



EARTH ENVIRONMENTAL CONSULTANTS INCORPORATED

SOIL SURVEY AND INTERPRETATIONS
HUBBELL TRADING POST HISTORICAL SITE, ARIZONA

FOR
NATIONAL PARK SERVICE

BY
EARTH ENVIRONMENTAL CONSULTANTS, INC.
ALBUQUERQUE, NEW MEXICO

SEPTEMBER, 1978

RESOURCE EVALUATION · PLANNING · ENGINEERING

EARTH ENVIRONMENTAL CONSULTANTS, INCORPORATED

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September 14, 1978

Dr. Milford Fletcher
National Park Service
P.O. Box 728
Santa Fe, New Mexico 87501

Dear Dr. Fletcher:

Earth Environmental Consultants, Inc., has completed a detailed soil survey on approximately 150 acres contained in the Hubbell Trading Post Historical Site near Ganado, Arizona. This soil survey report includes descriptions of soils as well as use interpretations and management recommendations.

Soil classifications are considered tentative, but are presented at the family level as defined in Soil Taxonomy, Handbook No. 436 USDA, Soil Conservation Service, 1975.

Should you have questions concerning the contents of this report, please contact our office.

Sincerely,

EARTH ENVIRONMENTAL CONSULTANTS, INC.

Dean L. Stoneman

Dean L. Stoneman, President

DLS/cw

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SOIL SURVEY AND INTERPRETATIONS
HUBBELL TRADING POST HISTORICAL SITE, ARIZONA

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SOIL SURVEY AND INTERPRETATIONS
HUBBELL TRADING POST HISTORICAL SITE, ARIZONA

INTRODUCTION

The Hubbell Trading Post Historical Site is located in northeastern Arizona (see FIGURE 1) at an elevation of 6,325 feet. The survey area itself contains about 150 acres of land, much of which has been farmed in the past. Because the NPS desires to improve the quality of vegetation on the previously farmed areas, this report on soils and proposed reclamation was developed. The report will also provide information relative to the suitability of soils as foundations for light buildings within a 25-acre area of the site.

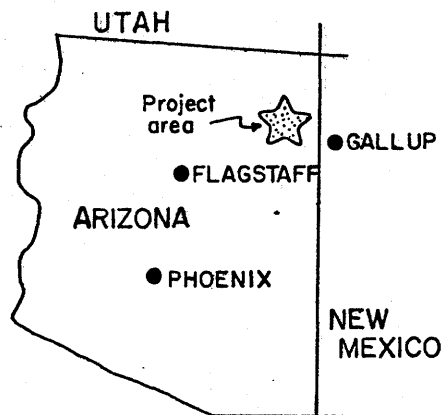


FIGURE 1

Most of the survey area exhibits low relief with occasional interruption by ephemeral drainageways and shaly knolls. The natural vegetation, although now largely removed, is scattered juniper with an understory of short and midgrasses and shrubs. The parent material for soils is mainly alluvium.

The detailed soil survey, of first order intensity on 25 acres, and second order intensity on the remaining 125 acres, was made by a soil scientist who walked over the land, digging holes, examining soil, describing soil profiles, and taking notes on pertinent soil characteristics. Soils with similar characteristics were grouped together and dissimilar soils were separated.

Groups of contiguous similar soils were classified at the family level in the USDA soil classification system, Soil Taxonomy, USDA-SCS, 1975, and are the soil taxonomic units of this soil survey. These units are groups of soils having horizons similar in differentiating characteristics and arrangement in the soil profile, except for texture of the surface part. The taxonomic units were used in designing mapping units which were located and delineated on aerial photographs at a scale of 1:3000. The minimum size of delineation is less than one acre. Mapping units used in this survey are consociations. Consociations are mapping units in which only one identified phase or land type, plus allowable inclusions occur in each delineation.

DESCRIPTIONS OF SOILS

This section presents detailed descriptions of soil taxonomic and soil mapping units. All taxonomic classifications were made in accordance with Soil Taxonomy, 1975, but are considered tentative.

1 RIVER WASH

The 1 unit is a land type and occurs in channels of intermittent arroyos and streams. The material of this land type is sandy and is subject to shifting during periods of normal high water. It is essentially barren of vegetation. This land type is nearly level to gently sloping.

Mapping Unit:

1 RIVER WASH, 1 to 3 PERCENT SLOPES

The 1 unit is defined as River Wash and is not classified as a taxonomic unit, but rather as a land type. The land type occurs as a single mapping unit. Slopes range from nearly level to gently sloping. The river wash occurs in channels of intermittent arroyos and streams in the survey area, principally the Pueblo Colorado River. This land type is stratified sandy material and it is subject to shifting during periods of normal high water.

2 TAXONOMIC UNIT

Taxonomic unit 2 is a member of the fine, mixed, mesic family of Typic Torrerts. It consists of moderately deep, well-drained soils that have formed over shaly material. They occur on hill sideslopes where slopes are moderately steep to steep.

In a representative profile, the surface layer is a weak red clay about 6 inches thick. The subsoil is weak red clay about 30 inches thick. The substratum is highly weathered shaly material.

