percent slopes

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* moderate shrink-swell potential
* hazard of soil blowing
* corrosion hazard for steel
* low strength
* ponding
* very slow permeability
* high salinity and sodicity

BUILDING SITE DEVELOPMENT

* Buildings and roads should be designed to offset the effects of shrinking and swelling.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with salt, sodium, and drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing, but they may difficult to establish on this unit without reclamation.
* Offset the risk of corrosion to uncoated steel by using corrosion-resistant material for underground utilities.
* The load supporting capacity of the soils in this unit is high when the soil is dry, but it decreases rapidly when the soil is wet.
* The Leuhman clay loam component of this unit and to a lesser extent the Leuhman fine sandy loam component are subject to ponding after rains for periods ranging from a few days to several weeks. Methods of removing the ponded water should be considered when designing buildings and roads.
* Absorption lines should be placed below the very slowly permeable layer.
* These soils have severe limitations for most ornamental plants without reclamation.
* It is extremely difficult to establish any type of vegetation on the Leuhman clay loam component of this map unit because of the high content of sodium and salts in the surface layer.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.

143 Leuhman complex, 0 to 1 percent slopes

* The Leuhman clay loam component of this unit and to a lesser extent the Leuhman fine sandy loam component are subject to ponding after rains for periods ranging from a few days to several weeks.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.
* Surfacing roads with rock or oil or applying water will reduce dustiness.
* This soil may be impassable when wet. The use of wheeled and tracked equipment when the soil is wet produces ruts and compacts the soil.

INTERPRETIVE GROUPS

Capability subclass: VIIs, nonirrigated
MLRA: 30

152 Machone-Randsburg complex, 2 to 9 percent slopes

SETTING

LANDFORM: hillslopes
ELEVATION: 2,300 to 2,600 feet
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Machone sandy loam and similar inclusions: 50 percent
Randsburg sandy loam and similar inclusions: 35 percent
CONTRASTING INCLUSIONS: 15 percent

MACHONE SOIL

POSITION ON LANDSCAPE: hillslopes
PARENT MATERIAL: material weathered from granitic rock
SLOPE: 2 to 9 percent
TYPICAL PROFILE:

* 0 to 3 inches: brown sandy loam
* 3 to 23 inches: light yellowish brown sandy loam
* 23 to 30 inches: reddish brown strongly weathered granitic rock

DEPTH CLASS: moderately deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: low
POTENTIAL ROOTING DEPTH: 20 to 40 inches
SURFACE RUNOFF: medium
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 20 to 40 inches to strongly weathered granitic rock

RANDSBURG SOIL

POSITION ON LANDSCAPE: hillslopes
PARENT MATERIAL: material weathered from granitic rock
TYPICAL PROFILE:

* 0 to 3 inches: brown sandy loam
* 3 to 18 inches: light yellowish brown sandy loam
* 18 to 45 inches: very pale brown strongly weathered granitic rock

DEPTH CLASS: shallow
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: very low

152 Machone-Randsburg complex, 2 to 9 percent slopes

POTENTIAL ROOTING DEPTH: 8 to 20 inches to strongly weathered rock
SURFACE RUNOFF: medium
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 8 to 20 inches to strongly weathered rock

INCLUDED AREAS

CONTRASTING INCLUSIONS:
* Muroc sandy loam and rock outcrop scattered throughout the unit
* Hi Vista sandy loam on the more stable slopes
* Neuralia sandy loam along the lower edges of this unit

SIMILAR INCLUSIONS:
* Soils similar to these Machone and Randsburg soils except underlain with hard rock

CHARACTERISTIC PLANT COMMUNITY

MACHONE SOIL:
* creosote bush
* burrobush
* filaree
* schismus

RANDSBURG SOIL:
* creosote bush
* winterfat
* spiny hopsage
* schismus
* filaree

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* moderately deep to weathered rock
* low available water capacity
* hazard of blowing soil

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* This unit has severe limitations for constructing buildings and roads. Heavy equipment may be needed to dig through areas of rock outcrop.

152 Machone-Randsburg complex, 2 to 9 percent slopes

* This unit has severe limitations for septic tank absorption fields.
* Exposed bedrock during construction may hinder revegetation.
* Because the soil is shallow or moderately deep and has a low or very low available water capacity this unit has severe limitations for most ornamental plants without bringing in topsoil.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing, and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used. Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability subclass: VIIe, nonirrigated
MLRA: 30

135 Muroc-Randsburg complex, 5 to 15 percent slopes

SETTING

LANDFORM: hillslopes
ELEVATION: 2300 to 2650 feet
SLOPE RANGE: 5 to 15 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Muroc sandy loam and similar inclusions: 50 percent
Randsburg sandy loam and similar inclusions: 40 percent
CONTRASTING INCLUSIONS: 10 percent

MUROC SOIL

POSITION ON LANDSCAPE: hillslopes
PARENT MATERIAL: material weathered from granitic rock
SLOPE: 5 to 15 percent
TYPICAL PROFILE:

* 0 to 14 inches: light yellowish brown sandy loam
* 14 to 21 inches: white silica-lime cemented duripan
* 21 to 45 inches: white strongly weathered granitic rock

DEPTH CLASS: shallow
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: very low
POTENTIAL ROOTING DEPTH: 8 to 20 inches to the duripan
SURFACE RUNOFF: medium to rapid
HAZARD OF EROSION BY WATER: moderate
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 8 to 20 inches to the duripan

RANDSBURG SOIL

POSITION ON LANDSCAPE: hillslopes
PARENT MATERIAL: material weathered from granitic rock
SLOPE: 5 to 15 percent
TYPICAL PROFILE:

* 0 to 3 inches: brown sandy loam
* 3 to 18 inches: light yellowish brown sandy loam
* 18 to 45 inches: very pale brown strongly weathered granitic rock

DEPTH CLASS: shallow
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid

135 Muroc-Randsburg complex, 5 to 15 percent slopes

AVAILABLE WATER CAPACITY: very low
POTENTIAL ROOTING DEPTH: 8 to 20 inches to strongly weathered rock
SURFACE RUNOFF: medium to rapid
HAZARD OF EROSION BY WATER: moderate
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 8 to 20 inches to strongly weathered rock

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Machone sandy loam scattered throughout the unit
* Rock outcrop mostly along ridge tops
* Popson fine sandy loam and Popson loamy sand in drainages
* Hi Vista sandy loam on the more stable slopes

SIMILAR INCLUSIONS:

* Soils similar to this Randsburg soil except underlain with hard rock
* Soils similar to this Muroc soil except the duripan is shattered

CHARACTERISTIC PLANT COMMUNITY

MUROC SOIL:

* spiny hopsage
* creosotebush
* filaree
* schismus
* desert needlegrass
* ephedra
* red brome
* white bursage

RANDSBURG SOIL:

* creosote bush
* winterfat
* spiny hopsage
* schismus
* filaree

MAJOR USES

* building site development
* research and development operations

135 Muroc-Randsburg complex, 5 to 15 percent slopes

MAJOR MANAGEMENT FACTORS

* shallow soil depth
* very low available water capacity
* strongly sloping slopes in some areas
* hazard of blowing soil

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* This unit has severe limitations for constructing buildings and roads. Most construction projects will require extensive surface modifications. Heavy equipment may be needed to dig through areas of rock outcrop.
* This unit has severe limitations for septic tank absorption fields.
* Exposed bedrock during construction may hinder revegetation.
* Because of shallow depth and very low available water capacity this unit has severe limitations for most ornamental plants without bringing in topsoil.
* Design roads to provide adequate cut-slope grade.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce erosion and soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in the formation of gullies, increased soil blowing, and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.
* Surfacing roads with rock or oil or applying water will reduce dustiness.
* Water bars can be used to control erosion on roads.

INTERPRETIVE GROUP

Capability subclass: VIIe, nonirrigated
MLRA: 30

138 Neuralia sandy loam, 0 to 5 percent slopes

SETTING

LANDFORM: fan terraces
ELEVATION: 2300 to 2430 feet
SLOPE RANGE: 0 to 5 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Neuralia sandy loam and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

NEURALIA SOIL

PARENT MATERIAL: granitic fan alluvium
TYPICAL PROFILE:

* 0 to 5 inches: light yellowish brown sandy loam
* 5 to 23 inches: light brown sandy clay loam
* 23 to 41 inches: light yellowish brown sandy clay loam
* 41 to 60 inches: light yellowish brown sandy loam

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderately slow
AVAILABLE WATER CAPACITY: moderate to high
POTENTIAL ROOTING DEPTH: 60 inches or more
SURFACE RUNOFF: slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 60 inches or more

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Neuralia soil except having hard rock at a depth of 40 to 60 inches
* Popson fine sandy loam and Popson loamy sand in drainages
* Hi Vista sandy loam along upper fringes of fan terraces

SIMILAR INCLUSIONS:

* Soils similar to this Neuralia soil except with a clayey subsoil

138 Neuralia sandy loam, 0 to 5 percent slopes

CHARACTERISTIC PLANT COMMUNITY

* shadscale
* red brome
* filaree
* littleleaf horsebrush
* Anderson's desert thorn
* fiddleneck

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* moderate shrink-swell potential
* hazard of soil blowing
* moderately slow permeability

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* Buildings and roads should be designed to offset the effects of shrinking and swelling in the subsoil.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing.
* Absorption lines should be placed below the moderately slow permeability layer.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.
* Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability subclass: VIIe, nonirrigated
MLRA: 30

122 Popson loamy sand, 0 to 2 percent slopes

SETTING

LANDFORM: flood plains and alluvial fans
ELEVATION: 2270 to 2550 feet
SLOPE RANGE: 0 to 2 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Popson loamy sand and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

POPSON SOIL

PARENT MATERIAL: granitic alluvium
TYPICAL PROFILE:

* 0 to 4 inches: light yellowish brown loamy sand
* 4 to 11 inches: light yellowish brown sandy loam
* 11 to 22 inches: light yellowish brown loamy sand
* 22 to 34 inches: light brown loamy sand
* 34 to 57 inches: light brown gravelly loamy coarse sand
* 57 to 60 inches: pink dense sandy loam

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: moderate
AVAILABLE WATER CAPACITY: moderate
POTENTIAL ROOTING DEPTH: 60 inches or more
SURFACE RUNOFF: slow
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: severe
FLOODING HAZARD: occasionally flooded for brief periods in December through March
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 60 inches or more
SALINITY: The EC is less than 2 mmhos/cm throughout.
SODICITY: The SAR is less than 10 throughout.

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Popson soil except with hard bedrock at a depth of 40 to 60 inches in the area around the Shuttle Mate-Demate Facility.
* Soils similar to this Popson soil except with an EC of 2 to 8 and an SAR of 10 to 20 in the substratum.
* Soils that are sandy throughout.

122 Popson loamy sand, 0 to 2 percent slopes

SIMILAR INCLUSIONS:

* Popson fine sandy loam scattered throughout the unit
* Soils similar to this Popson soil except with a sandy clay loam or clay loam substratum.

CHARACTERISTIC PLANT COMMUNITY

* allscale saltbush
* littleleaf horsebrush
* filaree
* schismus
* eriophyllum
* shadscale

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* occasional flooding hazard
* hazard of blowing soil

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* The possibility of occasional flooding should be considered before roads and buildings are constructed on this unit.
* Dikes and channels that have outlets for flood water can be used to protect buildings and onsite sewage disposal systems from flooding.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.
* Windbreaks can be used to provide protection from the wind and reduce soil blowing.
* Irrigation water for ornamental plants should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize leaching of plant nutrients.

RESEARCH AND DEVELOPMENT OPERATIONS

* Clearing, or any other disturbance that destroys the soil structure and vegetation, can result in increased soil blowing and barren areas.
* The soils in this unit are dusty when subjected to vehicular traffic. Treatment of the surface of roads may be desirable if they are heavily used.

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122 Popson loamy sand, 0 to 2 percent slopes

* Surfacing roads with rock or oil or applying water will reduce dustiness.

INTERPRETIVE GROUPS

Capability subclass: VIIe, nonirrigated
MLRA: 30

131 Randsburg-Rock outcrop complex, 15 to 30 percent slopes

SETTING

LANDFORM: hillslopes
ELEVATION: 2300 to 2620 feet
SLOPE RANGE: 15 to 30 percent
VEGETATION: desert shrubs and annual grasses and forbs
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Randsburg and similar inclusions: 50 percent
Rock outcrop: 35 percent
CONTRASTING INCLUSIONS: 15 percent

RANDSBURG SOIL

POSITION ON LANDSCAPE: hillslopes
PARENT MATERIAL: material weathered from granitic rock
SLOPE: 15 to 30 percent
TYPICAL PROFILE:

* 0 to 3 inches: brown sandy loam
* 3 to 18 inches: light yellowish brown sandy loam
* 18 to 45 inches: very pale brown strongly weathered granitic rock

DEPTH CLASS: shallow
DRAINAGE CLASS: well drained
PERMEABILITY: moderately rapid
AVAILABLE WATER CAPACITY: very low
POTENTIAL ROOTING DEPTH: 8 to 20 inches to strongly weathered rock
SURFACE RUNOFF: rapid
HAZARD OF EROSION BY WATER: moderate
HAZARD OF EROSION BY WIND: moderate
FLOODING HAZARD: none
PONDING: none
DEPTH TO RESTRICTIVE LAYER: 8 to 20 inches to strongly weathered rock

ROCK OUTCROP

Rock outcrop consists of exposures of bare rock such as quartz monzonite, granite, and in a few places basalt and andesite. It is generally barren of vegetation except for a few shrubs, forbs, and grasses that grow in cracks of the rocks. Most rock outcrops are hard rock, but some are soft.

131 Randsburg-Rock outcrop complex, 15 to 30 percent slopes

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Cajon loamy sand and sand dunes in areas where eolian deposits accumulate
* Machone sandy loam in scattered areas
* Hi Vista sandy loam on the more stable slopes

SIMILAR INCLUSIONS:

* Soils similar to this Randsburg soil except underlain with hard rock
* Muroc sandy loam in scattered areas

CHARACTERISTIC PLANT COMMUNITY

RANDSBURG SOIL:

* creosote bush
* winterfat
* spiny hopsage
* schismus
* filaree

MAJOR USES

* building site development
* research and development operations

MAJOR MANAGEMENT FACTORS

* shallow soil depth
* rock outcrop
* moderately steep slopes
* very low available water capacity
* hazard of blowing soil

GENERAL MANAGEMENT CONSIDERATIONS AND PRACTICES

BUILDING SITE DEVELOPMENT

* This unit has severe limitations for constructing buildings and roads. Most construction projects will require extensive surface modifications. Heavy equipment may be needed to dig through areas of rock outcrop.
* This unit has severe limitations for septic tank absorption fields.
* Because of shallow depth, rock outcrop, and very low available water capacity this unit has severe limitations for most ornamental plants without bringing in topsoil.
* As much of the existing natural vegetation as feasible should be left around building sites to reduce erosion and soil blowing.
* Areas disturbed during construction should be revegetated with drought tolerant plants as soon as possible. Native plants may be the most effective.

131 Randsburg-Rock outcrop complex, 15 to 30 percent slopes

RESEARCH AND DEVELOPMENT OPERATIONS

* Surfacing roads with rock or oil or applying water will reduce dustiness.
* Water bars can be used to control erosion on roads.

INTERPRETIVE GROUPS

RANDSBURG SOIL:
Capability subclass: VIIe, nonirrigated
ROCK OUTCROP:
Capability class: VIII
MLRA: 30

149 Wherry clay, 0 to 1 percent slopes

SETTING

LANDFORM: basin floors
ELEVATION: 2265 to 2285 feet
VEGETATION: barren
MEAN ANNUAL PRECIPITATION: 4 to 5 inches
MEAN ANNUAL TEMPERATURE: 60 to 64 degrees F.
FROST FREE PERIOD: 200 to 250 days

COMPOSITION

Wherry clay and similar inclusions: 85 percent
CONTRASTING INCLUSIONS: 15 percent

WHERRY SOIL

PARENT MATERIAL: lacustrine sediments
TYPICAL PROFILE:

* 0 to 3 inches: light gray clay
* 3 to 9 inches: light gray clay loam with very thin strata of sandy material
* 9 to 28 inches: light gray clay with very thin strata of sandy material
* 28 to 38 inches: stratified light gray clay and white sand
* 38 to 60 inches: light olive gray clay

DEPTH CLASS: very deep
DRAINAGE CLASS: well drained
PERMEABILITY: very slow
AVAILABLE WATER CAPACITY: moderate
POTENTIAL ROOTING DEPTH: The dense nature of this soil prevents roots from penetrating it.
SURFACE RUNOFF: ponded
HAZARD OF EROSION BY WATER: slight
HAZARD OF EROSION BY WIND: slight, however there may be considerable blowing of new depositions if they are not hardened by alternating periods ponding and drying before windy periods begin
FLOODING HAZARD: frequently flooded for periods of a few days to six weeks in December through March
PONDING: see flooding hazard
DEPTH TO RESTRICTIVE LAYER: 60 inches or more
SALINITY: The EC ranges from 20 to 75 mmhos/cm in the upper 38 inches and it is less than 8 mmhos/cm below.
SODICITY: The SAR ranges from 100 to 400 in the upper 3 inches and from 50 to 200 below.

149 Wherry clay, 0 to 1 percent slopes

INCLUDED AREAS

CONTRASTING INCLUSIONS:

* Soils similar to this Wherry soil except having bedrock at a depth of 40 to 60 inches along the margins of Rogers Lake near the NASA facilities.
* Small dune areas scattered throughout the unit
* Soils similar to this Wherry soil except having stratified layers of gravelly fan alluvium throughout the profile
* Challenger loam and Leuhman clay loam along margins of the unit

SIMILAR INCLUSIONS:

* Soils similar to this Wherry soil except for having a loam, silt loam, or clay loam surface

MAJOR USES

* research and development operations

MAJOR MANAGEMENT FACTORS

* high shrink-swell potential
* corrosion hazard for steel
* low strength
* high salinity and sodicity
* very slow permeability
* flooding

RESEARCH AND DEVELOPMENT OPERATIONS

GENERAL MANAGEMENT CONSIDERATIONS

* The high salinity and sodicity make it impossible to grow any vegetation on this soil.
* This unit has severe limitations for building site development.
* This unit is subject to flooding after rains for periods ranging from a few days to six weeks.
* The load supporting capacity of the this soil is very high when the soil is dry, but it decreases rapidly when the soil is wet.
* Offset the risk of corrosion to uncoated steel by using corrosion-resistant material for underground utilities.
* Roads should be designed to offset the effects of shrinking and swelling.
* This soil may be impassable when wet. The use of wheeled and tracked equipment when the soil is wet produces ruts that may create hazards for aircraft when the soil dries.

INTERPRETIVE GROUPS

Capability subclass: VIIIw
MLRA: 30

NND12415466E
Amendment 1
Attachment 10

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The table on page 81 shows the classification of the soils in this survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Fluvent (Fluv, meaning river, plus ent, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Torrifluvent (Torr, meaning hot and dry, plus fluvent, the suborder of the Entisols that have a torric moisture regime).

SUBGROUP. Each subgroup has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Typic identifies the subgroup that typifies the great group. An example is Typic Torrifluvents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect use and management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral

content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series. An example is the Popson series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (7). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (8). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

ADELANTO SERIES

The Adelanto Series consists of very deep, well drained soils on fan terraces. These soils formed in fan alluvium derived from granitic rock. Slopes range from 1 to 4 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Adelanto Series in this survey area are coarse-loamy, mixed, thermic Typic Camborthids.

Typical pedon of Adelanto coarse sandy loam, 1 to 4 percent slopes, on a west-facing slope of 3 percent, about 11 miles south of Edwards AFB headquarters; 220 feet east and 200 feet north of the southwest corner of Sec. 19 (intersection of 140th Street East and Avenue E), T. 8 N., R. 9 W., Redman quadrangle., SBBM.

A--0 to 4 inches; light brownish gray (2.5Y 6/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; few very fine interstitial pores; 8 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.5); clear smooth boundary.