A representative profile of Taxonomic unit 2 clay is located at site A as shown on Photo 2-2. (Colors are for dry soil unless otherwise noted.)

A11--0 to 4 inches, weak red (10R 5/3) clay, weak red (10R 4/3) moist; moderate very fine granular structure; slightly hard, very friable, sticky and plastic; few very fine and fine roots; many very fine and fine interstitial pores; abrupt smooth boundary.

A12--4 to 6 inches, weak red (10R 5/3) clay, weak red (10R 4/3) moist; strong very fine platy structure; hard, friable, sticky and plastic; few very fine and fine roots; many very fine interstitial pores; clear wavy boundary.

AC--6 to 36 inches, weak red (10R 4/3) clay, weak red (10Y 4/3) moist; massive with many slickensides; very hard, firm, sticky and plastic; no roots; common fine, medium and coarse interstitial pores; clear wavy boundary.

Cr--36 to 44+ inches, weathered shale.

Depth to bedrock is 20 to 40 inches. The surface horizons have values of 4 or 5 dry and 3 or 4 moist. Chromas range from 2 to 3. Textures range from clay loam to clay. The subsoil has values of 4 or 5 dry and 3 or 4 moist. Chromas range from 2 to 3. Texture is clay. The profile is calcareous throughout.

Mapping Unit:

2 Taxonomic Unit 2 clay, 10 to 35 percent slopes

This map unit is that soil described as Taxonomic unit 2. It occurs on sloping to steep hill sideslopes and toeslopes. About 25 percent of the soil surface is occupied by gravels and cobbles. The soil has a slow permeability and runoff is medium. The available water holding capacity is 4 to 6 inches and effective rooting depth is about 36 inches. Erosion hazard is severe.

Included in mapping are similar soils as described in Taxonomic 2 except that the soils are shallow and 60 percent of the soil surface is occupied by stones, cobbles, and gravels.

3 TAXONOMIC UNIT

Taxonomic unit 3 is a member of the coarse-loamy, mixed, mesic family of Typic Torrifuvents. It consists of deep, somewhat poorly drained soils formed from stream alluvium on low terraces. Slopes are nearly level to gently sloping.

In a representative profile, the surface horizon is a dusky red sandy clay loam about 2 inches thick. Below this is a dusky red sandy clay loam about 6 inches thick. Below this the substratum is stratified loamy sand, sandy loam, sandy clay loam, or clay and is several feet thick. Colors vary from weak red to reddish brown.

A representative profile of Taxonomic unit 3 sandy clay loam is located at site B as shown on Photo 2-2. (Colors are for dry soil unless otherwise noted.)

A11--0 to 2 inches, weak red (10R 4/2) sandy clay loam, dusky red (10R 3/2) moist; moderate very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine interstitial pores; abrupt wavy boundary.

A12--2 to 13 inches, weak red (10R 4/3) sandy clay loam, dusky red (10R 3/2) moist; strong fine and moderate subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine interstitial and tubular pores; abrupt wavy boundary.

C----13 to 17 inches, weak red (10R 4/3) sandy loam, weak red (10R 4/3) moist; massive; so, very friable, non-sticky and nonplastic; few very fine and fine roots;

common very fine and fine interstitial pores; abrupt wavy boundary.

C2---17 to 26 inches, weak red (10R 4/3) clay, weak red (10R 4/3) moist; massive; hard, friable, sticky and plastic; no roots; few very fine and fine interstitial and tubular pores; clear wavy boundary.

C3---26 to 60 inches, highly stratified loamy sand, sandy loam and sandy clay loam; massive; few very fine roots; few very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. The surface horizons have values of 3 or 4 dry and 3 or 4 moist. Chromas are 2 or 3. Textures in this horizon are sandy clay loam or sandy clay. The C stratified subsurface horizons have values of 4, 5, or 6 dry and 4 or 5 moist. Chromas range from 2 or 3. Hue ranges from 10R to 5YR. The horizons range in texture from coarse loamy sandy to sandy loam, sandy clay loam, or clay. The profile is calcareous throughout. This soil is somewhat poorly-drained due to a water table at 40 to 60 inches.

Mapping Unit:

3 TAXONOMIC UNIT 3 SANDY CLAY LOAM, 0 to 3 PERCENT SLOPES

This map unit is that soil described as the 3 Taxonomic unit. This map unit occurs on nearly level to level low terraces. The soil has moderate permeability and runoff is slow. The available water holding capacity is 8 to 10 inches and effective rooting depth is 60 inches. Erosion hazard is slight and the soils are susceptible to seasonal flooding.

4 TAXONOMIC UNIT

The 4 Taxonomic unit is a member of the coarse-loamy, mixed, mesic family of Typic Torrifluvents. It consists of deep, somewhat poorly-drained soils formed from stream alluvium on low terraces with nearly level to gentle slopes.

In a representative profile, the surface horizon is a reddish brown clay about 3 inches thick. Below this is a dark reddish brown clay about 10 inches thick. Below this the substratum is stratified loamy sand, sandy loam or sandy clay loam and is several feet thick. Colors of the substratum are variable, but are mainly reddish brown or dark reddish brown.

A representative profile of Taxonomic unit 4 is located at site C as shown on Photo 1-2. (Colors are for dry soil unless otherwise noted.)

A1---0 to 3 inches, reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) moist; strong fine and medium subangular structure; very hard, firm, sticky and plastic; many very fine and fine roots; common very fine, fine, and medium interstitial pores; clear wavy boundary.

C1---3 to 13 inches, reddish brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; massive parting to strong fine, medium, and coarse angular blocks; very hard, firm, sticky and plastic; common very fine and fine roots; common very fine and fine interstitial pores; abrupt wavy boundary.

C2---13 to 30 inches, light reddish brown (5YR 6/3) sandy loam, reddish brown (5YR 4/3) moist; massive, soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine interstitial pores; clear wavy boundary.

C3---30 to 60 inches, highly stratified loamy sand and sandy loam, reddish brown (5YR 4/3) dry; massive; no roots; few very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. The surface horizon has values of 4 or 5 dry and 3 or 4 moist. Chromas range from 3 to 4. This horizon ranges from loamy sand to clay in texture. The horizon below this has values of 4 or 5 dry and 3 or 4 moist. Chromas range from 3 to 4. This horizon ranges from sandy clay loam to clay in texture. Below this, the stratified horizons have values of 4, 5, or 6 dry and 3, 4, or 5 moist. Chromas are 3 or 4. These horizons range from loamy sand, sandy loam, or sandy clay loam in textures. The profile is calcareous throughout. This soil is somewhat poorly-drained due to a water table at 40 to 60 inches.

Mapping Units:

4A TAXONOMIC UNIT 4 CLAY, 0 to 3 PERCENT SLOPES

This map unit is that soil described as the 4 Taxonomic unit. This map unit occurs on nearly level to gently sloping low terraces. The soil has moderate permeability and runoff is slow. The available water holding capacity is 7 to 9 inches and effective rooting depth is 30 inches. Erosion hazard is slight and the soils are susceptible to seasonal flooding.

4B TAXONOMIC UNIT 4 COMPLEX, 0 to 3 PERCENT SLOPES

This map unit is similar to that soil described as the 4 Taxonomic unit except that the surface has small areas of loose loamy sand and sandy loam texture materials which have been recently deposited. Susceptible to seasonal flooding.

5 TAXONOMIC UNIT

Taxonomic unit 5 is a member of the fine-loamy, mixed, mesic family of Typic Torriorthents. It consists of deep, well-drained soils that have formed from alluvium. They occur on gently sloping to sloping upland.

In a representative profile, the surface horizon is a weak red sandy clay loam about 6 inches thick. The subsoil is weak red clay about 16 inches thick. Below this, the substratum is reddish brown sandy clay and sandy clay loam several feet thick.

A representative profile of 5 Taxonomic unit sandy clay loam is located at site D as shown on Photo 2-3. (Colors are for dry soil unless otherwise noted.)

A1--0 to 6 inches, weak red (2.5YR 4/2) sandy clay loam, weak red (2.5YR 5/2) moist; strong very fine and fine sub-angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; abrupt wavy boundary.

CA--6 to 22 inches, weak red (2.5YR 4/2) clay, weak red (2.5YR 5/2) moist; massive parting to strong very fine and fine angular blocks; hard, firm, sticky and plastic; few very fine and fine roots; few very fine and fine interstitial and tubular pores; abrupt clear boundary.

C1ca--22 to 32 inches, reddish brown (2.5YR 4/4) sandy clay loam, reddish brown (5YR 4/3) moist; massive parting to strong fine and medium subangular blocks; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine interstitial and tubular pores; abrupt wavy boundary.

C2ca--32 to 60 inches, reddish brown (2.5YR 5/4) sandy clay loam, reddish brown (5YR 4/3) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. The surface horizon has values of 4 or 5 dry and 4 or 5 moist. Chroma are 2 or 3. Texture ranges from sandy clay loam to clay. Below this, the horizon has values of 4 or 5 dry and 4 or 5 moist. Chromas range from 2 to 3. The horizon ranges in texture from sandy clay loam to sandy clay or clay. The horizon below this has values of 4 or 5 dry and 4 or 5 moist. Chromas range from 3 to 4. The horizons range in texture from sandy clay loam to sandy clay or clay. The profile is calcareous throughout.

Mapping Unit:

5 Taxonomic Unit 5, sandy clay loam, 3 to 7 percent slopes

This map unit is that soil described as the 5 Taxonomic unit. This map unit occurs on gently sloping to sloping upland. The soil has moderately slop permeability and runoff is medium. The available water holding capacity is 6 to 7 inches. Erosion hazard is moderate.

6 TAXONOMIC UNIT

Taxonomic unit 6 is a member of the fine clayey, mixed, mesic family of Typic Torrifluvents. The unit consists of deep, well-drained soils that have derived from an old stream alluvium and colluvium with gentle to moderate slopes.

In a representative profile, the surface layer is dark reddish brown sandy clay loam about 5 inches thick. The subsurface horizons are reddish brown sandy loam or sandy clay loam stratified, several feet thick.

A representative profile of Taxonomic unit 6 sandy clay loam is located at site E on Photo 1-3. (Colors are for dry soil unless otherwise noted.)