Bw1--4 to 10 inches; pale brown (10YR 6/3) coarse sandy loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; few very fine tubular and interstitial pores; 8 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.8); clear smooth boundary.

Bw2--10 to 17 inches; pale brown (10YR 6/3) coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; few very fine tubular and interstitial pores; 8 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.8); clear smooth boundary.

Bk--17 to 28 inches; pale brown (10YR 6/3) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine tubular and interstitial pores; 20 percent pebbles (2 to 15 mm in diameter); slightly effervescent disseminated lime and segregated as hard coatings on underside of rock fragments; moderately alkaline (pH 7.9); abrupt smooth boundary.

2Btk--28 to 40 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine and few fine tubular pores; common thin clay films in pores; 8 percent pebbles (2 to 10 mm in diameter); violently effervescent disseminated lime and segregated as common fine soft masses; moderately alkaline (pH 8.3); abrupt smooth boundary.

2C--40 to 60 inches; light brown (7.5YR 6/4) sandy loam, dark brown (7.5YR 4/4) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine interstitial and few very fine tubular pores; 10 percent pebbles (2 to 15 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.4).

The A horizon has dry colors of 10YR 6/2, 6/3, 6/4; 2.5Y 6/2 Or 6/4. Moist colors are 10YR 4/2, 4/3, 4/4; 2.5Y 4/2, or 4/4. It has 5 to 12 percent clay and 5 to 15 percent gravel. Reaction is neutral or mildly alkaline.

The Bw horizon has dry colors of 10YR 6/2, 6/3, or 6/4. Moist colors are 10YR 4/2, 4/3, or 4/4. It is sandy loam or coarse sandy loam with 5 to 12 percent clay and 5 to 15 percent gravel. Reaction is mildly alkaline or moderately alkaline.

The Bk horizon has dry colors of 10YR 6/2, 6/3, or 6/4. Moist colors are 10YR 4/2, 4/3, or 4/4. It is sandy loam, coarse sandy loam, or their gravelly equivalents with 5 to 12 percent clay and 10 to 25 percent gravel. It is slightly effervescent or strongly effervescent.

The 2Btk horizon has dry colors of 5YR 6/3, 6/4; or 7.5YR 6/4. Moist colors are 5YR 4/3, 4/4; or 7.5YR 4/4. It has 12 to 18 percent clay and 5 to 15 percent gravel.

The 2C horizon has dry colors of 5YR 6/3, 6/4; or 7.5YR 6/4. Moist colors are 5YR 4/3, 4/4; or 7.5YR 4/4. It is sandy loam or loamy sand with 5 to 12 percent clay and 5 to 15 percent gravel.

The Adelanto soils in this survey area are a taxadjunct to the Adelanto series as mapped elsewhere in California because they have a cambic horizon in place of an argillic horizon, and they have an aridic moisture regime that is not bordering on xeric. These differences do not significantly affect the use or behavior of the soils.

CORUM SERIES

The Corum series consists of moderately deep, well drained soils on fan terraces along the margins of Rodgers Dry Lake. These soils formed in fan alluvium that has overwashed material weathered from granitic rock. Slopes range from 0 to 5 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Corum series are fine-loamy, mixed, thermic Typic Natrargids.

Typical pedon of Corum sandy loam, 0 to 5 percent slopes, on an east-facing slope of 1.5 percent, about 2 miles north of Edwards AFB headquarters; 1375 feet west and 200 feet south of the northeast corner of Sec. 24, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There are 35 percent coarse fragments (2 to 15 mm in diameter) on the surface.

A1--0 to 2 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many; many very fine interstitial pores; 12 percent pebbles (2 to 15 mm in diameter); very slightly effervescent disseminated lime; mildly alkaline (pH 7.8); abrupt smooth boundary.

A2--2 to 7 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial and few very fine tubular pores; 5 percent pebbles (2 to 8 mm in diameter); mildly alkaline (pH 7.8); clear smooth boundary.

A3--7 to 12 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and

nonplastic; common very fine and few fine and medium roots; common very fine interstitial and few very fine tubular pores; 5 percent pebbles (2 to 8 mm in diameter); moderately alkaline (pH 8.4); abrupt smooth boundary.

2Btn--12 to 15 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse columnar structure; hard, firm, sticky and plastic; few very fine, fine, and medium roots; common very fine and few fine tubular pores; common thin clay films in bridges between mineral grains and few thin clay films on peds; 10 percent pebbles (2 to 8 mm in diameter); very slightly effervescent disseminated lime; strongly alkaline (pH 8.8); clear smooth boundary.

2Bkn--15 to 27 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine and few fine and medium tubular pores; 8 percent pebbles (2 to 8 mm in diameter); violently effervescent disseminated lime and segregated as many fine and medium soft masses; very strongly alkaline (pH 9.2); abrupt smooth boundary.

3Btknb--27 to 34 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine, fine, and medium roots; common very fine and few fine tubular pores; few thin and moderately thick clay films in bridges between mineral grains and in pores; 8 percent pebbles (2 to 8 mm in diameter); violently effervescent disseminated lime and segregated as common fine soft masses; strongly alkaline (pH 8.6); clear wavy boundary.

3Cr--34 to 51 inches; soft, strongly weathered granitic rock; clear wavy boundary.

3R--22 inches; hard granitic rock.

Weathered granitic rock is at a depth of 20 to 40 inches.

The A horizon has dry colors of 10YR 5/3, 5/4, 6/3 or 6/4. Moist color is 10YR 3/3, 4/3 or 4/4. It has 6 to 15 percent clay and 0 to 15 percent gravel. It is noneffervescent or slightly effervescent. Reaction is mildly alkaline or moderately alkaline.

The 2Btn horizon has dry colors of 10YR 6/3 or 6/4. Moist colors are 10YR 4/3 or 4/4. It is sandy loam or sandy clay loam with 16 to 25 percent clay, but averages 18 to 25 percent. It has 5 to 15 percent gravel.

The 2Bkn horizon has dry colors of 10YR 6/3 or 6/4. Moist colors are 10YR 4/3 or 4/4. It is loamy sand or sandy loam with 6 to 15 percent clay and 5 to 15 percent gravel. It has 5 to 15 percent calcium carbonate equivalent. Reaction is strongly alkaline or very strongly alkaline.

The buried 3Btknb horizon has dry colors of 10YR 6/3, 6/4; or 7.5YR 6/4. Moist colors are 10YR 4/3, 4/4; or 7.5YR 4/4. It has 20 to 30 percent clay and 5 to 15 percent gravel. Reaction is strongly alkaline or very strongly alkaline.

ECLIPSE SERIES

The Eclipse series consists of very deep, somewhat excessively drained soils on beach terraces. These soils formed in beach deposits of ancient Lake Thompson. Slopes range from 0 to 5 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Eclipse series are sandy, mixed, thermic Typic Camborthids.

Typical pedon of Eclipse loamy sand, 0 to 5 percent slopes, on a southeast facing slope of 1 percent, about 2.5 miles north of Edwards AFB headquarters and 220 feet northeast of northeast corner of fence surrounding fuel storage area; 1900 feet north and 1600 feet west of the southeast corner of Sec. 13, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There are 40 percent coarse fragments (2 to 20 mm in diameter) on the surface.

A--0 to 4 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak coarse platy; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine and few fine interstitial pores; 10 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.8); clear smooth boundary.

Bt--4 to 12 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine interstitial and tubular pores; common thin clay films in bridges between mineral grains; 12 percent pebbles (2 to 15 mm in diameter); moderately alkaline (pH 8.2); clear smooth boundary.

Cn1--12 to 21 inches; light yellowish brown (10YR 6/4) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine interstitial and tubular pores; 20 percent pebbles (2 to 15 mm in diameter); strongly alkaline (pH 8.6); clear smooth boundary.

C1--21 to 31 inches; light yellowish brown (10YR 6/4) gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and few fine interstitial pores and few very fine tubular pores; slightly effervescent disseminated lime and segregated as hard coatings on bottoms of coarse fragments; 20 percent pebbles (2 to 20 mm in diameter); moderately alkaline (pH 8.4); clear smooth boundary.

C2--31 to 45 inches; pale yellow (2.5Y 7/4) gravelly sand, light olive brown (2.5Y 5/4) moist; single grain; loose, loose, nonsticky and nonplastic; few very fine roots; many very fine and few fine interstitial pores; strongly effervescent disseminated lime and segregated as hard coatings on bottoms of coarse fragments; 32 percent pebbles (2 to 20 mm in diameter); moderately alkaline (pH 8.2); abrupt smooth boundary.

Cn2--45 to 60 inches; pale yellow (2.5Y 7/4) gravelly sand, light olive brown (2.5Y 5/4) moist; single grain; loose, loose, nonsticky and nonplastic; many very fine interstitial pores; slightly effervescent disseminated lime and segregated as hard coatings on bottoms of coarse fragments; 20 percent pebbles (2 to 12 mm in diameter); strongly alkaline (pH 8.8).

It is mildly alkaline or moderately alkaline throughout.

The A horizon has 5 to 15 percent coarse fragments. It has 3 to 8 percent clay content.

The Bt horizon has dry colors of 10YR 6/3 or 6/4. Moist colors are 10YR 4/3 or 4/4. It has 6 to 10 percent clay and 5 to 15 percent coarse fragments. It is noneffervescent or slightly effervescent. Reaction is moderately alkaline or strongly alkaline.

The C horizon has dry colors of 10 YR 6/3, 6/4, 7/3, 7/4; 2.5Y 6/4 or 7/4. Moist colors are 10YR 4/3, 4/4, 5/3, 5/4; 2.5Y 4/4 or 5/4. It has 0 to 5 percent clay and 5 to 35 percent coarse fragments. It is slightly or strongly effervescent. Reaction is moderately alkaline or strongly alkaline.

This soil is not a taxadjunct, but it differs from the Eclipse series, as mapped elsewhere in California, because it is mapped at elevations of 2,285 to 2,310 feet instead of 3,600 to 3,820 feet; and it is mapped on beach terraces instead of stream or lacustrine terraces. These differences do not significantly affect the use or behavior of the soils.

HI VISTA SERIES

The Hi Vista series consists of moderately deep, well drained soils on hills. These soils formed in material weathered from granitic rock. Slopes range from 2 to 9 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Hi Vista series are fine-loamy, mixed, thermic Typic Haplargids.

Typical pedon of Hi Vista sandy loam, 2 to 9 percent slopes, on a northeast-facing slope of 6 percent, about 3 miles north of Edwards AFB headquarters; 1850 feet north and 1500 feet west of the southeast corner of Sec. 12, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There are 45 percent coarse fragments (2 to 35 mm in diameter) on the surface.

A--0 to 3 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; 10 percent pebbles (2 to 20 mm in diameter); mildly alkaline (pH 7.8); abrupt smooth boundary.

Bt1--3 to 8 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; strong coarse columnar structure parting to moderate medium and coarse subangular blocky; very hard, firm, sticky and plastic; common very fine and few fine, medium, and coarse roots; few very fine tubular pores; many thin and moderately thick clay films on peds; 10 percent pebbles (2 to 20 mm in diameter); mildly alkaline (pH 7.6); clear smooth boundary.

Bt2--8 to 15 inches; reddish brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; strong coarse columnar structure parting to moderate medium and coarse subangular blocky; very hard, firm, sticky and plastic; few very fine, fine, medium, and coarse roots; few very fine tubular pores; many thin and moderately thick clay films on peds; 12 percent pebbles (2 to 20 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

BCtk--15 to 22 inches; yellowish red (5YR 5/6) gravelly sandy clay loam, yellowish red (5YR 4/6) moist; weak coarse columnar structure; very hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common moderately thick clay films on peds; 25 percent pebbles (2 to 20 mm in diameter); strongly effervescent disseminated lime and segregated as common fine soft masses; moderately alkaline (pH 8.0); clear smooth boundary.

R--22 inches; hard granitic rock.

Hard granitic rock is at a depth of 20 to 40 inches.

The A horizon has dry colors of 10YR 5/3, 5/4, 6/3 or 6/4. Moist color is 10YR 4/3 or 4/4. It has 8 to 15 percent clay. It has 5 to 15 percent gravel.

The Bt horizon has dry colors of 5YR 5/3, 5/4, 5/6; 7.5YR 5/4 or 5/6. Moist colors are 5YR 4/3, 4/4, 4/6; 7.5YR 4/4 or 4/6. It is clay loam or sandy clay loam with 20 to 35 percent clay. It has 5 to 35 percent gravel. Reaction is mildly alkaline or moderately alkaline.

LEUHMAN SERIES

The Leuhman series consists of very deep, well drained soils on basin floors. These soils formed in lacustrine sediments. Slopes range from 0 to 1 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Leuhman series are fine-loamy, mixed, thermic Typic Natrargids.

Typical pedon of Leuhman fine sandy loam, 0 to 1 percent slopes, about 2.7 miles south of Edwards AFB headquarters; 90 feet north of Hospital Road; 1,200 feet east and 750 feet north of the southwest corner of Sec. 12, T. 9 N., R. 10 W., Edwards quadrangle., SBBM.

A--0 to 2 inches; pale brown (10YR 6/3) fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; very slightly effervescent disseminated lime; moderately alkaline (pH 8.2); abrupt smooth boundary.

2BAt--2 to 8 inches; pale brown (10YR 6/3) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse columnar structure parting to moderate coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine

tubular, vesicular, and interstitial pores; common thin clay films in bridges between mineral grains and few thin clay films in pores; slightly effervescent disseminated lime; strongly alkaline (pH 8.6); clear smooth boundary.

2Btn--8 to 18 inches; light yellowish brown (2.5Y 6/4) sandy clay loam, olive brown (2.5Y 4/) moist; moderate coarse columnar structure; hard, firm, sticky and plastic; common very fine and few fine roots; common very fine and few fine tubular pores; common moderately thick clay films on peds and in pores and common thin clay films in bridges between mineral grains; strongly effervescent disseminated lime and segregated as few fine and medium soft masses; very strongly alkaline (pH 9.1); clear wavy boundary.

2Btkn--18 to 24 inches; light olive brown (2.5Y 5/4) sandy clay loam, olive brown (2.5YR 4/4) moist; moderate coarse columnar structure parting to moderate coarse subangular blocky; hard, firm, sticky and plastic; few very fine roots; common very fine and few fine interstitial pores and few very fine and fine tubular pores; common thin clay films on peds and in pores and common thin clay films in bridges between mineral grains; violently effervescent disseminated lime and segregated as common fine and medium soft masses; very strongly alkaline (pH 9.3); gradual wavy boundary.

2Bkn--24 to 47 inches; light yellowish brown (2.5Y 6/4) sandy clay loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, firm, sticky and plastic; few very fine roots; common very fine and fine tubular pores and common very fine interstitial pores; violently effervescent disseminated lime and segregated as many fine, medium, and large soft masses; very strongly alkaline (pH 9.1); clear smooth boundary.

3Ckn--47 to 52 inches; pale yellow (5Y 7/3) fine sandy loam, pale olive (5Y 6/3) moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; few very fine and fine tubular and very fine interstitial pores; violently effervescent disseminated lime and segregated as common medium and large soft masses; very strongly alkaline (pH 9.2); abrupt smooth boundary.

3Cn--52 to 60 inches; pale olive (5Y 6/3) loamy sand, olive (5Y 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; very slightly effervescent disseminated lime; strongly alkaline (pH 9.0).

In some pedons the eolian material on the surface has been blown out leaving the wind resistant natric horizon exposed at the surface.

The A horizon has a dry color of 10YR 6/3 or 4/3. Moist color is 10YR 4/3 or 4/4. It is loamy sand or fine sandy loam with 5 to 15 percent clay. It is noneffervescent to slightly effervescent with disseminated lime. Electrical conductivity is less than 4 mmhos/cm and the SAR is less than 10.

The 2Btn horizon has dry colors of 10YR 6/3, 6/4; or 2.5Y 6/4. Moist color is 10YR 4/3, 4/4, 5/3; or 2.5Y 4/4. It is sandy clay loam or clay loam with 10 to 30 percent clay. It is slightly effervescent or strongly effervescent with disseminated lime. Reaction is strongly alkaline or very strongly alkaline. Electrical conductivity is 2 to 8 mmhos/cm. The SAR ranges from 20 to 60.

The 2Btkn and 2Bkn horizons have dry colors of 10YR 5/4, 6/3, 6/4, 7/4; 2.5Y 5/4, or 6/4. Moist colors are 10YR 4/4, 5/3; or 2.5Y 4/4. It is sandy clay loam, fine sandy loam, or very fine sandy loam averaging 18 to 35 percent clay. It is strongly effervescent or violently effervescent with disseminated and segregated lime. Reaction is strongly alkaline or very strongly alkaline. Electrical conductivity is 4 to 10 mmhos/cm. The SAR ranges from 13 to 50.

The 3Ckn and 3Cn horizons have dry colors of 10YR 6/3; 2.5Y 6/2, 6/4, 7/2; 5Y 6/3 or 7/3. Moist colors are 10YR 4/3; 2.5Y 4/2, 4/4, 5/4; 5Y 5/3, or 5/4. It is loamy sand, loamy fine sand, sandy loam, or fine sandy loam. Clay content ranges from 5 to 20 percent. It has up to 10 percent gravel. It is strongly effervescent or violently effervescent with disseminated and segregated lime. Reaction is strongly alkaline or very strongly alkaline. Electrical conductivity is 10 to 25 mmhos/cm. The SAR ranges from 3 to 20.

MACHONE SERIES

The Machone series consists of moderately deep, well drained soils on hills. These soils formed in material weathered from granitic rock. Slopes range from 2 to 9 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Machone series are coarse-loamy, mixed (calcareous), thermic Typic Torriorthents.

Typical pedon of Machone sandy loam in an area of Machone-Randsburg complex, 2 to 9 percent slopes, on an east-facing slope of 7 percent, about 2.5 miles north northwest of Edwards AFB headquarters, 1800 feet east and 1050 feet north of the southwest corner of Sec. 14, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

A--0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine and few fine interstitial pores; 10 percent pebbles (2 to 15 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); abrupt smooth boundary.

C1--3 to 9 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine interstitial pores and few very fine tubular pores; 10 percent pebbles (2 to 15 mm in diameter); moderately alkaline (pH 8.0); gradual smooth boundary.

C2--9 to 23 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and few fine, medium, coarse, and very coarse roots; few very fine interstitial pores; 10 percent pebbles (2 to 15 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); abrupt wavy boundary.

2Crt--23 to 30 inches; reddish brown strongly weathered granitic rock. Clay films coat the rock structure in the upper three inches of this horizon.

A paralithic contact is at a depth of 20 to 40 inches. The soil is slightly effervescent or strongly effervescent below 10 inches.

The A horizon has dry colors of 10YR 5/3 or 5/4. Moist color is 10YR 4/3 or 4/4. It has 8 to 18 percent clay and 0 to 15 percent gravel.

The C horizon has dry colors of 10YR 6/3 or 6/4. Moist color is 10YR 4/3 or 4/4. It is sandy loam or coarse sandy loam with 8 to 18 percent clay. It has 0 to 15 percent gravel.

MUROC SERIES

The Muroc series consists of shallow, well drained soils on hills. These soils formed in material weathered from granitic rock. Slopes range from 2 to 15 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Muroc series are loamy, mixed, thermic, shallow Typic Durorthids.

Typical pedon of Muroc sandy loam in an area of Muroc-Randsburg sandy loams, 5 to 15 percent slopes, on a north northwest-facing slope of 6 percent, about 4 miles northwest of Edwards AFB headquarters, 50 feet east of dirt road; 1850 feet north and 100 feet east of the southwest corner of Sec. 9, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There is 75 percent gravel and pan fragments (2 to 20 mm in diameter) on the surface.

A--0 to 3 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure parting to weak coarse platy; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine tubular and interstitial and few fine tubular pores; 10 percent pebbles (2 to 10 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

C--3 to 14 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common very fine tubular and interstitial and few fine tubular pores; 10 percent pebbles (2 to 10 mm in diameter); strongly effervescent disseminated lime; moderately alkaline (pH 8.2); abrupt smooth boundary.