A11--0 to 1 inches, reddish brown (2.5YR 5/4) sandy, clay loam, dark reddish brown (2.5YR 3/4) moist; moderate very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; abrupt smooth boundary.

A12--1 to 5 inches, reddish brown (2.5YR 5/4) sandy clay loam, reddish brown (2.5YR 4/4) moist; strong fine and medium subangular blocky structure; hard friable, sticky and plastic; common very fine roots; common very fine interstitial pores; clear wavy boundary.

C1--5 to 12 inches, reddish brown (2.5YR 4/4) sandy loam, reddish brown (2.5YR 4/4) moist; massive; loose, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine interstitial pores; abrupt smooth boundary.

C2--12 to 41 inches, reddish brown (2.5YR 4/4) clay loam, reddish brown (2.5YR 4/4) moist; massive; hard, friable, sticky and plastic; common very fine roots; common very fine and fine interstitial and tubular pores; clear wavy boundary.

C3--41 to 60 inches, reddish brown (2.5YR 4/4) sandy loam, reddish brown (2.5YR 4/4) moist; massive; loose, very friable, slightly sticky and slightly plastic; no roots; few very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. Coarse fragments of gravels average 5 to 10 percent, by volume, throughout the profile and 5 to 15 percent of the soil surface. The A horizon has values of 4 or 5 dry and 3 or 4 moist. Chromas are 2 or 4. Texture of horizon is sandy loam or sandy clay loam, excluding coarse fragments. The C stratified subsurface layers have values of 4 or 5 dry and 3 or 4 moist. Chromas 2 or 4. Textures of these horizons are sandy loam, sandy clay loam, or clay loam. The entire profile is calcareous.

Mapping Unit:

6 Taxonomic Unit 6, sandy clay loam, 3 to 8 percent slopes

This map unit is that soil described as the 8 Taxonomic unit. This map unit occurs on gently sloping to sloping hill sideslopes and toeslopes. About 10 percent of the soil surface is occupied by gravels. The soil has a moderately slow permeability and runoff is medium. The available water holding capacity is 6 to 7 inches and effective rooting depth is 41 inches. Erosion hazard is slight.

7 TAXONOMIC UNIT

The Taxonomic unit 7 is a member of the coarse loamy, mixed, mesic family of Typic Torrifluvents. The unit consists of deep, well-drained soils that have formed from old stream alluvium on an up-land terrace with gentle slopes.

In a representative profile, the surface layer is reddish brown sandy clay loam about 4 inches thick. The subsurface layers are reddish brown or dark reddish brown sandy loam or sandy clay loam stratified.

A representative profile of 7 Taxonomic unit sandy clay loam is located at site F on Photo 1-3. (Colors are for dry soil unless otherwise noted.)

A1p--0 to 4 inches, reddish brown (2.5YR 5/4) sandy clay loam, reddish brown (2.5YR 4/4) moist; common very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; abrupt smooth boundary.

C1---4-14 inches, reddish brown (2.5YR 4/4) sandy loam, dark reddish brown (2.5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine interstitial and tubular pores; clear wavy boundary.

C2---14 to 44 inches, reddish brown (2.5YR 5/4) gravelly sandy loam, reddish brown (2.5YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common very fine and fine interstitial pores; clear smooth boundary.

C3---44 to 60 inches, reddish brown (2.5YR 5/4) sandy loam, reddish brown (2.5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; no roots; few very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. Coarse fragments of gravel or cobble average 10 to 35 percent, by volume, throughout the profile and 1 to 5 percent of the soil surface. The Ap horizon has values of 4 or 5 dry and 3 or 4 moist. Chromas are 2 or 4. Texture of this horizon is sandy loam or sandy clay loam, excluding coarse fragments. The C stratified subsurface layers have hues of 2.5YR or 5YR, with values of 4 or 5 dry and 3 or 4 moist. Chromas are 2 or 4. Texture, excluding coarse fragments, of these horizons is coarse sandy loam, sandy loam, or sandy clay loam. The entire profile is calcareous.

Mapping Unit:

7 TAXONOMIC UNIT 7, SANDY CLAY LOAM, 1 to 4 PERCENT SLOPES

This map unit is that soil described as the 7 Taxonomic unit. This map unit occurs on nearly level to gently sloping upland terraces. The soil has a moderately rapid permeability and runoff is slow. The available water holding capacity is 5 to 7 inches and the effective rooting depth is 44 inches. Erosion hazard is slight.

8 TAXONOMIC UNIT

Taxonomic unit 8 is a member of the fine-loamy, mixed, mesic family of Typic Torrifluvents. It consists of deep, well-drained soils formed from old stream alluvium on an upland terrace with nearly level to gentle slopes. This taxonomic unit makes up the largest soil unit in the survey area.

In a representative profile, the surface layer is a dark reddish brown sandy clay loam about 14 inches thick. The subsoil is stratified sandy loam and sandy clay loam and is several feet thick. Colors of the subsoil are variable, but are mainly reddish brown and dark reddish brown.

A representative profile of Taxonomic unit 8 clay loam is located at site G on Photo 1-3. (Colors are for dry soil unless otherwise noted.)

A11p--0 to 2 inches, reddish brown (2.5YR 4/4) clay loam, dark reddish brown (2.5YR 3/4) moist; moderate very fine granular structure; slightly hard, very friable, sticky and plastic; few very fine roots; many very fine and fine interstitial pores; abrupt smooth boundary.

A12p--2 to 14 inches, reddish brown (2.5YR 4/4) sandy clay loam, dark reddish brown (2.5YR 5/3) moist; massive parting into strong fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; few very fine interstitial and tubular pores; clear wavy boundary.

C1----14 to 17 inches, reddish brown (5YR 5/3) sandy loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few very fine interstitial pores; clear wavy boundary.

C2----17 to 21 inches, reddish brown (2.5YR 4/4) clay loam, reddish brown (2.5YR 4/4) moist; massive; hard, friable, sticky and plastic; few very fine roots; few very fine interstitial pores; abrupt wavy boundary.

C3----21 to 30 inches, light brown (7.5YR 6/4) sandy loam, reddish brown (5YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; clear wavy boundary.

C4----30 to 44 inches, reddish brown (2.5YR 4/4) sandy clay loam, dark reddish brown (2.5YR 4/3) moist; massive; slightly plastic; no roots; few very fine interstitial pores; clear wavy boundary.

C5----44 to 60 inches, reddish brown (2.5YR 4/4) sandy clay loam, dark reddish brown (2.5YR 3/4) moist; massive; hard, friable, sticky and plastic; no roots; few very fine interstitial pores;

Depth to bedrock is greater than 60 inches. The Ap horizons have value of 4 or 5 when dry and 3 or 4 when moist. Chroma range from 2 to 4. This horizon ranges from sandy loam to sandy clay loam or clay loam in texture. The C stratified subsurface horizons has values of 4, 5, or 6 when dry and 3 or 4 moist. Chromas ranges from 2 to 4. The horizons range in texture from coarse sandy loam, sandy loam, sandy clay loam, or clay loam. The entire profile is calcareous.

Mapping Units:

8A TAXONOMIC UNIT 8, CLAY LOAM, 1 to 4 PERCENT SLOPES

This map unit is that soil described as the 8 Taxonomic unit. This map unit occurs on nearly level to gently sloping upland terrace. The soil has moderate permeability and runoff is slow. The available water holding capacity

is 5 to 7 inches and effective rooting depth is 60 inches. Erosion hazard is slight.

Included in this map unit are soils similar to Taxonomic unit 8 except that the soil texture between 10 to 40 inches is generally sandy loam.

8B TAXONOMIC UNIT 8, SANDY LOAM, 1 to 4 PERCENT SLOPES

This map unit is similar to that soil described as the 8 Taxonomic unit except that the surface texture is sandy loam. This mapping unit occurs on nearly level to gently sloping upland terraces. The soil has moderate permeability and runoff is slow. The available water holding capacity is 5 to 7 inches and effective rooting depth is 60 inches. Erosion hazard is slight.

8C TAXONOMIC UNIT 8, SANDY LOAM, 3 to 8 PERCENT SLOPES.

This map unit is similar to 8B except that the soil surface texture is sandy loam and is not used as agriculture crop land. The surface has not been leveled, consequently the surface topography is undulating with slopes of 3 to 8 percent. Erosion hazard is moderate.

9 TAXONOMIC UNIT

Taxonomic unit 9 is a member of the loamy-skeletal, mixed (calcareous), mesic family of Typic Torriorthents. This unit consists of deep, well-drained soils that have formed from old gravelly alluvium. They formed on an upland terrace with gentle to moderate slopes.

In a representative profile, the surface layer is dark reddish brown gravelly sandy clay loam about 3 inches thick. The subsoil is dark reddish brown, very gravelly sandy clay loam several feet thick. The coarse fragments have carbonate accumulations throughout the profile.

Representative profile of Taxonomic unit 9 sandy clay loam is located at site H on Photo 2-3. (Colors are for dry soil unless otherwise noted.)

A1ca--0 to 3 inches, reddish brown (2.5YR 4/4) gravelly sandy clay loam, dark reddish brown (2.5YR 3/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine interstitial pores; clear wavy boundary.

C1ca--3 to 60 inches, reddish brown (2.5YR 4/4) very gravelly sandy clay loam, dark reddish brown (2.5YR 3/4) moist; massive and single grain; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores.

Depth to bedrock is greater than 60 inches. Coarse fragment content ranges from 75 to 90 percent throughout the soil profile and 10 to 30 percent of the soil surface. Coarse fragments are usually gravels but includes some cobbles. The A horizon has values of 4 or 5 dry and 3 or 4 moist. Chroma are 2 or 4. Texture of this horizon is sandy loam or sandy clay loam, excluding coarse fragments. The C horizon has

values of 4 or 5 dry and 3 or 4 moist. Chroma are 2 or 4. Texture of this horizon is sandy loam or sandy clay loam, excluding coarse fragments.