2Ckqm--14 to 21 inches; white (10YR 8/1) silica-lime cemented duripan (the upper 2 to 5 mm is an indurated laminar cap), light gray (10YR 7/2) moist; massive with vertical cracks averaging 24 inches apart; very hard, firm, nonsticky and nonplastic; few very fine and fine roots in cracks; few very fine and fine tubular pores; violently effervescent disseminated lime; strongly alkaline (pH 8.8); clear wavy boundary.

2Crk--21 to 45 inches; white (10YR 8/2) strongly weathered granitic rock, light brownish gray (10YR 6/2) moist; has rock structure, but will disperse on shaking in water; strongly effervescent disseminated lime and segregated in seams and cracks.

Depth to the duripan is 8 to 20 inches. There are 0 to 15 percent gravel throughout.

The A horizon has dry colors of 10YR 5/3, 5/4, 6/3, or 6/4. Moist color is 10YR 4/3 or 4/4. It has 8 to 18 percent clay.

The C horizon has dry colors of 10YR 6/3 or 6/4. Moist color is 10YR 4/3 or 4/4. It is sandy loam or coarse sandy loam with 8 to 18 percent clay.

The 2Ckqm horizon has dry colors of 10YR 7/3, 8/1, 8/2, or 8/3. Moist colors are 10YR 6/2, 6/3, 7/2, or 7/3. Typically only the upper 2 to 5 mm is indurated. The duripan becomes softer with depth.

NEURALIA SERIES

The Neuralia series consists of very deep, well drained soils on fan terraces. These soils formed in fan alluvium derived from granitic rock. Slopes range from 0 to 5 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Neuralia series are fine-loamy, mixed, thermic Typic Haplargids.

Typical pedon of Neuralia sandy loam, 0 to 5 percent slopes, on a northeast-facing slope of 2 percent, about 4 miles north of Edwards AFB headquarters and 0.7 mile west of Rosamond Blvd.; 875 feet north and 150 feet west of the southeast corner of Sec. 2, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There are 50 percent gravel (2 to 10 mm in diameter) on the surface

A1--0 to 2 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium platy structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine vesicular pores; 5 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.6); abrupt smooth boundary.

A2--2 to 5 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine tubular pores; 5 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.6); abrupt smooth boundary.

2Bt--5 to 17 inches; light brown (7.5YR 6/4) sandy clay loam, dark brown (7.5YR 4/4) moist; strong medium columnar structure; very hard, firm, sticky and plastic; common very fine and few fine and medium roots; few very fine tubular pores; many moderately thick clay films on peds and common thin clay films in pores; 8 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 7.8); clear wavy boundary.

2Btk--17 to 23 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; moderate medium columnar structure; very hard, firm, sticky and plastic; few very fine and fine roots; few very fine tubular pores; common

moderately thick clay films on peds and common thin clay films in pores; strongly effervescent with disseminated lime and segregated as few fine soft masses; 8 percent pebbles (2 to 10 mm in diameter); mildly alkaline (pH 8.0); clear wavy boundary.

2Bk--23 to 41 inches; light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (7.5YR 5/4) moist; weak coarse subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; violently effervescent with disseminated lime and segregated as common medium and large soft masses; 12 percent pebbles (2 to 10 mm in diameter); moderately alkaline (pH 8.2); clear smooth boundary.

2C--41 to 60 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/6) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; 8 percent pebbles (2 to 10 mm in diameter); strongly effervescent with disseminated lime; moderately alkaline (pH 8.2).

Thickness of the solum is 21 to 50 inches. The surface is covered with about 30 to 60 percent gravel. Reaction is neutral to moderately alkaline to a depth of 10 inches and is mildly alkaline or moderately alkaline below.

The A horizon has dry colors of 7.5YR 5/4; 10YR 5/2, 5/3, 5/4, 6/3, 6/4, or 6/6. Moist color is 7.5YR 4/4; 10YR 4/3, or 4/4. It has 8 to 15 percent clay.

The Bt horizon has dry colors of 7.5YR 5/4, 5/6, 6/4; 10YR 5/3, 5/4, 6/4, or 6/6. Moist colors are 7.5YR 4/4, 4/6, 5/4, 5/6; 10YR 4/3, 4/4, 4/6, 5/4, or 5/6. It has 20 to 35 percent clay and 5 to 15 percent gravel.

The Btk and Bk horizons have dry colors of 7.5YR 5/4, 6/4; 10YR 5/3, 5/4, 6/4, or 6/6. Moist colors are 7.5YR 4/4, 5/4, 5/6; 10YR 4/3, 4/4, or 5/2. It has 20 to 35 percent clay and 5 to 15 percent gravel. It is strongly effervescent or violently effervescent.

The C horizon has dry colors of 7.5YR 5/4, 6/4, 7/2, 7/6; 10YR 5/4, 5/6, 6/4, or 6/6. Moist colors are 7.5YR 5/2, 5/6; 10YR 4/3, or 4/6. It is sandy loam or loamy sand with 5 to 20 percent clay and 5 to 15 percent gravel.

POPSON SERIES

The Popson series consists of very deep, well drained soils on flood plains and broad alluvial fans. These soils formed in stream or fan alluvium derived from granitic rock. Slopes range from 0 to 5 percent. The average annual

precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Popson series are fine-loamy, mixed (calcareous), thermic Typic Torrifluvents.

Typical pedon of Popson fine sandy loam, 0 to 2 percent slopes, about 4 miles southwest of Edwards AFB headquarters and 1 mile southeast of the Rod and Gun Club; 1850 feet east and 1100 feet south of the northwest corner of Sec. 16, T. 9 N., R. 10 W., Edwards quadrangle., SBBM.

A1--0 to 2 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure parting to weak coarse platy; soft, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; few very fine tubular pores; 10 percent pebbles (2 to 10 mm in diameter); slightly effervescent disseminated lime; neutral (pH 7.2); abrupt smooth boundary.

A2--2 to 9 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common very fine and few fine tubular pores; 7 percent pebbles (2 to 10 mm in diameter); neutral (pH 7.2); clear smooth boundary.

C1--9 to 17 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and few fine tubular pores; 7 percent pebbles (2 to 10 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

C2--17 to 31 inches; light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and few fine tubular pores; 7 percent pebbles (2 to 10 mm in diameter); slightly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

C3--31 to 49 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine and few fine tubular pores; 10 percent pebbles (2 to 10 mm in diameter); moderately alkaline (pH 8.2); abrupt smooth boundary.

C4--49 to 60 inches; light yellowish brown (10YR 6/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist;

massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; few fine manganese nodules; moderately alkaline (pH 8.2).

The A horizon has dry colors of 10YR 6/3 or 6/4. Moist color is 10YR 4/3 or 4/4. It has 8 to 18 percent clay. It is noneffervescent or slightly effervescent with disseminated lime. Reaction is neutral or mildly alkaline. It has 5 to 15 percent gravel.

The C horizon has dry colors of 10YR 6/2, 6/3, or 6/4. Moist colors are 10YR 4/2, 4/3, or 4/4. It is stratified with layers of sandy loam, loamy sand, and gravelly loamy coarse sand. Textures of loam, clay loam and sandy clay loam with 20 to 35 percent clay are common below 40 inches. It is typically slightly effervescent to strongly effervescent with disseminated lime between 10 and 30 inches. Reaction is mildly alkaline or moderately alkaline. It typically has 5 to 15 percent gravel, but some pedons have 15 to 35 percent gravel in some horizons.

RANDSBURG SERIES

The Randsburg series consists of shallow, well drained soils on hills. These soils formed in material weathered from granitic rock. Slopes range from 2 to 30 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Randsburg series are loamy, mixed (calcareous), thermic Typic Torriorthents.

Typical pedon of Randsburg sandy loam in an area of Muroc-Randsburg sandy loams, 5 to 15 percent slopes, on an east-facing slope of 8 percent, about 2 miles north of Edwards AFB headquarters, 160 feet north of Lancaster Blvd. and 50 feet west of dirt road; 1900 feet north and 60 feet west of the southeast corner of Sec. 14, T. 10 N., R. 10 W., Edwards quadrangle., SBBM.

There is 50 percent gravel (2 to 20 mm in diameter) on the surface.

A--0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to weak coarse platy; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine tubular and interstitial pores; 10 percent pebbles (2 to 5 mm in diameter); strongly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

C1--3 to 12 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular and few very fine interstitial pores; 10 percent pebbles (2 to 5 mm in diameter); strongly effervescent disseminated lime; moderately alkaline (pH 8.0); clear smooth boundary.

C2--12 to 18 inches; light yellowish brown (10YR 6/4) sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine tubular and interstitial pores; 10 percent pebbles (2 to 5 mm in diameter); strongly effervescent disseminated lime; moderately alkaline (pH 8.0); abrupt wavy boundary.

2Crk--18 to 45 inches; strongly weathered very pale brown (10YR 7/4) granitic rock, yellowish brown (10YR 5/4) moist; strongly effervescent disseminated lime and segregated in seams and cracks; disperses after soaking in water.

A paralithic contact is at a depth of 8 to 20 inches. It is slightly effervescent or strongly effervescent throughout.

The A horizon has dry colors of 10YR 5/3 or 5/4. Moist color is 10YR 4/3 or 4/4. It has 8 to 18 percent clay and 0 to 15 percent gravel.

The C horizon has dry colors of 10YR 6/3 or 6/4. Moist color is 10YR 4/3 or 4/4. It is sandy loam or coarse sandy loam with 8 to 18 percent clay. It has 0 to 15 percent gravel.

WHERRY SERIES

The Wherry series consists of very deep, well drained, saline-sodic soils on basin floors. These soils formed in lacustrine sediments. Slopes are 0 to 1 percent. The average annual precipitation is 4 to 5 inches, and the mean annual temperature is 60 to 64 degrees F.

Soils of the Wherry series are fine, mixed (calcareous), thermic Typic Torrifluvents.

Typical pedon of Wherry clay, 0 to 1 percent slopes, about 5 miles south of Edwards AFB headquarters; 1300 feet east and 850 feet north of the southwest corner of Sec. 24, T. 9 N., R. 10 W., Redman quadrangle., SBBM.

An--0 to 3 inches; light gray (2.5Y 7/2) clay, grayish brown (2.5Y 5/2) moist; moderate coarse subangular blocky structure parting to moderate medium and coarse platy; very

hard, friable, very sticky and very plastic; no roots; common very fine and few fine and medium tubular pores; common pressure faces; violently effervescent disseminated lime; strongly alkaline (pH 9.0); clear smooth boundary.

Cn1--3 to 9 inches; light gray (2.5Y 7/2) clay loam with very thin (less than 2 mm) strata of sandy material, dark grayish brown (2.5Y 4/2) moist; moderate coarse subangular blocky structure parting to moderate medium and coarse platy; very hard, friable, sticky and very plastic; common very fine and few fine and medium tubular pores; common pressure faces; violently effervescent disseminated lime; very strongly alkaline (pH 9.2); clear smooth boundary.

Cn2--9 to 28 inches; light gray (2.5Y 7/2) clay with very thin (less than 2 mm) strata of sandy material, grayish brown (2.5Y 5/2) moist; moderate very coarse prismatic structure parting to weak medium and coarse subangular blocky; very hard, very firm, very sticky and very plastic; continuous pressure faces; common very fine tubular pores; strongly effervescent disseminated lime; very strongly alkaline (pH 9.6); abrupt smooth boundary.

Cn3--28 to 38 inches; light gray (2.5Y 7/2) and white (2.5Y 8/2) stratified sand and clay (strata are 5 to 30 mm thick), grayish brown (2.5Y 5/2) and light brownish gray (2.5Y 6/2) moist; moderate very coarse prismatic structure with sand coating ped faces; the sand is slightly hard, very friable, nonsticky and nonplastic, the clay is very hard, very firm, sticky and very plastic; common very fine tubular pores; many pressure faces on clay part; strongly effervescent disseminated lime; very strongly alkaline (pH 9.6); clear smooth boundary.

Cn4--38 to 60 inches; light olive gray (5Y 6/2) clay, olive gray (5Y 4/2) moist; moderate very coarse prismatic structure with sand coating ped faces; very hard, very firm, sticky and very plastic; common very fine tubular pores; continuous pressure faces; strongly effervescent disseminated lime; strongly alkaline (pH 8.8); abrupt wavy boundary.

There are virtually no coarse fragments throughout the soil. Calcium Carbonate equivalent ranges from 10 to 30 percent in the mineralogy family control section.

The An horizon has dry colors of 10YR 7/3; or 2.5Y 7/2. Moist color is 10YR 5/4; or 2.5Y 5/2. It has 40 to 60 percent clay. It is strongly effervescent or violently effervescent with disseminated lime. Reaction is strongly alkaline or very strongly alkaline. EC ranges from 35 to 75 dS/m. SAR ranges from 100 to 400.

The Cn horizons have dry colors of 2.5Y 6/2, 7/2, 8/2; 5Y 6/2, 6/3, 7/2 or 7/3. Moist colors are 2.5Y 4/2, 5/2, 5/4 6/2; 5Y 4/2, 5/2, or 5/3. It is stratified with layers of contrasting particle-size. It is dominantly clay or clay loam with 35 to 80 percent clay with thin strata of sand with 0 to 10 percent clay. The horizon averages 35 to 60 percent clay. Some pedons also have thin strata of sandy loam and loam. Reaction is moderately alkaline to very strongly alkaline. EC ranges from 20 to 50 dS/m in the upper part and decreases to less than 8 dS/m below 38 inches. SAR ranges from 50 to 200.

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GLOSSARY

ALLUVIAL FANS - A dynamic body of alluvium, with or without debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a plain. Common longitudinal profiles are gently sloping and nearly linear. Shallow braided channels, form a radial network, subject to sheet flooding associated with major storm events. Source uplands range in relief and areal extent from mountain slopes and plateaus to gullied terrains on hillslopes and terraces.

ALLUVIUM - Material, such as sand, silt, or clay, deposited on land by streams.

ASSOCIATION, SOIL - A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

AVAILABLE WATER CAPACITY (available moisture capacity) - The capacity of a soil to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low 0 to 2.5
Low 2.5 to 5
Moderate 5 to 7.5
High 7.5 to 10
Very high, more than 10

BASIN FLOORS - A dynamic nearly level to gently sloping, bottom surface of a basin. Component landforms include playas, deltas, and broad alluvial flats containing ephemeral drainageways.

BEDROCK - The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

CALCAREOUS SOIL - A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

CLAY - As a soil separate, the mineral soil particles less than 0.002 millimeter, in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

CLAY FILM - A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels.

COARSE FRAGMENTS - Mineral or rock particles larger than 2 millimeters in diameter.

COARSE TEXTURED SOIL - Sand or loamy sand.

COBBLE - A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 25 centimeters) in diameter.

COMPLEX, SOIL - A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small an area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

CONCRETIONS - Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

CONSISTENCE, SOIL - The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

LOOSE - Noncoherent when dry or moist; does not hold together in a mass.

FRIABLE - When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed into a lump.

FIRM - When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

PLASTIC - Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

STICKY - Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

HARD - When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

SOFT - When dry, breaks into powder or individual grains under very slight pressure.

CEMENTED - Hard; little affected by moistening.

CONTROL SECTION - The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 inches.

COPPICE DUNE - A small dune of fine-grained soil material stabilized around shrubs or small trees.

CUTBANKS CAVE - The walls of excavations tend to cave in or slough.

DRAINAGE CLASS - Refers to the frequency and duration of periods of saturation or partial saturation during soil formation. Two drainage classes are used on Edwards Air Force Base:

SOMEWHAT EXCESSIVELY DRAINED - These soils have high hydraulic conductivity and low water holding capacity.

WELL DRAINED - These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough to adversely affect crop yields.

DUNES - A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

EOLIAN SOIL MATERIAL - Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes.

EPHEMERAL STREAM - A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

EROSION - The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

EROSION (geologic) - Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and alluvial fans.

EROSION (accelerated) - Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or animals or of a catastrophe in nature; for example, fire that exposes the surface.

EROSION HAZARD - The susceptibility of a soil to erosion. It does not describe past erosion, but the possibility of future erosion. It is generally described in terms of potential loss of soil in tons/acre/year. Categories of erosion hazard used in this survey are as follows:

SLIGHT - less than 0.9
MODERATE - 0.9 to 3.6
SEVERE - more than 3.6

FAN TERRACES - A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces. Representing the dissected remnants of an abandoned alluvial fan. Major storm events can cause overbank flooding on low fan terraces.

FIELD MOISTURE CAPACITY - The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain.

FINE TEXTURED SOIL - Sandy clay, silty clay, and clay.

FLOOD PLAINS - The nearly level dynamic alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

GRAVEL - Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

GRAVELLY SOIL MATERIAL - Material that is 15 to 35 percent, by volume, rounded or angular gravel-sized rock fragments.

HARDPAN - Hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented and is cemented by iron oxide, silica, calcium carbonate, or other substances. They can be fractured.

HILLSLOPES - The steeper part of a hill between its summit and the drainage line, valley flat or depressional floor at the base of the hill. In descending order geomorphic components of a simple hillslope may include shoulder, backslope, footslope, and toeslope. However, all of these components are not necessarily present in any given hillslope continuum.

HORIZONS, SOIL - A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major

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horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the Soil Survey Manual. The major horizons of mineral soil are as follows:

A HORIZON - The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

B HORIZON - The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C HORIZON - The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

R LAYER - Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or B horizon.

HYDROLOGIC SOIL GROUPS - Refers to soils grouped according to their runoff producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a natric horizon, claypan, or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material.

INFILTRATION - The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

IRRIGATION - Application of water to assist in the production of plants. Methods of irrigation are:

BASIN - Water is applied rapidly to nearly level plains surrounded by levees or dikes.

BORDER - Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

DRIP - Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

FURROW - Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

SPRINKLER - Water is sprayed over the soil surface through pipes or nozzles from a pressure system

LACUSTRINE DEPOSIT - Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

LEACHING - The removal of soluble material from soil or other material by percolating water.

LIQUID LIMIT - The moisture content at which the soil passes from a plastic to a liquid state.

LOAM - Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

LOW STRENGTH - The soil is not strong enough to support loads.

MEDIUM TEXTURED SOIL - Very fine sandy loam, loam, silt loam, or silt.

MINERAL SOIL - Soil that is mainly mineral material and low in organic material. Its bulk density is more is more than that of organic soil.

MINIMUM TILLAGE - Only the tillage essential to crop production and prevention of soil damage.

MISCELLANEOUS AREA - An area that has little or no natural soil and supports little or no vegetation.

MORPHOLOGY, SOIL - The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

MUNSELL NOTATION - A designation of color by degrees of the three simple variables: hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

NEUTRAL SOIL - A soil having a pH value between 6.6 and 7.3.

NUTRIENT, PLANT - Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

ORGANIC MATTER - Plant and animal residue in the soil in various stages of decomposition.

PAN - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. For example, hardpan, fragipan, claypan, plowpan, and traffic pan.

PARENT MATERIAL - The unconsolidated organic and mineral material in which soil forms.

PED - An individual natural soil aggregate, such as a granule, a prism, or a block.

PEDON - The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit the study of all horizons. Its area ranges from about 10 to 100 square feet, depending on the variability of the soil.

PERCOLATION - The downward movement of water through soil.

PERMEABILITY - The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

VERY SLOW - less than 0.06 inch
SLOW - 0.06 to 0.2 inch
MODERATELY SLOW - 0.2 to 0.6 inch
MODERATE - 0.6 to 2.0 inches
MODERATELY RAPID - 2.0 to 6.0 inches
RAPID - 6.0 to 20 inches
VERY RAPID - more than 20 inches

PHASE, SOIL - A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH VALUE - A numerical designation of acidity and alkalinity in soil

PIPING - Formation of subsurface tunnels or pipelike cavities by water moving through the soil

PLASTICITY INDEX - The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

PLASTIC LIMIT - The moisture content at which the soil changes from semisolid to plastic.