Mapping Unit:

9 Taxonomic Unit 9, gravelly sandy clay loam, 3 to 7 percent slopes

This map unit is that soil described as the 9 Taxonomic unit. This map unit occurs on gently sloping to sloping upland terrace. The soil has moderately rapid permeability and runoff is medium. The available water holding capacity is 4 to 6 inches and effective rooting depth is 60 inches. Erosion hazard is slight.

10 TAXONOMIC UNIT

Taxonomic unit 10 is a member of the fine clayey, mixed, mesic family of Typic Torrifluvents. It consists of deep, moderately well-drained soils formed from old stream alluvium on an upland terrace with nearly level to gentle slopes.

In a representative profile, the surface horizon is a dark reddish brown sandy loam about 10 inches thick. The subsoil is about 10 inches thick, and is reddish brown gravelly sandy clay loam. The substratum is reddish brown to pinkish gray clay several feet thick, grading into weather shale.

A representative profile of Taxonomic unit 10 sandy loam is located at site I on Photo 2-3. (Colors are for dry soil unless otherwise noted.)

A1p---0 to 10 inches, reddish brown (5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) moist; massive parting to strong fine and medium subangular blocky structure; common very fine and fine roots; common very fine and fine interstitial and tubular pores; abrupt wavy boundary.

A12---10 to 20 inches, light reddish brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 5/4) moist; massive parting to moderate very fine and fine subangular structure; common very fine and fine roots; common very fine and fine interstitial and tubular pores; clear wavy boundary.

C1---20 to 30 inches, pink (5YR 7/4) clay, light reddish brown (5YR 6/4) moist; massive with many slickensides; very hard, firm, sticky and plastic; no roots; common very fine and fine interstitial pores; clear wavy boundary.

C2----30 to 45 inches, pinkish gray (5YR 7/2) clay, pinkish gray (5YR 6/2) moist; massive with many slickensides more strongly developed than in overlying horizon; no roots; many very fine and fine interstitial pores; clear wavy boundary.

Cr----45 to 53 inches, weathered shale-like material, light gray (5YR 7/1) heavy sandy clay loam, light gray (5YR 6/1) moist; massive; no roots; common very fine and fine interstitial pores.

Depth to bedrock is greater than 60 inches. The A horizons have value of 4, 5, or 6 dry and 3, 4 or 5 moist. Chromas are 3 to 4. The horizons range from sandy loam to sandy clay loam or gravelly sandy clay loam. The C1 horizon has values of 6 or 7 dry and 5 or 6 moist. Chromas are 3 or 4. This horizon ranges from heavy clay loam to clay. The C2 horizon has values of 6 or 7 dry and 5 or 6 moist. Chromas are 2 or 3. The horizon ranges from heavy clay loam to clay. The bedrock is moderately weathered for several inches below the substratum. The profile is calcareous throughout.

Mapping Units:

10 TAXONOMIC UNIT 10, SANDY LOAM, 1 to 4 PERCENT SLOPES

This map unit is that soil described as the 10 Taxonomic unit. This map unit occurs on nearly level to gently sloping upland terraces. The soil has slow permeability and runoff is slow. The available water holding capacity is 5 to 6 inches and effective rooting depth is 60 inches. Erosion hazard is slight.

INTERPRETATIONS

Interpretations were made for various uses of the soils. These interpretations were made in accordance with standard criteria as provided in "Guide for Interpreting Engineering Uses of Soils," USDA-Soil Conservation Service, 1971. These interpretations are shown in the following interpretative forms by taxonomic unit. Most of the interpretations are estimates that are based on the physical and chemical characteristics.

INTERPRETATIONS FOR TAXONOMIC UNIT 1

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
	sandy river wash															
DEPTH TO BEDROCK OR HARDPAN: > 5' FLOOD HAZARD: Severe																
DEPTH TO SEASONAL HIGH WATERTABLE may be less than 5' HYDROLOGIC GROUP																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Poor	GRAVEL: Deposits may be localized
SAND: Fair	ROADFILL: Good

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Severe - flood hazard	SEPTIC TANK FILTER FIELDS: Severe - flood hazard
SHALLOW EXCAVATIONS: Severe - Sides will sluff	SEWAGE LAGOONS: Severe - flood hazard
DWELLINGS: <u>3/</u> Severe- flood hazard	LIGHT BUILDINGS: <u>3/</u> Severe - flood hazard

1/ Suitability ratings are good, fair, and poor.

2/ Limitation ratings are slight, moderate, and severe.

3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 2

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHTO		4	10	40	200								
0-36	c	CH	A-7		100	100	90-100	75-95			.06-.2	.14-.16			high	mod
36+	shaly material															
DEPTH TO BEDROCK OR HARDPAN: Shaly material at 36" FLOOD HAZARD: Slight DEPTH TO SEASONAL HIGH WATERTABLE > 5' HYDROLOGIC GROUP D																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair to poor	GRAVEL: Poor
SAND: Poor	ROADFILL: Poor

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Poor	SEPTIC TANK FILTER FIELDS: Severe - slow permeability
SHALLOW EXCAVATIONS: Moderate - somewhat hard material at 36"	SEWAGE LAGOONS: Severe - slope
DWELLINGS: 3/ Severe - high shrink-swell	LIGHT BUILDINGS: 3/ Severe