PLAYA - The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

PONDING - Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

POTENTIAL ROOTING DEPTH - Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

PROFILE, SOIL - A vertical section of the soil extending through all its horizons and into the parent material.

REACTION, SOIL - A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as:

EXTREMELY ACID - pH below 4.5
VERY STRONGLY ACID - pH ranges from 4.5 to 5.0
STRONGLY ACID - pH ranges from 5.1 to 5.5
MEDIUM ACID - pH ranges from 5.6 to 6.0
SLIGHTLY ACID - pH ranges from 6.1 to 6.5
NEUTRAL - pH ranges from 6.6 to 7.3
MILDLY ALKALINE - pH ranges from 7.4 to 7.8
MODERATELY ALKALINE - pH ranges from 7.9 to 8.4
STRONGLY ALKALINE - pH ranges from 8.5 to 9.0
VERY STRONGLY ALKALINE - pH is 9.1 or higher

RELICT BASIN FLOORS - A nearly level to gently sloping, platform of an incised intermontane basin. Originally formed near the level of alluvial flats and playa - like depressions, relict basin floors grade mountainward to distal parts of piedmont slopes.

RELIEF - The elevations or inequalities of a land surface, considered collectively.

ROCK FRAGMENTS - Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

ROOT ZONE - The part of the soil that can be penetrated by plant roots.

RUNOFF - The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

SALINE SOIL - A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

SALINE-SODIC SOIL - A soil containing both soluble salts and exchangeable sodium in such an amount that both impair plant growth.

SAND - As a soil separate, individual rock or mineral fragments from 0.05 to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

SEEPAGE - The movement of water through soil. Seepage adversely affects the specified use.

SERIES, SOIL - A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

SHEET EROSION - The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

SHRINK-SWELL - The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

SILICA - A combination of silicon and oxygen. The mineral form is called quartz.

SILT - As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

SLOPE - The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

SODIC SOIL - A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

SODICITY - The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of sodium (Na+) to calcium (Ca++) plus magnesium (Mg++). The degrees of sodicity are:

SLIGHT - less than 13:1
MODERATE - 13-30:1
STRONG - more than 30:1

SOIL - A natural, three dimensional body at the earth's surface. It is capable of supporting plants (The Wherry series is an exception) and has properties resulting from the integrated effect of climate, and living matter acting on earthy parent material, as conditioned by relief over periods of time.

SOIL SEPARATES - Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

Very coarse sand - 2.0 to 1.0 mm
Coarse sand - 1.0 to 0.5 mm
Medium sand - 0.5 to 0.25 mm
Fine sand - 0.25 to 0.10 mm
Very fine sand - 0.10 to 0.05 mm
Silt - 0.05 to 0.002 mm
Clay - Less than 0.002 mm

SOLUM - The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B

horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

STRUCTURE, SOIL - The arrangement of primary soil particles into compound particles ar aggregates. The principal forms of soil structure are platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

SUBSOIL - Technically, the B horizon; roughly, the part of the solum below plow depth.

SUBSTRATUM - The part of the soil below the solum.

SURFACE LAYER - The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches.

TAXADJUNCTS - Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

TEXTURE, SOIL - The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

TILTH, SOIL - The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

VARIANT, SOIL - A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

WEATHERING - All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

WILTING POINT (or permanent wilting point - The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

TABLE A.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
132	Hi Vista sandy loam, 2 to 9 percent slopes	950	29.7
135	Muroc-Randsburg complex, 5 to 15 percent slopes	500	15.6
138	Neuralia sandy loam, 0 to 5 percent slopes	355	11.1
143	Leuhman complex, 0 to 1 percent slopes	35	1.1
149	Wherry clay, 0 to 1 percent slopes	135	4.2
122	Popson loamy sand, 0 to 2 percent slopes	50	1.6
127	Adelanto coarse sandy loam, 1 to 4 percent slopes	35	1.1
131	Randsburg-Rock outcrop complex, 15 to 30 percent slopes	115	3.6
152	Machone-Randsburg complex, 2 to 9 percent slopes	775	24.2
153	Eclipse loamy sand, 0 to 5 percent slopes	75	2.3
154	Corum sandy loam, 0 to 5 percent slopes	175	5.5
	Total	3,200	100.0

* Less than 0.1 percent.

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TABLE G.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
132 Hi Vista	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: depth to rock.
135*:					
Muroc	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope, depth to rock, cemented pan.	Slight	Severe: depth to rock.
Randsburg	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
138 Neuralia	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
143*:					
Leuhman	Severe: flooding, ponding, excess sodium.	Severe: ponding, excess sodium.	Severe: ponding, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
Leuhman	Severe: flooding, ponding, excess sodium.	Severe: ponding, excess sodium.	Severe: ponding, excess sodium.	Severe: ponding.	Severe: excess sodium, ponding.
149 Wherry	Severe: flooding, excess salt.	Severe: excess salt.	Severe: flooding, excess salt.	Moderate: too clayey, flooding.	Severe: excess salt, flooding, too clayey.
122 Popson	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: droughty, flooding.
127 Adelanto	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
131*:					
Randsburg	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: depth to rock.
152*:					
Machone	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty, depth to rock.
Randsburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Severe: depth to rock.
153 Eclipse	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
154 Corum	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Slight	Severe: excess sodium.

* See description of the map unit for composition and behavior characteristics of the map unit.

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TABLE H.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
132---------- Hi Vista	0-3	Sandy loam--------	SM	A-2	0	90-100	85-90	50-65	25-35	20-30	NP-5
	3-15	Sandy clay loam; clay loam.	SC, CL	A-6	0	90-100	75-90	65-80	35-65	30-40	10-20
	15-22	Gravelly sandy clay loam; gravelly clay loam.	SC	A-2, A-6	0	65-80	50-75	40-70	25-50	25-35	10-15
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
135*:											
Muroc----------	0-14	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	50-70	25-40	15-25	NP-5
	14-21	Indurated---------	---	---	---	---	---	---	---	---	---
	21	Weathered bedrock	---	---	---	---	---	---	---	---	---
Randsburg--------	0-18	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	50-70	25-45	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
138---------- Neuralia	0-5	Sandy loam--------	SM-SC, SM	A-2, A-4	0	100	85-100	55-70	30-40	15-25	NP-10
	5-41	Sandy clay loam	SC	A-6	0	100	80-100	65-85	35-50	25-35	10-15
	41-60	Stratified loamy sand to sandy clay loam.	SM, SM-SC	A-2, A-4	0	85-95	75-85	40-70	30-45	20-30	NP-10
143*:											
Leuhman----------	0-7	Fine sandy loam	SM	A-4	0	100	95-100	70-85	35-50	20-30	NP-5
	7-21	Sandy clay loam; clay loam.	SC, CL	A-6	0	100	95-100	75-90	40-60	30-40	10-20
	21-30	Sandy clay loam	SC	A-6	0	100	95-100	75-90	35-50	30-40	10-20
	30-60	Stratified loamy sand to fine sandy loam.	SM	A-1, A-2	0	90-100	85-100	50-75	15-35	20-30	NP-5
Leuhman----------	0-10	Clay loam---------	CL	A-6	0	100	95-100	75-90	50-60	30-40	10-20
	10-20	Sandy clay loam	SC	A-6	0	100	95-100	75-90	35-50	30-40	10-20
	20-30	Very fine sandy loam; fine sandy loam.	SM, SM-SC; SM, SM-SC	A-4	0	100	95-100	70-85	40-55	20-30	NP-10
	30-60	Stratified loamy sand to fine sandy loam.	SM	A-1, A-2	0	95-100	85-100	50-75	15-35	20-30	NP-5
149---------- Wherry	0-3	Clay----------	CH	A-7	0	100	100	90-100	75-95	50-60	25-35
	3-28	Stratified clay to clay loam.	CL, CH	A-7	0	100	100	90-100	70-95	40-60	20-35
	28-38	Stratified sand to clay.	CL	A-6	0	100	100	75-85	60-85	30-40	10-20
	38-60	Stratified clay to clay loam.	CL, CH	A-7	0	100	100	90-100	75-95	40-60	20-35

See footnote at end of table.

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TABLE H.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
122---------- Popson	0-4	Loamy sand--------	SM	A-1, A-2	0	80-100	75-95	40-65	15-30	---	NP
	4-34	Stratified sandy loam to loamy sand.	SM	A-1, A-2, A-4	0	80-100	75-95	40-65	15-40	20-30	NP-5
	34-57	Stratified gravelly loamy coarse sand to gravelly sandy loam.	SM, GM	A-1	0	55-80	50-75	25-50	10-25	---	NP
	57-60	Stratified sandy loam to loamy sand.	SM	A-1, A-2, A-4	0	80-100	75-95	40-65	15-40	20-30	NP-5
127---------- Adelanto	0-4	Coarse sandy loam	SM	A-2, A-4	0	85-100	75-95	50-70	25-40	---	NP
	4-17	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0	85-100	75-95	50-75	25-50	20-30	NP-5
	17-28	Sandy loam, gravelly coarse sandy loam.	SM	A-2, A-4	0	70-95	60-85	50-65	30-50	20-30	NP-5
	28-40	Sandy loam--------	SM	A-4	0	85-100	75-95	60-75	35-50	20-30	NP-5
	40-60	Loamy sand, sandy loam.	SM	A-2, A-4	0	85-100	75-95	50-75	25-40	---	NP
131*:											
Randsburg--------	0-18	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	50-70	25-45	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
152*:											
Machone----------	0-3	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	50-70	25-45	---	NP
	3-23	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0	80-100	75-100	50-70	25-45	---	NP
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
Randsburg--------	0-18	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	50-70	25-45	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---
153---------- Eclipse	0-4	Loamy sand--------	SM	A-1, A-2	0	80-100	75-100	40-70	15-25	---	NP
	4-12	Sandy loam, loamy sand.	SM	A-2, A-4	0	80-100	75-100	40-75	25-50	20-30	NP-5
	12-60	Stratified gravelly coarse sand to fine sandy loam.	SP-SM, SM	A-1, A-2, A-3	0-5	65-100	60-100	35-75	5-25	---	NP
154---------- Corum	0-12	Sandy loam--------	SM	A-2, A-4	0	80-100	75-100	40-70	25-40	---	NP
	12-15	Sandy loam, sandy clay loam.	SC, SM-SC	A-4, A-6	0	80-95	75-90	50-75	35-50	25-35	5-15
	15-27	Loamy sand, sandy loam.	SM	A-2, A-4	0	80-95	75-90	40-70	20-35	20-30	NP-5
	27-34	Sandy clay loam	SC	A-6	0	80-95	75-90	60-80	35-50	30-40	10-15
	34-51	Weathered bedrock	---	---	---	---	---	---	---	---	---
	51	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

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TABLE J.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH	mmhos/cm					Pct
132---------- Hi Vista	0-3	8-15	1.50-1.60	2.0-6.0	0.08-0.11	6.6-8.4	<2	Low--------	0.28	2	3	<1
	3-15	20-35	1.40-1.55	0.2-0.6	0.15-0.18	7.4-8.4	<2	Moderate	0.28			
	15-22	20-30	1.40-1.55	0.2-0.6	0.10-0.14	7.4-8.4	<2	Moderate	0.20			
	22	---	---	---	---	---	---	----------	----			
135*:												
Muroc----------	0-14	8-18	1.50-1.60	2.0-6.0	0.08-0.11	7.9-8.4	<2	Low--------	0.24	1	3	<.5
	14-21	---	---	---	---	---	---	----------	----			
	21	---	---	---	---	---	---	----------	----			
Randsburg--------	0-18	8-18	1.40-1.50	2.0-6.0	0.07-0.11	7.9-8.4	<2	Low--------	0.24	1	3	<.5
	18	---	---	---	---	---	---	----------	----			
138---------- Neuralia	0-5	8-15	---	2.0-6.0	0.09-0.11	6.6-8.4	<2	Low--------	0.28	5	3	<.5
	5-41	20-35	---	0.2-0.6	0.16-0.18	7.4-8.4	<2	Moderate	0.24			
	41-60	15-25	---	0.2-0.6	0.13-0.15	7.4-8.4	<2	Low--------	0.24			
143*:												
Leuhman----------	0-7	5-15	1.50-1.60	2.0-6.0	0.13-0.15	7.9-8.4	<4	Low--------	0.43	2	3	<.5
	7-21	20-35	1.50-1.70	<0.06	0.12-0.14	>8.4	2-8	Moderate	0.37			
	21-30	20-30	1.45-1.60	0.2-0.6	0.09-0.11	>8.4	4-16	Moderate	0.37			
	30-60	5-20	1.60-1.70	2.0-6.0	0.04-0.06	>8.4	>8	Low--------	0.32			
Leuhman----------	0-10	28-35	1.50-1.70	<0.06	0.12-0.14	>8.4	2-8	Moderate	0.37	1	4L	<.5
	10-20	20-35	1.45-1.60	0.2-0.6	0.09-0.11	>8.4	4-16	Moderate	0.37			
	20-30	10-20	1.50-1.60	2.0-6.0	0.08-0.10	>8.4	4-16	Low--------	0.43			
	30-60	5-20	1.60-1.70	2.0-6.0	0.04-0.06	>8.4	>8	Low--------	0.32			
149---------- Wherry	0-3	40-60	1.20-1.40	<0.06	0.12-0.14	>8.4	>16	High-------	0.37	5	4	<.5
	3-28	35-60	1.20-1.40	<0.06	0.12-0.14	>8.4	>16	High-------	0.37			
	28-38	20-50	1.30-1.55	<0.06	0.09-0.11	>7.8	<8	Moderate	0.32			
	38-60	35-60	1.20-1.40	<0.06	0.12-0.14	>7.8	<8	High-------	0.37			
122---------- Popson	0-4	5-10	1.60-1.70	6.0-20	0.06-0.08	7.4-8.4	<2	Low--------	0.28	5	2	<.5
	4-34	5-18	1.50-1.70	0.6-2.0	0.07-0.12	7.4-8.4	<2	Low--------	0.32			
	34-57	5-10	1.55-1.70	2.0-6.0	0.04-0.06	7.4-8.4	<2	Low--------	0.20			
	57-60	8-18	1.50-1.70	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low--------	0.32			
127---------- Adelanto	0-4	5-12	1.50-1.60	2.0-6.0	0.08-0.12	6.6-7.8	<2	Low--------	0.24	5	3	<.5
	4-17	5-12	1.50-1.60	2.0-6.0	0.08-0.12	7.4-8.4	<2	Low--------	0.24			
	17-28	5-12	1.50-1.60	2.0-6.0	0.07-0.11	7.9-8.4	<2	Low--------	0.24			
	28-40	12-18	1.50-1.60	2.0-6.0	0.10-0.12	7.9-8.4	<2	Low--------	0.24			
	40-60	5-12	1.50-1.70	2.0-20	0.07-0.11	7.9-8.4	<2	Low--------	0.24			
131*:												
Randsburg--------	0-18	8-18	1.40-1.50	2.0-6.0	0.07-0.11	7.9-8.4	<2	Low--------	0.24	1	3	<.5
	18	---	---	---	---	---	---	----------	----			
Rock outcrop----	0-60	---	---	---	---	---	<2	----------	----	---	---	---
152*:												
Machone----------	0-3	8-18	1.50-1.60	2.0-6.0	0.08-0.12	7.9-8.4	<2	Low--------	0.24	2	3	<.5
	3-23	8-18	1.55-1.65	2.0-6.0	0.07-0.11	7.9-8.4	<2	Low--------	0.24			
	23	---	---	---	---	---	---	----------	----			
Randsburg--------	0-18	8-18	1.40-1.50	2.0-6.0	0.07-0.11	7.9-8.4	<2	Low--------	0.24	1	3	<.5
	18	---	---	---	---	---	---	----------	----			
153---------- Eclipse	0-4	0-6	1.60-1.70	6.0-20	0.05-0.08	7.4-8.4	<8	Low--------	0.20	5	2	<.5
	4-12	6-10	1.55-1.65	2.0-6.0	0.08-0.12	>7.8	2-8	Low--------	0.32			
	12-60	0-10	1.55-1.70	6.0-20	0.05-0.08	>7.8	2-8	Low--------	0.28			
154---------- Corum	0-12	6-15	1.50-1.60	2.0-6.0	0.09-0.11	7.4-8.4	<2	Low--------	0.28	2	3	<.5
	12-15	18-25	1.45-1.55	0.2-0.6	0.11-0.14	8.5-9.0	2-8	Moderate	0.28			
	15-27	6-15	1.55-1.65	2.0-6.0	0.07-0.10	>8.4	2-8	Low--------	0.24			
	27-34	20-30	1.45-1.55	0.2-0.6	0.12-0.14	>8.4	2-8	Moderate	0.24			
	34-51	---	---	---	---	---	---	----------	----			
	51	---	---	---	---	---	---	----------	----			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE K.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Cemented pan: Depth	Cemented pan: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
132 Hi Vista	C	None	---	---	>6.0	---	---	20-40	Hard	---	---	High	Low.
135*:													
Muroc	D	None	---	---	>6.0	---	---	10-30	Soft	8-20	Thick	High	Low.
Randsburg	D	None	---	---	>6.0	---	---	8-20	Soft	---	---	High	Low.
138 Neuralia	C	None	---	---	>6.0	---	---	>60	---	---	---	High	Low.
143*:													
Leuhman	D	Rare	---	---	+.5-0.5	Perched	Dec-Mar	>60	---	---	---	High	Low.
Leuhman	D	Rare	---	---	+.5-0	Perched	Dec-Mar	>60	---	---	---	High	Low.
149 Wherry	D	Frequent	Very brief to very long.	Dec-Feb	>6.0	---	---	>60	---	---	---	High	Low.
122 Popson	B	Occasional	Very brief	Dec-Mar	>6.0	---	---	>60	---	---	---	High	Low.
127 Adelanto	B	None	---	---	>6.0	---	---	>60	---	---	---	High	Low.
131*:													
Randsburg	D	None	---	---	>6.0	---	---	8-20	Soft	---	---	High	Low.
Rock outcrop	D	None	---	---	>6.0	---	---	0	Hard	---	---	---	---
152*:													
Machone	B	None	---	---	>6.0	---	---	20-40	Soft	---	---	High	Low.
Randsburg	D	None	---	---	>6.0	---	---	8-20	Soft	---	---	High	Low.
153 Eclipse	B	None	---	---	>6.0	---	---	>60	---	---	---	High	Low.
154 Corum	C	Rare	---	---	>6.0	---	---	20-40	Hard	---	---	High	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

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TABLE L.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
132 Hi Vista	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: depth to rock.
135*:					
Muroc	Severe: depth to rock, cemented pan.	Severe: seepage, depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: slope.	Poor: depth to rock.
Randsburg	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Moderate: slope.	Poor: depth to rock.
138 Neuralia	Severe: percs slowly.	Moderate: slope.	Moderate: too sandy.	Slight	Fair: too sandy, small stones.
143*:					
Leuhman	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding, excess salt.	Severe: ponding.	Poor: ponding.
Leuhman	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding, excess salt.	Severe: ponding.	Poor: ponding.
149 Wherry	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, excess salt.	Severe: flooding.	Poor: hard to pack.
122 Popson	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding.	Severe: flooding.	Fair: too sandy.
127 Adelanto	Slight	Severe: seepage.	Moderate: too sandy.	Slight	Fair: too sandy.
131*:					
Randsburg	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Rock outcrop	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, slope.
152*:					
Machone	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock.	Slight	Poor: depth to rock.
Randsburg	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Poor: depth to rock.
153 Eclipse	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight	Poor: seepage, too sandy.
154 Corum	Severe: depth to rock, percs slowly.	Severe: seepage, depth to rock.	Severe: depth to rock.	Moderate: flooding.	Poor: depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE M.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
132 Hi Vista	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, shrink-swell.	Moderate: depth to rock.
135*:						
Muroc	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: depth to rock.
Randsburg	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: depth to rock.
138 Neuralia	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Slight.
143*:						
Leuhman	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: excess sodium, ponding.
Leuhman	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding.	Severe: excess sodium, ponding.
149 Wherry	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Severe: excess salt, flooding, too clayey.
122 Popson	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
127 Adelanto	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
131*:						
Randsburg	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: depth to rock.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.
152*:						
Machone	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Slight	Slight	Moderate: droughty, depth to rock.
Randsburg	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: depth to rock.
153 Eclipse	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
154 Corum	Severe: depth to rock, cutbanks cave.	Severe: flooding.	Severe: flooding, depth to rock.	Severe: flooding.	Moderate: depth to rock, flooding.	Severe: excess sodium.

* See description of the map unit for composition and behavior characteristics of the map unit.

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TABLE N.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
13Z Hi Vista	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
135*:				
Muroc	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, cemented pan.
Randsburg	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
138 Neuralia	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
143*:				
Leuhman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness, excess sodium.
Leuhman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness, excess sodium.
149 Wherry	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, excess salt.
122 Popson	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
127 Adelanto	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
131*:				
Randsburg	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
Rock outcrop	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, slope.
152*:				
Machone	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, small stones, thin layer.
Randsburg	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock.
153 Eclipse	Good	Probable	Probable	Poor: too sandy, small stones.
154 Corum	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE P.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions
132 Hi Vista	Moderate: depth to rock, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, soil blowing.	Depth to rock, soil blowing.
135*:						
Muroc	Severe: depth to rock, cemented pan, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, cemented pan.
Randsburg	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.
138 Neuralia	Slight	Moderate: seepage, piping.	Severe: no water.	Deep to water	Soil blowing	Too sandy, soil blowing.
143*:						
Leuhman	Severe: seepage.	Severe: ponding, excess sodium, excess salt.	Severe: no water.	Ponding, percs slowly, excess salt.	Ponding, soil blowing.	Erodes easily, ponding, soil blowing.
Leuhman	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: no water.	Ponding, percs slowly, cutbanks cave.	Ponding, droughty, percs slowly.	Erodes easily, ponding, too sandy.
149 Wherry	Slight	Severe: excess salt.	Severe: no water.	Deep to water	Slow intake, percs slowly, erodes easily.	Erodes easily, percs slowly.
122 Popson	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
127 Adelanto	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.
131*:						
Randsburg	Severe: depth to rock, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.
Rock outcrop	Severe: depth to rock, slope.	Slight	Severe: no water.	Deep to water	Slope, depth to rock.	Slope, depth to rock.
152*:						
Machone	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Droughty, soil blowing, depth to rock.	Depth to rock, soil blowing.
Randsburg	Severe: depth to rock.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Depth to rock, soil blowing.
153 Eclipse	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.
154 Corum	Severe: seepage.	Severe: excess sodium.	Severe: no water.	Deep to water	Droughty, soil blowing, depth to rock.	Depth to rock, too sandy, soil blowing.

* See description of the map unit for composition and behavior characteristics of the map unit.

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TABLE 01.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
* Adelanto	Coarse-loamy, mixed, thermic Xeralfic Haplargids
Corum	Fine-loamy, mixed, thermic Typic Natrargids
Eclipse	Sandy, mixed, thermic Typic Camborthids
Hi Vista	Fine-loamy, mixed, thermic Typic Haplargids
Leuhman	Fine-loamy, mixed, thermic Typic Natrargids
Machone	Coarse-loamy, mixed (calcareous), thermic Typic Torriorthents
Muroc	Loamy, mixed, thermic, shallow Typic Durorthids
Neuralia	Fine-loamy, mixed, thermic Typic Haplargids
Popson	Coarse-loamy, mixed (calcareous), thermic Typic Torrifluvents
Randsburg	Loamy, mixed (calcareous), thermic, shallow Typic Torriorthents
Rock outcrop.	
Wherry	Fine, mixed (calcareous), thermic Typic Torrifluvents

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LABORATORY DATA OF SELECTED SITES

ANALYSES PERFORMED BY THE NATIONAL SOIL SURVEY LABORATORY LINCOLN, NEBRASKA

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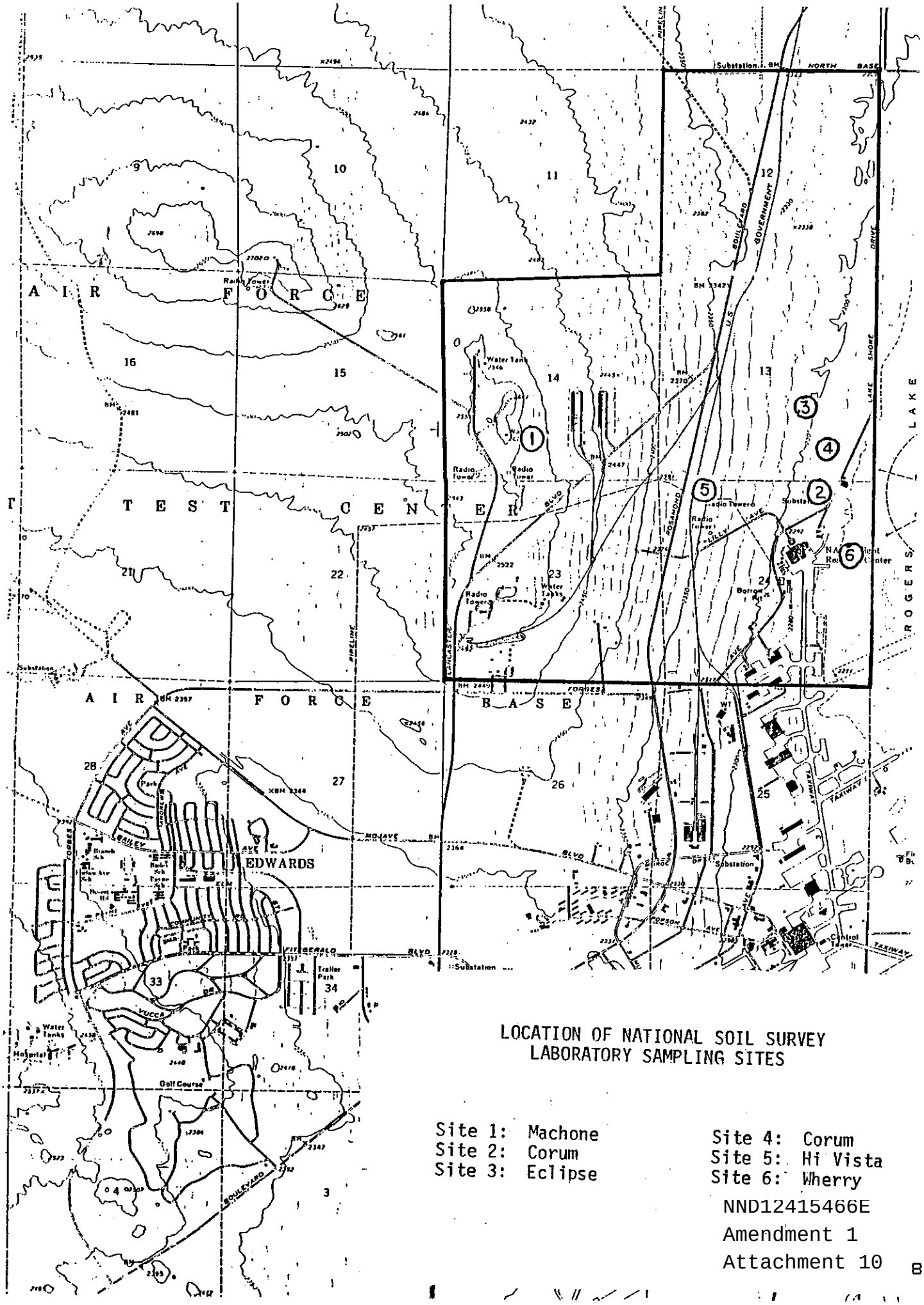

LOCATION OF NATIONAL SOIL SURVEY
LABORATORY SAMPLING SITES

Site 1: Machone
Site 2: Corum
Site 3: Eclipse

Site 4: Corum
Site 5: Hi Vista
Site 6: Wherry

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S88CA-029-001

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : MACHONE ; COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC TYPIC TORRIORTHENT
REVISED TO : ;

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 947, SAMPLES 88P5152-5152
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL - - -)			(- -CLAY- -)		(- -SILT- -)		(- - - - -SAND- - - - - -)					(-COARSE FRACTIONS(MM)-)				(>2MM)
SAMPLE NO.	DEPTH (CM)	HORIZON		CLAY LT .002	SILT .002 -.05	SAND .05 -2	FINE LT .0002	CO3 LT .002	FINE .002 -.02	COARSE .02 -.05	VF .05 -.10	F .10 -.25	M .25 -.50	C .5 -1	VC 1 -2	- - - - WEIGHT - - - - 2 -5	5 -20	20 -75	.1- 75	WT PCT OF WHOLE SOIL
				<- - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM(3B1)->				
88P5152S	23- 58	C2		7.8	16.2 SL	76.0			6.2	10.0	13.6	14.7	14.8	18.1	14.8	15	1	--	68	16

DEPTH (CM)	ORGN C 6A1C PCT	TOTAL N 6B3A <2MM	EXTR P 6S3 PPM	TOTAL S 6R3A	(- - DITH-CIT - -) EXTRACTABLE FE 6C2B <- PERCENT	AL 6G7A OF	MN 6D2A <2MM -->	(RATIO/CLAY) CEC 8D1	15 BAR 8D1	(ATTERBERG) - LIMITS - LL 4F1 PCT	PI 4F <0.4MM	(- BULK DENSITY -) FIELD MOIST 4A3A <- - G/CC	1/3 BAR 4A1D - - ->	OVEN DRY 4A1H	COLE WHOLE SOIL 4D1 CM/CM	(- - -WATER CONTENT - -) FIELD MOIST 4B4 <- - -PCT OF	1/10 BAR 4B1C	1/3 BAR 4B1C <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
23- 58	0.13							1.29	0.54 ok				1.60	1.65	0.009			7.6	4.2	0.05

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*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-001 PRINT DATE 03/10/89
SAMPLED AS : MACHONE ; COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC TYPIC TORRIORTHENT
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 947, SAMPLE 88P5152-5152

DEPTH (CM)	-1-- CA 5B5A 6N2E	-2-- MG 5B5A 6Q2D	-3-- NA 5B5A 6P2B	-4-- K 5B5A 6Q2B	-5-- SUM BASES	-6-- ACID-ITY 6H5A	-7-- EXTR AL 6G9A	-8-- CEC SUM CATS 5A3A	-9-- CEC NH4-OAC 5A8B	-10- CEC BASES + AL 5A3B	-11- AL SAT 5G1	-12- BASE SUM 5C3	-13- SAT- NH4 OAC 5C1	-14- CO3 AS CACO3 <2MM 6E1G	-15- RES. OHMS /CM 8E1	-16-	-17- COND. MMHOS /CM 8I	-18-	-19- PH CACL2 .01M 8C1F	-20- PH H2O 8C1F
	(- NH4OAC EXTRACTABLE BASES -)																			
	<- - - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->										<- - - - -PCT - - - ->									
23- 58		1.8	0.1	0.7					10.1			100	100	1			0.14		7.8	8.5

ANALYSES: S= ALL ON SIEVED <2MM BASIS

(Site 1, page 2)

S88CA-029-001

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : MACHONE ; COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC TYPIC TORRIORTHENT
REVISED TO : ;

NSSL - PROJECT 88P 174,
- PEDON 88P 947, SAMPLES 88P5152-5152
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	ENGINEERING PERCENTAGE PASSING PSDA SIEVE													CUMULATIVE CURVE FRACTIONS(<76MM) USDA LESS THAN DIAMETERS(MM) AT								ATTER-BERG LL PI	GRADATION UNI-FMTY CU	CUR-VTUR CC
			3	2	3/2	1	3/4	3/8	4	10	40	200	20	5	2	1.	.5	.25	.10	.05	60	50	10				
			<-----INCHES----->						<-NUMBER->				<-MICRONS->			<--------MM------->					<--PERCENTILE-->			<-PCT>			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
88P5152S	9- 23	C2	100	100	100	100	100	100	99	84	53	27	12	9	7	72	56	44	32	20	0.59	0.351	0.009			64.2	1.5

DEPTH (IN.)	(WEIGHT FRACTIONS) WHOLE SOIL (MM) >2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	<75 MM FRACTION 75 -2	75 -20	20 -5	5 -2	<2		(WEIGHT PER UNIT VOLUME G/CC) WHOLE SOIL SOIL SURVEY 1/3 BAR	OVEN -DRY	ENGINEERING MOIST	SATUR -ATED	<2 MM FRACTION SOIL SURVEY 1/3 BAR	15 BAR	OVEN -DRY	ENGINEERING MOIST	SATUR -ATED	(VOID) RATIOS AT 1/3 WHOLE SOIL	BAR <2 MM
	<------PCT OF WHOLE SOIL----->								<--PCT OF <75 MM->																
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
9- 23	16	--	--	16	--	1	15	84	16	--	1	15	84		1.71	1.76	1.81	2.06	1.60	1.62	1.65	1.72	2.00	0.55	0.66

NND12415466E
Amendment 1
Attachment 10
91

*** SUPPLEMENTARY CHARACTERIZATION DATA ***

S88CA-029-001 PRINT DATE 03/10/89
SAMPLED AS : MACHONE ; COARSE-LOAMY, MIXED (CALCAREOUS), THERMIC TYPIC TORRIORTHENT
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 947, SAMPLE 88P5152-5152

DEPTH (IN.)	-1-- >2 -UP	-2-- 250 -75	-3-- 250 -2	-4-- 75 -20	-5-- 75 -5	-6-- 20 -2	-7-- 5 <2	-8-- 2- .05	-9-- .05- .002	-10- LT .002	-11- D	-12- PORES F	-13- RAT -10	-14- FINE CLAY	-15-	-16-	-17-	-18-	-19-	-20-
	(VOLUME FRACTIONS)(C/)(RATIOS TO CLAY)(LINEAR EXTENSIBILITY)(WRD)																			
	----WHOLE SOIL (MM) AT 1/3 BAR--- (/N) -------<2 MM FRACTION------- WHOLE SOIL --<2 MM-- WHOLE <2																			
	<----------PCT OF WHOLE SOIL---------->														---CEC--			<-1/3 BAR TO (PCT)--->		SOIL MM
															SUM CATS	NH4-OAC	15 BAR H2O	LE 1/3 BAR	15 BAR	OVEN -DRY	15 BAR	OVEN -DRY	<--IN/IN->	
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
9- 23	10	--	--	10	--	1	10	90	41	9	4	25	10			2.67	1.29	0.54	0.128	0.6	1.0	0.4	1.0	0.05	0.05

DEPTH (IN.)	-1-- >2 -2	-2-- 75 -2	-3-- 20 .05	-4-- 2- .05	-5-- .05- .002	-6-- LT .002	-7-- VC	-8-- C	-9-- M	-10- F	-11- VF	-12- C	-13- F	-14- AY	-15-	-16-	-17-	-18-	-19-	-20-
	(WEIGHT FRACTIONS-CLAY FREE)(-TEXTURE--)(--PSDA(MM)---)(PH)(-ELECTRICAL)(CUMULT. AMOUNTS)																			
	--WHOLE SOIL-- ---<2 MM FRACTION---- (DETERMINED															SAND	SILT	CLAY	CA-	RES-	CON-	SALT	IN. OF H2O	
	>2	75	20	2-	.05-	LT	------SANDS-------					SILTS		CL	IN	BY	2-	.05-	LT	CL2	IST.	DUCT.	MG/	1/3 BAR TO	
	-2	-2	.05	.05	.002	.002								AY	FIELD	PSDA	.05	.002	.002	.01M	OHMS	MMHOS	KG	15BAR AIRDRY	
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)	(--PCT OF .2MM-)				(- - - - <2 MM- - - -)			(WHL SOIL)	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
9- 23	17	17	17	68	15	7	16	20	16	16	15	11	7	8	SL	COSL	76.0	16.2	7.8	7.8					

NND12415466E
Amendment 1
Attachment 10

S88CA-029-002

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
REVISED TO : CORUM ; FINE-LOAMY, MIXED, THERMIC TYPIC NATRARGIDS

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 948, SAMPLES 88P5153-5155
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS (MM) WEIGHT 2 -5	-14- COARSE FRACTIONS (MM) WEIGHT 5 -20	-15- COARSE FRACTIONS (MM) WEIGHT 20 -75	-16- COARSE FRACTIONS (MM) WEIGHT .1- 75	-17- (>2MM) WT PCT OF WHOLE SOIL
			<- - - - - - - - - - - - - PCT OF <2MM (3A1) - - - - - - - - - - - - - ->												<- PCT OF <75MM (3B1) ->				
88P5153S	18- 30	A3	4.7	19.6	75.7			6.9	12.7	17.2	14.4	13.9	15.6	14.6	15	2	--	66	17
88P5154S	30- 38		14.3	17.7	68.0			6.2	11.5	13.5	13.0	14.1	14.1	13.3	13	1	--	61	14
88P5155S	38- 69		8.6	19.2	72.2		0.3	7.7	11.5	12.8	11.8	11.6	14.3	21.7	16	4	--	68	20

DEPTH (CM)	ORGN C 6A1C PCT	TOTAL N 6B3A <2MM	EXTR P 6S3 PPM	TOTAL S 6R3A <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2B OF	AL 6G7A <2MM -->	MN 6D2A	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3A <-	1/3 BAR 4A1D G/CC	OVEN DRY 4A1H - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	1/10 BAR 4B1C -PCT OF	1/3 BAR 4B1C <2MM	15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
18- 30	0.09							1.47	0.62				1.67	1.67	--			5.9	2.9	0.04
30- 38	0.07							0.82	0.43				1.67	1.71	0.007			11.1	6.2	0.07
38- 69	0.08							0.86	0.58				1.65	1.68	0.005			9.2	5.0	0.06

(Site 2, page 1)

*** PRIMARY CHARACTERIZATION DATA ***

S88CA-029-002
SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 948, SAMPLE 88P5153-5155

PRINT DATE 03/10/89

DEPTH (CM)	-1- CA 5B5A 6N2E	-2- MG 5B5A 602D	-3- NA 5B5A 6P2B	-4- K 5B5A 6Q2B	-5- SUM BASES	-6- ACID-ITY 6H5A	-7- SUM CATS 5A3A	-8- NH4-OAC 5A8B	-9- EXCH NA 5B5B	-10- SAR 5E	-11- BASE SATURATION SUM 5C3	-12- NH4OAC 5C1	-13- CARBONATE AS CACO3 <2MM 6E1G	-14- <20MM 6E4	-15- CASO4 AS GYPSUM <2MM 6F1A	-16- <20MM 6F4	-17- PH SAT PASTE 8C1B	-18- PH CACL2 .01M 8C1F 1:2	-19- PH H2O 8C1F 1:1	-20-
	<- -MEQ / 100 G ->								PCT		<- -PCT- >		<- -PCT ->		<- -PCT ->					
18- 30	4.3	1.6	0.3	0.9	7.1		7.1	6.9	4		100	100	TR					7.4	8.3	
30- 38	6.3	2.5	2.2	1.5	12.5	--	12.5	11.7	19		100	100	TR					7.8	8.9	
38- 69		2.4	3.4	0.8				7.4	34	30	100	100	4				8.5	8.4	9.1	

DEPTH (CM)	CA 6N1B	MG 601B	NA 6P1B	K 6Q1B	CO3 6I1B	HCO3 6J1B	CL 6K1C	SO4 6L1C	NO3 6M1C	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3A MMHOS /CM
	< -MEQ / LITER >									<- -PCT ->		
18- 30												0.07
30- 38												0.20
38- 69	1.3	0.6	29.3	0.3	--	3.4	19.6	10.0	--	28.8	0.1	3.48

(- - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - - -)

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 1, 2,

(Site 2, page 2)