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 3

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ---				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
	Profile is highly stratified with clayey and sandy materials															
DEPTH TO BEDROCK OR HARDPAN:		> 5'			FLOOD HAZARD: Severe											
DEPTH TO SEASONAL HIGH WATERTABLE		40 - 60"			HYDROLOGIC GROUP A or B											

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Fair

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Mod to severe - flood hazard	SEPTIC TANK FILTER FIELDS: Severe - flood hazard, high water table
SHALLOW EXCAVATIONS: Mod to severe - flood hazard, high water table	SEWAGE LAGOONS: Severe - flood hazard, high water table
DWELLINGS: 3/ Severe - Flood hazard, high water table	LIGHT BUILDINGS: 3/ Severe - flood hazard, high water table

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 4

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0-13	c	CH	A-7		100	100	90-100	75-95			.06-.2	.14-.16			high	mod
13-60	sl and ls	SM	A-2		100	100	50-75	15-40			2-20	.06-.13			low	mod
DEPTH TO BEDROCK OR HARDPAN: >5' DEPTH TO SEASONAL HIGH WATERTABLE 40-60"																
FLOOD HAZARD: Severe HYDROLOGIC GROUP B																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Good below clayey surface

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Mod to severe - flood hazard	SEPTIC TANK FILTER FIELDS: Severe - flood hazard, high water table
SHALLOW EXCAVATIONS: Mod to severe - flood hazard, high water table	SEWAGE LAGOONS: Severe - flood hazard, high water table
DWELLINGS: 3/ Severe - flood hazard, high water table	LIGHT BUILDINGS: 3/ Severe - flood hazard, high water table

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 5

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ---				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in/in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0- 6	sc1 (h)	CL	A-6		100	100	80-90	35-55			.6-2	.14-.16			mod	mod
6-32	c	CH	A-7		100	100	90-100	75-95			.06-.2	.14-.16			high	mod
32-60	sc1	CL	A-6		100	100	80-90	35-55			.6-2	.14-.16			mod	mod
DEPTH TO BEDROCK OR HARDPAN: > 5'																
FLOOD HAZARD: Slight																
DEPTH TO SEASONAL HIGH WATERTABLE > 5'																
HYDROLOGIC GROUP B																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Fair to Poor

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Moderate to severe	SEPTIC TANK FILTER FIELDS: Moderate to severe
SHALLOW EXCAVATIONS: Slight	SEWAGE LAGOONS: Slight where slope is 2 percent moderate where slope is 2-6 percent
DWELLINGS: 3/ Severe - high shrink-swell	LIGHT BUILDINGS: 3/ Severe - high shrink-swell

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 6

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in/in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHTO		4	10	40	200								
0- 5	Sc1	SCL	A-6		100	100	80-90	35-55			.6-2	.14-.16			low-mod	high
5-12	sl	SM	A-2		100	100	60-70	30-40			2-6	.11-.13			low	high
12-41	cl	CL	A-6		100	100	90-100	70-80			.2-.6	.19-.21			mod	high
41-60	sl	SM	A-2		100	100	60-70	30-40			2-6	.11-.13			low-mod	high
DEPTH TO BEDROCK OR HARDPAN: > 5'																
FLOOD HAZARD: Slight																
DEPTH TO SEASONAL HIGH WATERTABLE > 5'																
HYDROLOGIC GROUP A or B																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Fair

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Moderate	SEPTIC TANK FILTER FIELDS: Moderate
SHALLOW EXCAVATIONS: Slight	SEWAGE LAGOONS: Slight if bottom is in CL material
DWELLINGS: 3/ Slight to moderate	LIGHT BUILDINGS: 3/ Slight to moderate

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 7

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEA-BILITY (in./hr)	AVAILABLE WATER CAPACITY (in/in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0- 4	sc1	S-C	A-6		100	100	80-90	35-55			.6-2	.14-.16			low-mod	mod
4-14	s1	SM	A-2		100	100	60-70	30-40			2-6	.11-.13			low	high
14-44	gs1	SM	A-2	10	100	100	60-70	30-40			2-6	.08-.1			low	high
44-60	s1	SM	A-2		100	100	60-70	30-40			2-6	.11-.13			low	high
DEPTH TO BEDROCK OR HARDPAN: > 5'																
FLOOD HAZARD: Slight																
DEPTH TO SEASONAL HIGH WATERTABLE >5'																
HYDROLOGIC GROUP A or B																

1/

SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Good to fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Good to fair

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Slight to moderate	SEPTIC TANK FILTER FIELDS: Slight
SHALLOW EXCAVATIONS: Slight	SEWAGE LAGOONS: Moderate
DWELLINGS: 1/ Slight	LIGHT BUILDINGS: 1/ Slight

1/ Suitability ratings are good, fair, and poor.

2/ Limitation ratings are slight, moderate, and severe.