S88CA-029-002

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
REVISED TO : CORUM ; FINE-LOAMY, MIXED, THERMIC TYPIC NATRARGIDS

NSSL - PROJECT 88P 174,
- PEDON 88P 948, SAMPLES 88P5153-5155
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	ENGINEERING PERCENTAGE PASSING <-INCHES-> 3	2	3/2	1	3/4	3/8	4	10	40	200	PSDA SIEVE <-MICRONS-> 20	5	2	CUMULATIVE USDA LESS THAN <-MM-> 1.	.5	.25	.10	.05	FRACTIONS(<76MM) DIAMETERS(MM) AT <-PERCENTILE-> 60	50	10	ATTER-BERG LL	PI <-PCT>	GRADATION UNI-FMTY CU	CUR-VTUR CC
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
88P5153S	7- 12	A3	100	100	100	100	100	99	98	83	55	29	10	6	4	71	58	46	34	20	0.56	0.310	0.021			27.0	0.6
88P5154S	12- 15		100	100	100	100	100	100	99	86	59	34	18	14	12	75	62	50	39	28	0.44	0.244	0.001			>100	5.9
88P5155S	15- 27		100	100	100	100	100	98	96	80	49	28	13	9	7	63	51	42	32	22	0.85	0.457	0.006			>100	1.3

DEPTH (IN.)	(WEIGHT FRACTIONS) WHOLE SOIL (MM) >2	250-UP	250-75	75-2	75-20	20-5	5-2	<2	<75 MM FRACTION >75-2	75-20	20-5	5-2	<2	(WEIGHT PER UNIT VOLUME G/CC) WHOLE SOIL SOIL SURVEY 1/3 BAR	OVEN-DRY	ENGINEERING MOIST	SATURATED	<2 MM FRACTION SOIL SURVEY 1/3 BAR	15 BAR	ENGINEERING OVEN-DRY	MOIST	SATURATED	(VOID RATIOS) AT 1/3 BAR WHOLE SOIL	<2 MM
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
7- 12	17	--	--	17	--	2	15	83	17	--	2	15	83		1.78	1.78	1.87	2.11	1.67	1.67	1.67	1.77	2.04	0.49	0.59
12- 15	14	--	--	14	--	1	13	86	14	--	1	13	86		1.76	1.80	1.94	2.10	1.67	1.69	1.71	1.86	2.04	0.51	0.59
15- 27	20	--	--	20	--	4	16	80	20	--	4	16	80		1.78	1.81	1.90	2.11	1.65	1.66	1.68	1.80	2.03	0.49	0.61

(Site 2, page 3)

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-002
SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 948, SAMPLE 88P5153-5155

PRINT DATE 03/10/89

DEPTH (IN.)	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(V O L U M E F R A C T I O N S)									(C/)	(R A T I O S TO C L A Y)				(LINEAR EXTENSIBILITY)				(W R D)	
	----W H O L E S O I L (MM) A T 1/3 B A R---									(/N)	-------<2 MM FRACTION-------				WHOLE SOIL		--<2 MM--		WHOLE	<2
	>2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	2- .05	.05- .002	LT .002	PORES D	RAT F	FINE -IO	---C E C-- SUM	NH4-	15 BAR	LE 1/3	<-1/3 BAR TO (PCT)---> 15	OVEN	15	OVEN	SOIL	MM
	<----------PCT OF WHOLE SOIL---------->														CATS	OAC	H2O	BAR	BAR	-DRY	BAR	-DRY	<--IN/IN->	
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
7- 12	11	--	--	11	--	1	10	89	42	11	3	24	9			1.51	1.47	0.62						0.04	0.05
12- 15	9	--	--	9	--	1	9	91	39	10	8	16	18			0.87	0.82	0.43	0.056	0.4	0.8	0.4	0.8	0.07	0.08
15- 27	13	--	--	13	--	3	11	87	39	10	5	21	12			4.08	0.86	0.58	0.070	0.4	0.6	0.2	0.6	0.06	0.07

DEPTH (IN.)	(W E I G H T F R A C T I O N S - C L A Y F R E E)														(-TEXTURE--)		(--P S D A(MM)---)			(PH)	(-ELECTRICAL)		(CUMULT. AMOUNTS)		
	--W H O L E S O I L--						---<2 MM F R A C T I O N ----								(DETERMINED		SAND	SILT	CLAY	CA-	RES-	CON-	SALT	IN. OF H2O	
	>2	75	20	2-	.05-	LT	------SANDS-------					SILTS		CL	IN	BY	2-	.05-	LT	CL2	IST.	DUCT.	MG/	1/3 BAR TO	
		-2	-2	.05	.002	.002	VC	C	M	F	VF	C	F	AY	FIELD	PSDA	.05	.002	.002	.01M	OHMS	MMHOS	KG	15BAR AIRDRY	
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)		(--PCT OF .2MM-)			(- - - - <2 MM- - - -)				(WHL SOIL)	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
7- 12	18	18	18	65	17	4	15	16	15	15	18	13	7	5	SL	LCOS	75.7	19.6	4.7	7.4					
12- 15	16	16	16	67	17	14	16	16	16	15	16	13	7	17	SCL	COSL	68.0	17.7	14.3	7.8					
15- 27	21	21	21	62	16	7	24	16	13	13	14	13	8	9	SL	COSL	72.2	19.2	8.6	8.4		3.5			

S88CA-029-003

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : ECLIPSE ; SANDY, MIXED, THERMIC TYPIC CAMBORTHID
REVISED TO : ;

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 949, SAMPLES 88P5156-5158
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	TOTAL CLAY LT .002	TOTAL SILT .002 -.05	TOTAL SAND .05 -2	CLAY FINE LT .0002	CLAY CO3 LT .002	SILT FINE .002 -.02	SILT COARSE .02 -.05	SAND VF .05 -.10	SAND F .10 -.25	SAND M .25 -.50	SAND C .5 -1	SAND VC 1 -2	COARSE FRACTIONS(MM) WEIGHT 2 -5	5 -20	20 -75	>2MM .1- 75	WT PCT OF WHOLE SOIL
			<- PCT OF <2MM (3A1) ->												<- PCT OF <75MM(3B1)->				
88P5156S	0- 10	A	4.6	16.9	78.5 LS			6.4	10.5	7.2	6.1	20.0	25.7	19.5	10	1	--	74	11
88P5157S	10- 31	BW	5.3	16.5	78.2 LS			6.6	9.9	8.1	6.6	18.5	25.6	19.4	11	3	--	74	14
88P5158S	79-115	C2	1.4	2.5	96.1 S			0.6	1.9	0.5	1.9	23.9	36.4	33.4	25	7	--	97	32

DEPTH (CM)	ORGN C 6A1C PCT	TOTAL N 6B3A <2MM	EXTR P 6S3 PPM	TOTAL S 6R3A <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2B OF	AL 6G7A <2MM -->	MN 6D2A	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3A	1/3 BAR 4A1D	OVEN DRY 4A1H	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4	1/10 BAR 4B1C	1/3 BAR 4B1C	15 BAR 4B2a	WRD WHOLE SOIL 4C1 CM/CM
												<- - G/CC - - ->				<- - -PCT OF <2MM - ->				
0- 10	0.26							1.17	0.61 ok										2.8	
10- 31	0.10							1.13	0.59										3.1	
79-115	0.03							1.64	1.29 ?										1.8	

NND12415466E
Amendment 1
Attachment 10
97

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-003
SAMPLED AS : ECLIPSE ; SANDY, MIXED, THERMIC TYPIC CAMBORTHID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 949, SAMPLE 88P5156-5158

PRINT DATE 03/10/89

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - - -CEC - - -)			AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - - -PH - - -)		
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS		CACL2	H2O
DEPTH	5B5A	5B5A	5B5A	5B5A	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM		.01M	
(CM)	6N2E	6O2D	6P2B	6Q2B		6H5A	6G9A	5A3A	5A8B	5A3B	5G1	5C3	5C1	6E1G	8E1		8I		8C1F	8C1F
	<- - - - - - - - - - - -				-MEQ /	100 G	- - - - - - - - - - - - - - - ->				<- - - - - -PCT - - - - ->								1:2	1:1
0- 10	6.7	0.8	0.1	0.5	8.1			8.1	5.4			100	100	TR			0.15		7.6	8.2
10- 31	6.1	1.2	0.1	0.5	7.9			7.9	6.0			100	100	TR			0.11		7.8	8.3
79-115		0.5	0.1	0.2					2.3			100	100	1			0.09		8.0	8.5

(Site 3, page 2)

S88CA-029-003

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : ECLIPSE ; SANDY, MIXED, THERMIC TYPIC CAMBORTHID
REVISED TO : ;

NSSL - PROJECT 88P 174,
- PEDON 88P 949, SAMPLES 88P5156-5158
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	ENGINEERING PERCENTAGE PASSING 3	2	3/2	1	3/4	3/8	4	10	40	200	PSDA SIEVE 20	5	2	CUMULATIVE CURVE FRACTIONS(<76MM) USDA LESS THAN 1.	.5	.25	.10	.05	DIAMETERS(MM) AT 60	50	10	ATTERBERG LL PI	GRADATION UNIFMTY CU	CURVTUR CC
			<-----INCHES----->						<-NUMBER->				<-MICRONS->			<--------MM------->					<--PERCENTILE-->			<-PCT>		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22 23	24	25
88P5156S	0- 4	A	100	100	100	100	100	100	99	89	44	23	10	6	4	72	49	31	26	19	0.70	0.519	0.020		34.4	3.1
88P5157S	4- 12	BW	100	100	100	100	100	99	97	86	43	23	10	7	5	69	47	31	26	19	0.75	0.544	0.018		41.0	2.9
88P5158S	31- 45	C2	100	100	100	100	100	97	93	68	16	3	1	1	1	45	21	4	3	3	1.57	1.155	0.319		4.9	0.9

DEPTH (IN.)	(WEIGHT FRACTIONS) ---WHOLE SOIL (MM)- >2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	-<75 MM FRACTION-- 75 -2	75 -20	20 -5	5 -2	<2	(WEIGHT PER UNIT VOLUME G/CC) ------WHOLE SOIL------ SOIL SURVEY ENGINEERING 1/3 BAR	OVEN -DRY	MOIST	SATUR -ATED	-------<2 MM FRACTION------- --SOIL SURVEY-- 1/3 BAR	15 BAR	OVEN -DRY	ENGINEERING MOIST	SATUR -ATED	(VOID) --RATIOS-- AT 1/3 WHOLE SOIL	BAR <2 MM
	<------PCT OF WHOLE SOIL----->								<--PCT OF <75 MM->																
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0- 4	11	--	--	11	--	1	10	89	11	--	1	10	89		1.52										
4- 12	14	--	--	14	--	3	11	86	14	--	3	11	86		1.55										
31- 45	32	--	--	32	--	7	25	68	32	--	7	25	68		1.70										

NND12415466E
Amendment 1
Attachment 10
99

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-003 PRINT DATE 03/10/89
SAMPLED AS : ECLIPSE ; SANDY, MIXED, THERMIC TYPIC CAMBORTHID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 949, SAMPLE 88P5156-5158

DEPTH (IN.)	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(V O L U M E F R A C T I O N S)										(C/)	(R A T I O S TO C L A Y)				(LINEAR EXTENSIBILITY)				(W R D)
	----W H O L E S O I L (MM) A T 1/3 B A R---										(/N)	-------<2 MM FRACTION-------				WHOLE SOIL --<2 MM--				WHOLE <2
	>2	250	250	75	75	20	5	2-	.05-	LT	PORES	RAT	FINE	---C E C--		15	LE	<-1/3 BAR TO (PCT)--->				SOIL MM
		-UP	-75	-2	-20	-5	-2	<2	.05	.002	.002	D F	-IO	CLAY	SUM	NH4-	BAR	1/3	15	OVEN	15	OVEN	
	<----------PCT OF WHOLE SOIL---------->														CATS	OAC	H2O	BAR	BAR	-DRY	BAR	-DRY	<--IN/IN->
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
0- 4	6	--	--	6	--	1	6	94	40	9	2	43				1.76	1.17	0.61							
4- 12	8	--	--	8	--	2	6	92	40	8	3	41				1.49	1.13	0.59							
31- 45	20	--	--	20	--	4	16	80	42	1	1	36				6.50	1.64	1.29							

DEPTH (IN.)	(W E I G H T F R A C T I O N S - C L A Y F R E E)														(-TEXTURE--)		(--P S D A(MM)---)			(PH)	(-ELECTRICAL)		(CUMULT. AMOUNTS)		
	--W H O L E S O I L--						---<2 MM F R A C T I O N ----								(DETERMINED		SAND	SILT	CLAY	CA-	RES-	CON-	SALT	IN. OF H2O	
	>2	75	20	2-	.05-	LT	------SANDS-------					SILTS		CL	IN	BY	2-	.05-	LT	CL2	IST.	DUCT.	MG/	1/3 BAR TO	
		-2	-2	.05	.002	.002	VC	C	M	F	VF	C	F	AY	FIELD	PSDA	.05	.002	.002	.01M	OHMS	MMHOS	KG	15BAR AIRDRY	
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)		(--PCT OF .2MM-)			(- - - - <2 MM- - - -)				(WHL SOIL)	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
0- 4	11	11	11	73	16	4	20	27	21	6	8	11	7	5		LCOS	78.5	16.9	4.6	7.6					
4- 12	15	15	15	70	15	5	20	27	20	7	9	10	7	6		LCOS	78.2	16.5	5.3	7.8					
31- 45	32	32	32	66	2	1	34	37	24	2	1	2	1	1		COS	96.1	2.5	1.4	8.0					

(Site 3, page 4)

S88CA-029-004

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC
REVISED TO : CORUM ;

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 950, SAMPLES 88P5159-5161
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
				(- - -TOTAL	- - -)		(- -CLAY- -)		(- -SILT- -)		(- - - -	- -SAND-	- - - - -)			(-COARSE FRACTIONS(MM)-)				(>2MM)
				CLAY	SILT	SAND	FINE	CO3	FINE	COARSE	VF	F	M	C	VC	- - - - WEIGHT	- - - -			WT
SAMPLE	DEPTH	HORIZON		LT	.002	.05	LT	LT	.002	.02	.05	.10	.25	.5	1	2	5	20	.1-	PCT OF
NO.	(CM)			.002	-.05	-2	.0002	.002	-.02	-.05	-.10	-.25	-.50	-1	-2	-5	-20	-75	75	WHOLE
				<- - - - - - - - - - - - -				PCT OF <2MM		(3A1)	- - - - - - - - - - - - - -				->	<- PCT OF		<75MM(3B1)->		SOIL
88P5159S	0- 10	A		3.9	21.3	74.8			8.6	12.7	14.4	13.5	16.5	16.7	13.7	9	1	--	64	10
88P5160S	10- 25	2BW		7.9	22.2	69.9			10.3	11.9	14.3	13.9	15.4	14.6	11.7	10	2	--	61	12
88P5161S	61- 79	3BTKN		34.3	19.4	46.3		2.8	12.6	6.8	5.4	11.1	10.2	9.7	9.9	9	1	--	47	10

	ORGN	TOTAL	EXTR	TOTAL	(- - DITH-CIT - -)			(RATIO/CLAY)		(ATTERBERG)		(- BULK DENSITY -)			COLE	(- - -WATER CONTENT - -)				WRD
	C	N	P	S	EXTRACTABLE				15	- LIMITS -		FIELD	1/3	OVEN	WHOLE	FIELD	1/10	1/3	15	WHOLE
DEPTH					FE	AL	MN	CEC	BAR	LL	PI	MOIST	BAR	DRY	SOIL	MOIST	BAR	BAR	BAR	SOIL
(CM)	6A1C	6B3A	6S3	6R3A	6C2B	6G7A	6D2A	8D1	8D1	4F1	4F	4A3A	4A1D	4A1H	4D1	4B4	4B1C	4B1C	4B2a	4C1
	PCT	<2MM	PPM	<- PERCENT	OF	<2MM -->				PCT	<0.4MM	<- - G/CC	- - ->		CM/CM	<- - -PCT OF	<2MM	- ->		CM/CM
0- 10	0.16							1.56	0.74				1.62	1.62	--			5.6	2.9	0.04
10- 25	0.07							1.11	0.48										3.8	
61- 79	0.14							0.60	0.44				1.40	1.67	0.057			25.8	15.0	0.14

NND12415466E
Amendment 1
Attachment 10

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-004
SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 950, SAMPLE 88P5159-5161

PRINT DATE 03/10/89

DEPTH (CM)	-1-- CA 5B5A 6N2E	-2-- MG 5B5A 6O2D	-3-- NA 5B5A 6P2B	-4-- K 5B5A 6Q2B	-5-- SUM BASES	-6-- ACID-ITY 6H5A	-7--	-8-- CEC- SUM CATS 5A3A	-9-- NH4-OAC 5A8B	-10- EXCH NA 5B5B	-11- SAR 5E	-12- BASE SATURATION SUM 5C3	-13- NH4OAC 5C1	-14- CO3 AS CACO3 <2MM 6E1G	-15- RES. OHMS /CM 8E1	-16- CASO4 AS GYPSUM <2MM 6F1A	-17- <20MM 6F4	-18- PH SAT PASTE 8C1B	-19- CACL2 .01M 8C1F 1:2	-20- H2O 8C1F 1:1
	<- - - - - - - - - - -MEQ / 100 G - - - - - - - - - - - ->									PCT		<- -BCT- >		PCT		<- -PCT ->				
0- 10	6.1	1.1	0.1	0.6	7.9	--		7.9	6.1	2		100	100	TR					7.6	8.2
10- 25		2.6	0.2	1.0					8.8	2		100	100	1					7.9	8.4
61- 79		5.6	12.5	0.8					20.5	51	34	100	100	18	620	--		8.5	8.3	8.9

DEPTH (CM)	CA 6N1B	MG 6O1B	NA 6P1B	K 6Q1B	CO3 6I1B	HCO3 6J1B	CL 6K1C	SO4 6L1C	NO3 6M1C	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3A MMHOS /CM
	<- - - - - - - - - - - -MEQ / LITER - - - - - - - - - - - ->										<- -PCT ->	
0- 10												0.12
10- 25												0.13
61- 79	1.0	0.4	28.7	0.1	--	3.2	21.1	8.5	--	71.0	0.2	3.37

MMHOS/CM OF 1:2 WATER EXTRACT (8I) & EXCH NA AS EXTRACTABLE NA FOR LAYERS 1, 2,

(Site 4, page 2)

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-004 (KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC TYPIC CAMBORTHID
REVISED TO : ;

NSSL - PROJECT 88P 174,
- PEDON 88P 950, SAMPLES 88P5159-5161
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	ENGINERING PERCENTAGE PASSING 3	2	3/2	1	3/4	3/8	4	10	40	200	PSDA SIEVE 20	5	2	CUMULATIVE CURVE FRACTIONS(<76MM) USDA 1.	.5	LESS .25	THAN .10	.05	DIAMETERS(MM) AT 60	50	10	ATTER-BERG LL	PI	GRADATION UNI-FMTY CU	CUR-VTUR CC
			<-----INCHES----->						<-NUMBER->				<-MICRONS->			<--------MM-------->					<--PERCENTILE-->			<-PCT>			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
88P5159S	0- 4	A	100	100	100	100	100	100	99	90	59	30	11	7	4	78	63	48	36	23	0.44	0.277	0.014			32.1	0.9
88P5160S	4- 10	2BW	100	100	100	100	100	99	98	88	61	34	16	11	7	78	65	51	39	26	0.39	0.227	0.004			89.9	2.2
88P5161S	24- 31	3BTKN	100	100	100	100	100	100	99	90	70	51	42	35	31	81	72	63	53	48	0.19	0.063	--			>100	--

DEPTH (IN.)	(WEIGHT FRACTIONS) WHOLE SOIL (MM) >2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	<75 MM FRACTION 75 -2	75 -20	20 -5	5 -2	<2	(WEIGHT PER UNIT VOLUME G/CC) WHOLE SOIL SOIL SURVEY 1/3 BAR	SURVEY OVEN -DRY	ENGINEERING MOIST	ENGINEERING SATUR -ATED	<2 MM FRACTION SOIL SURVEY 1/3 BAR	SURVEY 15 BAR	SURVEY OVEN -DRY	ENGINEERING MOIST	ENGINEERING SATUR -ATED	VOID RATIOS AT 1/3 WHOLE SOIL	VOID RATIOS BAR <2 MM
	<-----PCT OF WHOLE SOIL----->								<--PCT OF <75 MM->																
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0- 4	10	--	--	10	--	1	9	90	10	--	1	9	90		1.69	1.69	1.77	2.05	1.62	1.62	1.62	1.71	2.01	0.57	0.64
4- 10	12	--	--	12	--	2	10	88	12	--	2	10	88		1.53										
24- 31	10	--	--	10	--	1	9	90	10	--	1	9	90		1.47	1.73	1.81	1.92	1.40	1.52	1.67	1.76	1.87	0.80	0.89

NND12415466E
Amendment 1
Attachment 10
103

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-004 PRINT DATE 03/10/89
SAMPLED AS : HI VISTA ; COARSE-LOAMY, MIXED, THERMIC
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 950, SAMPLE 88P5159-5161

DEPTH (IN.)	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(V O L U M E F R A C T I O N S)										(C/)	(R A T I O S TO C L A Y)				(LINEAR EXTENSIBILITY)				(W R D)
	----W H O L E S O I L (MM) A T 1/3 B A R---										(/N)	-------<2 MM FRACTION-------				WHOLE SOIL --<2 MM--				WHOLE <2
	>2	250	250	75	75	20	5	2-	.05-	LT	PORES	RAT	FINE	---C E C--		15	LE	<-1/3 BAR TO (PCT)--->			SOIL MM
		-UP	-75	-2	-20	-5	-2	<2	.05	.002	.002	D F	-IO	CLAY	SUM	NH4-	BAR	1/3	15	OVEN	15	OVEN	
	<----------PCT OF WHOLE SOIL---------->														CATS	OAC	H2O	BAR	BAR	-DRY	BAR	-DRY	<--IN/IN->
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
0- 4	6	--	--	6	--	1	6	94	43	12	2	28	8			2.03	1.56	0.74						0.04	0.04
4- 10	7	--	--	7	--	1	6	93	35	11	4	42				2.05	1.11	0.48							
24- 31	6	--	--	6	--	1	5	94	23	10	17	11	34			1.85	0.60	0.44	0.178	2.7	5.6	2.8	6.1	0.14	0.15

DEPTH (IN.)	(W E I G H T F R A C T I O N S - C L A Y F R E E)														(-TEXTURE--)		(--P S D A(MM)---)			(PH)	(-ELECTRICAL)		(CUMULT. AMOUNTS)	
	--W H O L E S O I L--						---<2 MM F R A C T I O N ----								(DETERMINED		SAND	SILT	CLAY	CA-	RES-	CON-	SALT	IN. OF H2O
	>2	75	20	2-	.05-	LT	------SANDS-------					SILTS		CL	IN	BY	2-	.05-	LT	CL2	IST.	DUCT.	MG/	1/3 BAR TO
		-2	-2	.05	.002	.002	VC	C	M	F	VF	C	F	AY	FIELD	PSDA	.05	.002	.002	.01M	OHMS	MMHOS	KG	15BAR AIRDRY
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)		(--PCT OF .2MM-)			(- - - - <2 MM- - - -)				(WHL SOIL)
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
0- 4	10	10	10	70	20	4	14	17	17	14	15	13	9	4	LS	LCOS	74.8	21.3	3.9	7.6					
4- 10	13	13	13	66	21	7	13	16	17	15	16	13	11	9	SL	COSL	69.9	22.2	7.9	7.9					
24- 31	14	14	14	60	25	45	15	15	16	17	8	10	19	52	SCL	SCL	46.3	19.4	34.3	8.3******		3.4			

(Site 4, page 4)

S88CA-029-005

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; FINE-LOAMY, MIXED, THERMIC TYPIC HAPLARGID
REVISED TO : ;

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 951, SAMPLES 88P5162-5165
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS(MM) WEIGHT 2 -5	-14- COARSE FRACTIONS(MM) WEIGHT 5 -20	-15- COARSE FRACTIONS(MM) WEIGHT 20 -75	-16- COARSE FRACTIONS(MM) WEIGHT .1-75	-17- (>2MM) WT PCT OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)->				
88P5162S	0- 15	A1	6.1	21.4	72.5			8.0	13.4	14.4	15.3	14.1	13.5	15.2	13	1	--	64	14
88P5163S	15- 34	A2	6.6	18.7	74.7		--	7.4	11.3	12.6	13.5	13.3	15.9	19.4	16	1	--	69	17
88P5164S	34- 61	C	8.2	19.2	72.6		--	8.5	10.7	12.1	15.1	14.6	15.2	15.6	18	2	--	68	20
88P5165S	61- 79	2BTKB	23.2	10.7	66.1		--	4.8	5.9	5.9	15.7	17.0	14.5	13.0	18	1	--	68	19

DEPTH (CM)	ORGN C 6A1C PCT	TOTAL N 6B3A <2MM	EXTR P 6S3 PPM	TOTAL S 6R3A <- PERCENT	DITH-CIT EXTRACTABLE FE 6C2B OF	DITH-CIT EXTRACTABLE AL 6G7A <2MM -->	DITH-CIT EXTRACTABLE MN 6D2A	CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1 PCT	ATTERBERG LIMITS PI 4F <0.4MM	BULK DENSITY FIELD MOIST 4A3A <-	BULK DENSITY 1/3 BAR 4A1D G/CC	BULK DENSITY OVEN DRY 4A1H - ->	COLE WHOLE SOIL 4D1 CM/CM	WATER CONTENT FIELD MOIST 4B4 <-	WATER CONTENT 1/10 BAR 4B1C -PCT OF	WATER CONTENT 1/3 BAR 4B1C <2MM	WATER CONTENT 15 BAR 4B2a - ->	WRD WHOLE SOIL 4C1 CM/CM
0- 15	0.25							1.34	0.62										3.8	
15- 34	0.10							1.17	0.59				1.61	1.63	0.004			7.7	3.9	0.05
34- 61	0.12							1.06	0.52				1.55	1.58	0.006			9.4	4.3	0.07
61- 79	0.08							0.72	0.37				1.79	1.92	0.020			13.4	8.5	0.08

AVERAGES, DEPTH 61- 79: PCT CLAY 23 PCT .1-75MM 68

(Site 5, page 1)

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-005
SAMPLED AS : HI VISTA ; FINE-LOAMY, MIXED, THERMIC TYPIC HAPLARGID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 951, SAMPLE 88P5162-5165

PRINT DATE 03/10/89

	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(- NH4OAC EXTRACTABLE BASES -)					ACID-	EXTR	(- - -	-CEC	- - -)	AL	-BASE	SAT-	CO3 AS	RES.		COND.	(- - -	-PH	- - -)
	CA	MG	NA	K	SUM	ITY	AL	SUM	NH4-	BASES	SAT	SUM	NH4	CACO3	OHMS		MMHOS		CACL2	H2O
DEPTH	5B5A	5B5A	5B5A	5B5A	BASES			CATS	OAC	+ AL			OAC	<2MM	/CM		/CM		.01M	
(CM)	6N2E	6O2D	6P2B	6Q2B		6H5A	6G9A	5A3A	5A8B	5A3B	5G1	5C3	5C1	6E1G	8E1		8I		8C1F	8C1F
	<- - - - - - - - - - - -				-MEQ /	100 G	- - -	- - -	- - -	- - ->	<- - - -	-PCT	- - -	->					1:2	1:1
0- 15		1.2	0.1	0.6					8.2			100	100	1			0.20		7.8	8.4
15- 34		1.4	0.1	0.6					7.7			100	100	3			0.12		7.9	8.3
34- 61		1.8	TR	0.6					8.7			100	100	2			0.12		7.9	8.6
61- 79		2.8	0.9	0.6					16.8			100	100	1			0.20		8.0	8.4

(Site 5, page 2)

S88CA-029-005

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : HI VISTA ; FINE-LOAMY, MIXED, THERMIC TYPIC HAPLARGID
REVISED TO : ;

NSSL - PROJECT 88P 174,
- PEDON 88P 951, SAMPLES 88P5162-5165
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	ENGINEERING PERCENTAGE PASSING 3	2	3/2	1	3/4	3/8	4	10	40	200	PSD SIEVE 20	5	2	CUMULATIVE USDA 1.	.5	LESS .25	THAN .10	.05	CURVE FRACTIONS(<76MM) DIAMETERS(MM) AT 60	50	10	ATTER-BERG LL	PI	GRADATION UNI-FMTY CU	CUR-VTUR CC
			<-----INCHES----->						<-NUMBER->				<-MICRONS->			<--------MM-------->					<--PERCENTILE-->			<-PCT>			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
88P5162S	0- 6	A1	100	100	100	100	100	100	99	86	58	31	12	8	5	73	61	49	36	24	0.46	0.262	0.010			47.2	1.1
88P5163S	6- 13	A2	100	100	100	100	100	100	99	83	51	27	12	8	5	67	54	43	31	21	0.70	0.396	0.011			63.9	1.1
88P5164S	13- 24	C	100	100	100	100	100	99	98	80	52	27	13	9	7	68	55	44	32	22	0.65	0.364	0.006			>100	1.9
88P5165S	24- 31	2BTKB	100	100	100	100	100	100	99	82	56	31	23	21	19	71	59	46	33	28	0.52	0.313	0.001			>100	13.6

DEPTH (IN.)	(WEIGHT FRACTIONS) WHOLE SOIL (MM) >2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	<75 MM FRACTION 75 -2	75 -20	20 -5	5 -2	<2	(WEIGHT PER UNIT VOLUME G/CC) WHOLE SOIL SURVEY 1/3 BAR	OVEN -DRY	ENGINEERING MOIST	SATUR -ATED	<2 MM FRACTION SOIL SURVEY 1/3 BAR	15 BAR	ENGINEERING OVEN -DRY	MOIST	SATUR -ATED	(VOID RATIOS) AT 1/3 BAR WHOLE SOIL	<2 MM
	<------PCT OF WHOLE SOIL----->								<--PCT OF <75 MM->															
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0- 6	14	--	--	14	--	1	13	86	14	--	1	13	86		1.55										
6- 13	17	--	--	17	--	1	16	83	17	--	1	16	83		1.73	1.74	1.83	2.08	1.61	1.62	1.63	1.73	2.00	0.53	0.65
13- 24	20	--	--	20	--	2	18	80	20	--	2	18	80		1.69	1.72	1.83	2.05	1.55	1.57	1.58	1.70	1.97	0.57	0.71
24- 31	18	--	--	18	--	1	17	82	18	--	1	17	82		1.90	2.02	2.11	2.18	1.79	1.84	1.92	2.03	2.11	0.39	0.48

NND12415466E
Amendment 1
Attachment 10
107

*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-005 PRINT DATE 03/10/89
SAMPLED AS : HI VISTA ; FINE-LOAMY, MIXED, THERMIC TYPIC HAPLARGID
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 951, SAMPLE 88P5162-5165

DEPTH (IN.)	-1--	-2--	-3--	-4--	-5--	-6--	-7--	-8--	-9--	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-	-18-	-19-	-20-
	(V O L U M E F R A C T I O N S)										(C/)	(R A T I O S TO C L A Y)				(LINEAR EXTENSIBILITY)				(W R D)
	----W H O L E S O I L (MM) A T 1/3 B A R---										(/N)	-------<2 MM FRACTION-------				WHOLE SOIL --<2 MM--				WHOLE <2
	>2	250	250	75	75	20	5		2-	.05-	LT	PORES	RAT	FINE	---C E C--		15	LE	<-1/3 BAR TO (PCT)--->		SOIL MM
		-UP	-75	-2	-20	-5	-2	<2	.05	.002	.002	D F	-IO	CLAY	SUM	NH4-	BAR	1/3	15	OVEN	15	OVEN
	<----------PCT OF WHOLE SOIL---------->														CATS	OAC	H2O	BAR	BAR	-DRY	BAR	-DRY	<--IN/IN->
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
0- 6	8	--	--	8	--	1	8	92	37	11	3	41				3.52	1.34	0.62							
6- 13	11	--	--	11	--	1	10	89	40	10	4	25	10			3.86	1.17	0.59	0.061	0.2	0.2	0.2	0.4	0.06	0.06
13- 24	13	--	--	13	--	1	11	87	37	10	4	22	14			4.05	1.06	0.52	0.073	0.4	0.6	0.4	0.6	0.07	0.08
24- 31	13	--	--	13	--	1	12	87	38	6	13	7	21			1.56	0.72	0.37	0.103	0.9	2.1	0.9	2.4	0.08	0.09

DEPTH (IN.)	(W E I G H T F R A C T I O N S - C L A Y F R E E)														(-TEXTURE--)	(--P S D A(MM)---)			(PH)	(-ELECTRICAL)		(CUMULT. AMOUNTS)		
	--W H O L E S O I L--						---<2 MM F R A C T I O N ----								(DETERMINED	SAND	SILT	CLAY	CA-	RES-	CON-	SALT	IN. OF H2O	
	>2	75	20	2-	.05-	LT	------SANDS-------					SILTS		CL	IN	BY	2-	.05-	LT	CL2	IST.	DUCT.	MG/	1/3 BAR TO	
		-2	-2	.05	.002	.002	VC	C	M	F	VF	C	F	AY	FIELD	PSDA	.05	.002	.002	.01M	OHMS	MMHOS	KG	15BAR AIRDRY	
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)		(--PCT OF .2MM-)			(- - - - <2 MM- - - -)				(WHL SOIL)	
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
0- 6	15	15	15	66	19	6	16	14	15	16	15	14	9	6		COSL	72.5	21.4	6.1	7.8					
6- 13	18	18	18	66	16	6	21	17	14	14	13	12	8	7		COSL	74.7	18.7	6.6	7.9					
13- 24	21	21	21	62	16	7	17	17	16	16	13	12	9	9		COSL	72.6	19.2	8.2	7.9					
24- 31	22	22	22	67	11	23	17	19	22	20	8	8	6	30		SCL	66.1	10.7	23.2	8.0					

(Site 5, page 4)

S88CA-029-006

*** P R I M A R Y C H A R A C T E R I Z A T I O N D A T A ***
(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : WHERRY ; FINE, MIXED (CALCAREOUS), THERMIC TYPIC TORRIFLUVENT
REVISED TO : ;

NSSL - PROJECT 88P 174, EDWARDS AIRFORCE BASE
- PEDON 88P 952, SAMPLES 88P5166-5171
- GENERAL METHODS 1B1A, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (CM)	HORIZON	-1-- TOTAL CLAY LT .002	-2-- TOTAL SILT .002 -.05	-3-- TOTAL SAND .05 -2	-4-- CLAY FINE LT .0002	-5-- CLAY CO3 LT .002	-6-- SILT FINE .002 -.02	-7-- SILT COARSE .02 -.05	-8-- SAND VF .05 -.10	-9-- SAND F .10 -.25	-10- SAND M .25 -.50	-11- SAND C .5 -1	-12- SAND VC 1 -2	-13- COARSE FRACTIONS (MM) WEIGHT 2 -5	-14- COARSE FRACTIONS (MM) WEIGHT 5 -20	-15- COARSE FRACTIONS (MM) WEIGHT 20 -75	-16- COARSE FRACTIONS (MM) WEIGHT .1- 75	-17- (>2MM) WT PCT OF WHOLE SOIL
			<- PCT OF <2MM (3A1)												<- PCT OF <75MM(3B1)				
88P5166S	0- 9	AN	76.7	16.7	6.6		5.6	12.1	4.6	1.5	3.5	1.3	0.3	--				5	--
88P5167S	9- 20	CKY	65.9	18.1	16.0		5.6	14.7	3.4	2.6	9.3	3.3	0.7	0.1				13	--
88P5168S	20- 31	CNZ	57.8	20.7	21.5		8.5	16.0	4.7	3.4	9.9	5.7	1.8	0.7				30	15
88P5169S	31- 69	CN1	60.5	21.5	18.0		8.1	16.8	4.7	3.0	7.8	5.5	1.4	0.3				36	25
88P5170S	69- 94	CN2	52.1	23.2	24.7		1.4	17.1	6.1	4.6	10.3	7.2	2.1	0.5				36	20
88P5171S	94-147	CN3	49.0	19.6	31.4		8.8	13.3	6.3	7.1	10.8	9.6	3.0	0.9				26	2

DEPTH (CM)	ORGN C 6A1C PCT	TOTAL N 6B3A <2MM	EXTR P 6S3 PPM	TOTAL S 6R3A	DITH-CIT EXTRACTABLE FE 6C2B	DITH-CIT EXTRACTABLE AL 6G7A	DITH-CIT EXTRACTABLE MN 6D2A	RATIO/CLAY CEC 8D1	RATIO/CLAY 15 BAR 8D1	ATTERBERG LIMITS LL 4F1	ATTERBERG LIMITS PI 4F	BULK DENSITY FIELD MOIST 4A3A	BULK DENSITY 1/3 BAR 4A1D	BULK DENSITY OVEN DRY 4A1H	COLE WHOLE SOIL 4D1	WATER CONTENT FIELD MOIST 4B4	WATER CONTENT 1/10 BAR 4B1C	WATER CONTENT 1/3 BAR 4B1C	WATER CONTENT 15 BAR 4B2a	WRD WHOLE SOIL 4C1
				<- PERCENT OF <2MM -->						PCT <0.4MM		<- - G/CC - - ->			CM/CM	<- - -PCT OF <2MM - ->				CM/CM
0- 9	0.29							0.44	0.30				1.26	1.43	0.043			28.7	22.8	0.07
9- 20	0.24							0.40	0.29				1.32	1.54	0.053			29.3	19.2	0.13
20- 31	0.20							0.36	0.30				1.51	1.73	0.042			23.1	17.1	0.08
31- 69	0.24							0.38	0.34				1.09	1.49	0.094			49.2	20.3	0.28
69- 94	0.16							0.36	0.35				1.23	1.60	0.080			40.0	18.4	0.24
94-147	0.15							0.34	0.37				1.48	1.85	0.076			27.9	18.2	0.14

AVERAGES, DEPTH 25-100: PCT CLAY 51 PCT .1-75MM 35

(Site 6, page 1)

NND12415466E
Amendment 1
Attachment 10

*** PRIMARY CHARACTERIZATION DATA ***

S88CA-029-006
SAMPLED AS : WHERRY ; FINE, MIXED (CALCAREOUS), THERMIC TYPIC TORRIFLUVENT
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 952, SAMPLE 88P5166-5171

PRINT DATE 03/10/89

DEPTH (CM)	-1-- CA 5B5A 6N2E	-2-- MG 5B5A 6O2D	-3-- NA 5B5A 6P2B	-4-- K 5B5A 6Q2B	-5-- SUM BASES	-6-- ACIDITY 6H5A	-7--	-8--	-9-- SUM CATS 5A3A	-10- NH4-OAC 5A8B	-11- EXCH NA 5B5B	-12- SAR 5E	-13- BASE SATURATION SUM 5C3	-14- NH4OAC 5C1	-15- CO3 AS CACO3 <2MM 6E1G	-16- RES. OHMS /CM 8E1	-17- CASO4 AS GYPSUM <2MM 6F1A	-18- <20MM 6F4	-19- (- - - -PH - - -) SAT PASTE 8C1B	-20- CACL2 .01M 8C1F 1:2	H2O 8C1F 1:1
	(- NH4OAC EXTRACTABLE BASES -)					ACID-			(- -CEC- -)		EXCH	SAR	BASE		CO3 AS	RES.	CASO4 AS		(- - - -PH - - -)		
	<- - - - - - - - - -MEQ / 100 G - - - - - - - - - ->										PCT		<- -PCT- >		PCT		<- -PCT ->				
0- 9		7.5	95.4	2.2						33.5	112	175	100	100	14		--		8.3	8.6	8.3
9- 20		6.9	61.0	1.6						26.6	101	121	100	100	17		--		8.5	8.7	8.6
20- 31		7.1	52.6	1.6						20.9	88	95	100	100	18		--		8.5	8.6	8.6
31- 69		7.0	49.4	1.9						23.2	104	155	100	100	16		--		8.7	8.6	9.4
69- 94		6.8	28.6	1.6						19.0	92	156	100	100	19		--		9.0	8.7	9.4
94-147		8.1	18.4	1.6						16.8	89	89	100	100	18	380	--		9.1	8.7	9.5

DEPTH (CM)	CA 6N1B	MG 6O1B	NA 6P1B	K 6Q1B	CO3 6I1B	HCO3 6J1B	CL 6K1C	SO4 6L1C	NO3 6M1C	H2O 8A	TOTAL SALTS EST. 8D5	ELEC. COND. 8A3A MMHOS /CM
	(- - - - - - - - -WATER EXTRACTED FROM SATURATED PASTE- - - - - - - - -)											
	< - - - - - - - - - - -MEQ / LITER - - - - - - - - - - >									<- -PCT ->		
0- 9	32.6	8.2	792.3	2.8	--	1.0	645.5	252.7	46.5	73.3	4.4	63.70
9- 20	24.0	5.2	462.2	1.5	--	0.9	323.2	203.8	34.5	73.8	2.7	40.30
20- 31	34.5	6.9	432.6	1.8	--	0.5	308.8	176.5	26.8	79.1	2.7	38.90
31- 69	2.8	1.8	235.3	1.1	--	1.6	195.5	98.8	16.9	107.3	2.2	24.30
69- 94	0.6	0.4	110.0	0.6	--	3.6	91.2	29.9	4.8	101.3	0.9	11.53
94-147	0.4	0.2	48.7	0.4	--	6.0	34.2	15.3	2.2	69.5	0.3	5.36

(Site 6, page 2)

S88CA-029-006

*** SUPPLEMENTARY CHARACTERIZATION DATA ***

(KERN COUNTY, CALIFORNIA)

PRINT DATE 03/10/89

SAMPLED AS : WHERRY ; FINE, MIXED (CALCAREOUS), THERMIC TYPIC TORRIFLUVENT
REVISED TO : ;

NSSL - PROJECT 88P 174,
- PEDON 88P 952, SAMPLES 88P5166-5171
- GENERAL METHODS (ENGINEERING FRACTIONS ARE CALCULATED FROM USDA FRACTION SIZES)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA 68508-3866

SAMPLE NO.	DEPTH (IN.)	HORIZON	PERCENTAGE PASSING 3	2	3/2	1	3/4	3/8	4	10	40	200	SIEVE 20	5	2	USDA 1.	.5	LESS .25	THAN .10	.05	DIAMETERS(MM) AT 60	50	10	BERG LL	PI	UNI-FMTY CU	CUR-VTUR CC
			<-----INCHES----->						<-NUMBER->				<-MICRONS->			<--------MM-------->					<--PERCENTILE-->			<-PCT>			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
88P5166S	0- 4	AN	100	100	100	100	100	100	100	100	99	94	89	82	77	100	100	98	95	93	--	0.001	--			4.5	0.7
88P5167S	4- 8	CKY	100	100	100	100	100	100	100	100	98	85	81	72	66	100	99	96	87	84	--	0.001	--			5.7	0.7
88P5168S	8- 12	CNZ	100	100	100	100	100	100	100	85	82	68	63	55	49	84	83	78	70	67	0.01	0.002	--			39.4	0.2
88P5169S	12- 27	CN1	100	100	100	100	100	100	100	75	73	63	58	50	45	75	74	70	64	61	0.03	0.005	--			>100	0.1
88P5170S	27- 37	CN2	100	100	100	100	100	100	100	80	76	62	55	47	42	80	78	72	64	60	0.05	0.008	--			>100	0.1
88P5171S	37- 58	CN3	100	100	100	100	100	100	100	98	92	71	61	53	48	97	94	85	74	67	0.02	0.003	--			51.4	0.1

DEPTH (IN.)	(WHOLE SOIL (MM)- >2	250 -UP	250 -75	75 -2	75 -20	20 -5	5 -2	<2	<75 MM FRACTION-- 75 -2	75 -20	20 -5	5 -2	<2		(WEIGHT PER UNIT VOLUME G/CC)(VOID) SOIL SURVEY ENGINEERING 1/3 BAR	OVEN -DRY	MOIST	SATUR -ATED	SOIL SURVEY 1/3 BAR	15 BAR	<2 MM FRACTION-- ENGINEERING OVEN -DRY	MOIST	SATUR -ATED	RATIOS-- AT 1/3 BAR WHOLE SOIL	<2 MM
	<-----PCT OF WHOLE SOIL----->								<--PCT OF <75 MM->																
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
0- 4	--	--	--	--	--	--	--	100	--	--	--	--	100		1.26	1.43	1.63	1.78	1.26	1.30	1.43	1.62	1.78	1.10	1.10
4- 8	--	--	--	--	--	--	--	100	--	--	--	--	100		1.32	1.54	1.70	1.82	1.32	1.40	1.54	1.71	1.82	1.01	1.01
8- 12	15	--	--	15	--	--	15	85	15	--	--	15	85		1.61	1.83	1.93	2.00	1.51	1.57	1.73	1.86	1.94	0.65	0.76
12- 27	25	--	--	25	--	--	25	75	25	--	--	25	75		1.28	1.67	1.75	1.80	1.09	1.33	1.49	1.63	1.68	1.07	1.43
27- 37	20	--	--	20	--	--	20	80	20	--	--	20	80		1.38	1.74	1.82	1.86	1.23	1.44	1.60	1.72	1.77	0.92	1.15
37- 58	2	--	--	2	--	TR	2	98	2	--	TR	2	98		1.49	1.86	1.89	1.93	1.48	1.61	1.85	1.89	1.92	0.78	0.79

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*** S U P P L E M E N T A R Y C H A R A C T E R I Z A T I O N D A T A ***

S88CA-029-006
SAMPLED AS : WHERRY ; FINE, MIXED (CALCAREOUS), THERMIC TYPIC TORRIFLUVENT
NATIONAL SOIL SURVEY LABORATORY ; PEDON 88P 952, SAMPLE 88P5166-5171

PRINT DATE 03/10/89

DEPTH (IN.)	-1-- >2 -UP	-2-- 250 -75	-3-- 250 -2	-4-- 75 -20	-5-- 75 -5	-6-- 20 -2	-7-- 5 <2	-8-- 2- .05	-9-- .05- .002	-10- LT .002	-11- PORES D	-12- PORES F	-13- RAT -IO	-14- FINE CLAY	-15- ---C E C-- SUM CATS	-16- NH4- OAC	-17- 15 BAR H2O	-18- LE 1/3 BAR	-19- WHOLE SOIL <-1/3 BAR TO 15 BAR	-20- WHOLE SOIL <2 MM --<2 MM-- (PCT)---> 15 BAR OVEN -DRY	15 BAR OVEN -DRY	WHOLE SOIL <--IN/IN->	WHOLE SOIL <2 MM
	<----------PCT OF WHOLE SOIL---------->																						
	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
0- 4	--	--	--	--	--	--	--	100	3	8	37	15	37			1.98	0.44	0.30	0.056	1.0	4.3	1.0	4.3	0.07	0.07
4- 8	--	--	--	--	--	--	--	100	8	9	33	12	38			1.85	0.40	0.29	0.080	2.0	5.3	2.0	5.3	0.13	0.13
8- 12	9	--	--	9	--	--	9	91	11	11	30	7	32			1.90	0.36	0.30	0.080	1.2	4.4	1.3	4.6	0.08	0.09
12- 27	12	--	--	12	--	--	12	88	7	8	22	5	47			1.68	0.38	0.34	0.182	5.9	9.3	6.9	11.0	0.28	0.32
27- 37	10	--	--	10	--	--	10	90	10	10	22	4	44			1.48	0.36	0.35	0.177	4.6	8.0	5.4	9.2	0.24	0.27
37- 58	1	--	--	1	--	TR	1	99	17	11	27	4	40			1.43	0.34	0.37	0.157	3.0	7.7	2.8	7.7	0.14	0.14

DEPTH (IN.)	--W >2	HOLE 75 -2	SOIL-- 20 -2	2- .05	.05- .002	LT .002	---<2 MM VC	C	M	F	VF	SILTS C	F	CL AY	(DETERMINED IN FIELD	BY PSDA	SAND 2- .05	SILT .05- .002	CLAY LT .002	CA- CL2 .01M	RES- IST. OHMS	CON- DUCT. MMHOS	SALT MG/ KG	1/3 BAR TO AIRDRY
	PCT OF >2MM+SAND+SILT>						(------PCT OF SAND+SILT------)								(--<2 MM-)		(--PCT OF .2MM-)			(- - - - <2 MM- - - -)				(WHL SOIL)
	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
0- 4				28	72	329		1	6	15	6	20	52	329		C	6.6	16.7	76.7	8.6		63.7			
4- 8				47	53	193	TR	2	10	27	8	10	43	193		C	16.0	18.1	65.9	8.7		40.3			
8- 12	29	29	29	36	35	97	2	4	14	23	8	11	38	137		C	21.5	20.7	57.8	8.6		38.9			
12- 27	46	46	46	25	30	83	1	4	14	20	8	12	43	153		C	18.0	21.5	60.5	8.6		24.3			
27- 37	34	34	34	34	32	71	1	4	15	22	10	13	36	109		C	24.7	23.2	52.1	8.7		11.5			
37- 58	4	4	4	59	37	92	2	6	19	21	14	12	26	96		C	31.4	19.6	49.0	8.7******		5.4			

SCS-SOILS-37A
3-75

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

U.S. DEPARTMENT OF AGRICULT
SOIL CONSERVATION SER

Soil Survey Area: Edwards AFB, NASA PART
State: California

Date: 7/89

DESCRIPTION	SYMBOL
CULTURAL FEATURES	
BOUNDARIES	
National, state, or province	
County or parish	
Minor civil division	
Reservation (national forest or park, state forest or park, and large airport)	
Land grant	
✓ Limit of soil survey (label)	
Field sheet matchline & neatline	
AD HOC BOUNDARY (label)	
Small airport, airfield, park, oilfield, cemetery, or flood pool	
STATE COORDINATE TICK	1,890 000 FEET
LAND DIVISION CORNERS (sections and land grants)	
ROADS	
Divided (median shown if scale permits)	
County, farm or ranch	
Trail	
ROAD EMBLEMS & DESIGNATIONS	
Interstate	66
Federal	287
State	52
Other	398
RAILROAD	
POWER TRANSMISSION LINE (normally not shown)	
PIPE LINE (normally not shown)	
FENCE (normally not shown)	
LEVEES	
Without road	
With road	
With railroad	
DAMS	
Large (to scale)	
Medium or small	w
PITS	
Gravel pit	
Mine or quarry	

DESCRIPTION	SYMBOL
CULTURAL FEATURES (cont.)	
MISCELLANEOUS CULTURAL FEATURES	
Farmstead, house (omit in urban areas)	
Church	
School	
Indian mound (label)	
Located object (label)	
Tank (label)	
Wells, oil or gas	
Windmill	
Kitchen midden	
WATER FEATURES	
DRAINAGE	
Perennial, double line	
Perennial, single line	
Intermittent	
Drainage end	
Canals or ditches	
Double - line (label)	CANAL
Drainage and/or irrigation	
LAKES, PONDS AND RESERVOIRS	
Perennial	water w
Intermittent	intermittent int
MISCELLANEOUS WATER FEATURES	
Marsh or swamp	
Spring	
Well, artesian	
Well, irrigation	
Wet spot	

DESCRIPTION	SYMBOL
SPECIAL SYMBOLS FOR SOIL SURVEY	
✓ SOIL DELINEATIONS AND SOIL SYMBOLS	
ESCARPMENTS	CeA FoB2
Bedrock (points down slope)	
Other than bedrock (points down slope)	
SHORT STEEP SLOPE	
GULLY	
DEPRESSION OR SINK	
SOIL SAMPLE SITE (normally not shown)	S
MISCELLANEOUS	
Blowout	
Clay spot	
Gravelly spot	
Gumbo, slick or scabby spot (sodic)	
✓ Dumps and other similar non soil areas	
Prominent hill or peak	
✓ Rock outcrop (includes sandstone and shale)	
Saline spot	
Sandy spot	
Severely eroded spot	
Slide or slip (tips point upslope)	
Stony spot, very stony spot	
RECOMMENDED AD HOC SOIL SYMBOLS	

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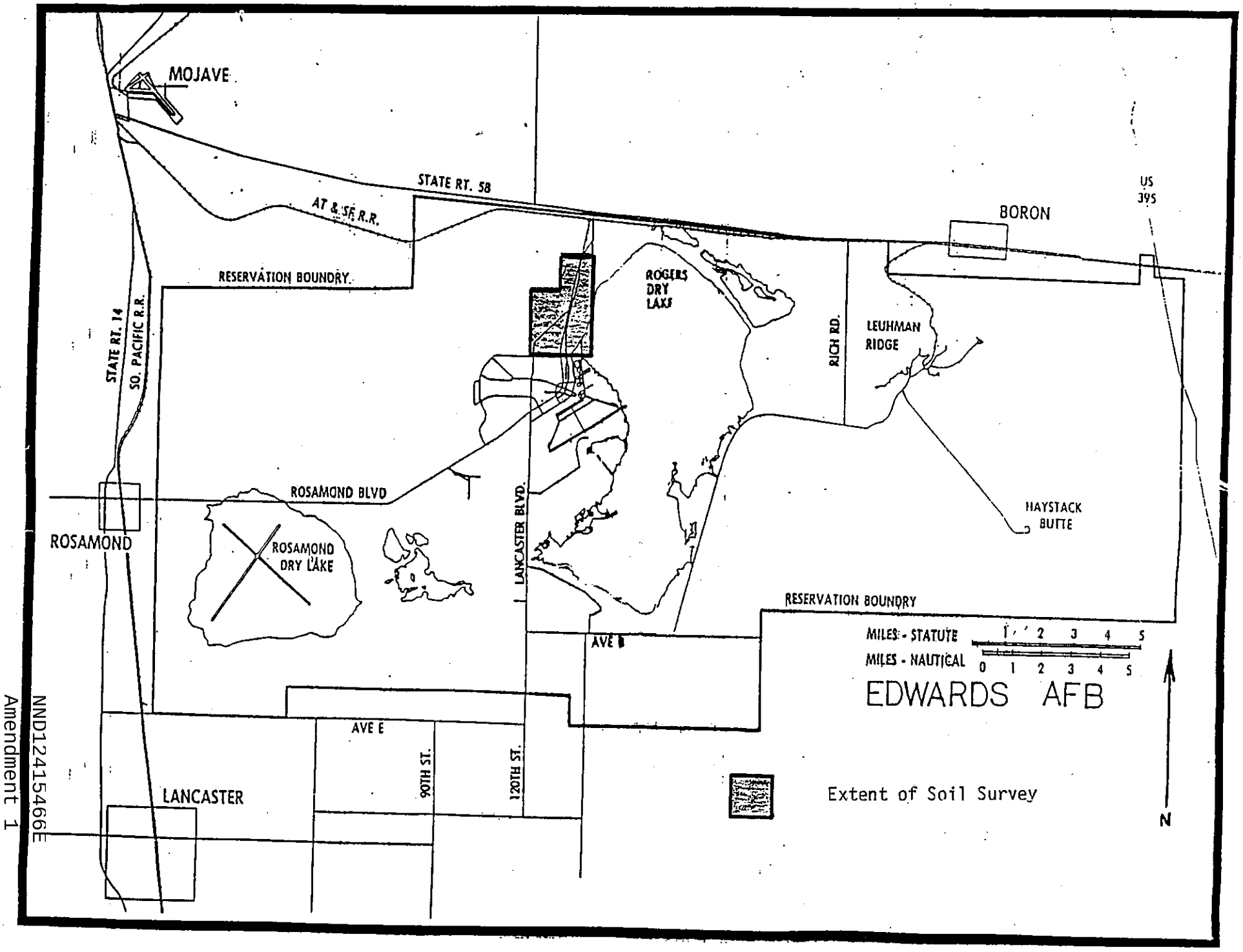

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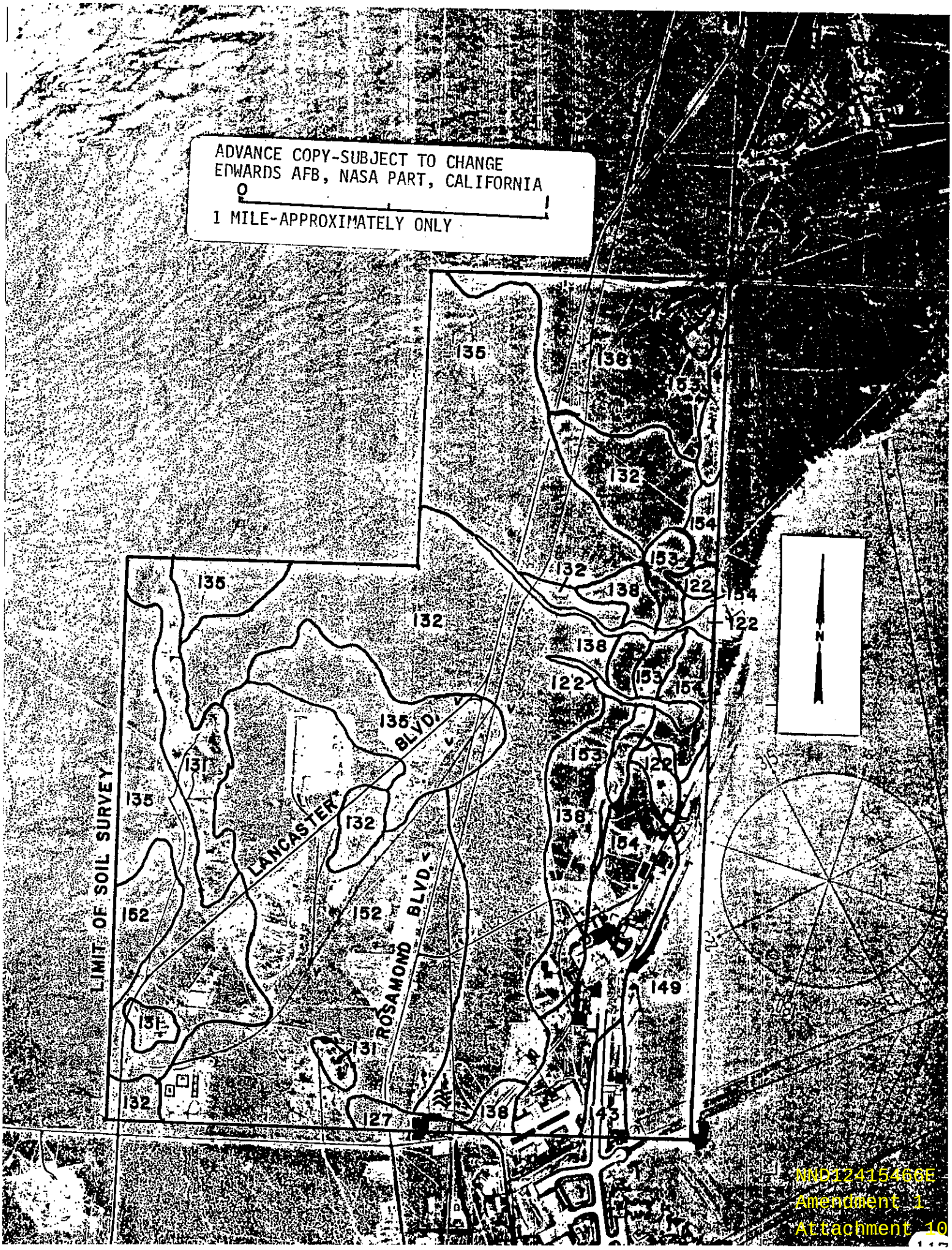

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