3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 8

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ---				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in/in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0-60*	Stratified sl, scl, cl	SC	A-6		100	100	80-90	35-55			.6-2	.14-.16			low to mod	mod
DEPTH TO BEDROCK OR HARDPAN: >5' DEPTH TO SEASONAL HIGH WATERTABLE: >5'																
FLOOD HAZARD: slight HYDROLOGIC GROUP: A or B																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair	GRAVEL: Poor
SAND: Poor	ROADFILL: Good to fair

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Slight to moderate	SEPTIC TANK FILTER FIELDS: Slight
SHALLOW EXCAVATIONS: Slight	SEWAGE LAGOONS: Moderate
DWELLINGS: <u>3/</u> Slight	LIGHT BUILDINGS: <u>3/</u> Slight

*Because this soil is so stratified, interpretations for individual horizons have not been made. Interpretations are based on the average profile texture which is sandy clay loam.

1/ Suitability ratings are good, fair, and poor.
2/ Limitation ratings are slight, moderate, and severe.
3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 9

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ----				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0- 3	gsc1	GC or SC	A-4	5	75						2-6	.11-.13			low	mod
3-60	vgsc1	GM	A-2	10	25						6-20	.05-.07			low	low
DEPTH TO BEDROCK OR HARDPAN: >5' DEPTH TO SEASONAL HIGH WATERTABLE > 5'																
FLOOD HAZARD: Slight HYDROLOGIC GROUP B																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Poor	GRAVEL: Fair to poor
SAND: Poor	ROADFILL: Good

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Slight	SEPTIC TANK FILTER FIELDS: Slight
SHALLOW EXCAVATIONS: Moderate to severe - sides may cave	SEWAGE LAGOONS: Severe
DWELLINGS: 3/ Slight	LIGHT BUILDINGS: 3/ Slight

- 1/ Suitability ratings are good, fair, and poor.
 2/ Limitation ratings are slight, moderate, and severe.
 3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

INTERPRETATIONS FOR TAXONOMIC UNIT 10

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

MAJOR SOIL HORIZONS (INCHES)	CLASSIFICATION			COARSE FRACT. > 3 IN. %	PERCENTAGE LESS THAN 3 INCHES PASSING SIEVE NO. ---				LL	PI	PERMEABILITY (in./hr)	AVAILABLE WATER CAPACITY (in./in)	SOIL REACTION (pH)	SALINITY (EC x 10 ³ @25°C)	SHRINK-SWELL POTENTIAL	POTENTIAL FROST ACTION
	USDA TEXTURE	UNIFIED	AASHO		4	10	40	200								
0-10	sl	SM	A-2		100	100	60-70	30-40			2 - 6	.11-.13			low	mod
10-20	gsc1	SC	A-6								.6-2	.12-.14			low-mod	mod
20-45	clay	CH	A-7		100	100	90-100	75-95			.06-.2	.14-.16			high	mod
45-53	shaly material															
DEPTH TO BEDROCK OR HARDPAN: 45" to shaly material																
FLOOD HAZARD: Slight																
DEPTH TO SEASONAL HIGH WATERTABLE > 5'																
HYDROLOGIC GROUP A																

1/ SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

TOPSOIL: Fair to poor	GRAVEL: Poor
SAND: Poor	ROADFILL: Poor

2/ DEGREE OF LIMITATION AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

LOCAL ROADS AND STREETS: Fair	SEPTIC TANK FILTER FIELDS: Severe
SHALLOW EXCAVATIONS: Moderate	SEWAGE LAGOONS: Slight
DWELLINGS: 3/ Severe - high shrink-swell	LIGHT BUILDINGS: 3/ Severe - high shrink-swell

1/ Suitability ratings are good, fair, and poor.

2/ Limitation ratings are slight, moderate, and severe.

3/ Interpretation refers to inherent soil characteristics. Disturbance of soil or improper compaction may alter foundation supporting characteristics of soil.

DISCUSSION AND RECOMMENDATIONS

Most of the soils inventoried at Hubbell Trading Post that were cultivated in the past are well suited for irrigated agriculture. Most soils outside the area of past cultivation are poorly suited for irrigated agriculture. Most of the soils that were used for cropland would classify as class I or class II land when irrigated.

It is recommended that the Hubbell Trading Post (National Park Service) enter into a cooperative agreement with the nearest Soil and Water Resource Conservation District. This will make available USDA Soil Conservation Service (SCS) technical people for the development of a conservation farm plan. The SCS may furnish assistance in the redesign of the irrigation system, cropping system, and soil conservation measures. If this assistance is not available through the SCS, then a private consultant could be retained to develop conservation, irrigation and agronomic standards and specifications.

The area mapped as map unit 2 in the northwest part of the property is somewhat fragile due to the high clay contents and slope. This area has accelerated soil erosion in progress. This area should be fenced as soon as practical to exclude livestock grazing. Off-road vehicle traffic in this area should be prohibited and foot traffic should be kept at a minimum.

The area along the river mapped as 8C should also be protected from grazing and surface traffic where possible. Care should be exercised in not allowing any tail water from the cropland to flow across this area.

Streambank erosion is a problem at certain points along the Pueblo Colorado River. These areas should be stabilized where possible with wire-and-rock or wire-and-brush structures. Here again, the SCS may be able to provide valuable assistance in this regard.

IDENTIFICATION LEGEND

Map Number	Mapping Unit	Page
1	Riverwash-----	
2	Taxonomic Unit 2 clay, 10 to 35 percent slopes-----	
3	Taxonomic Unit 3 sandy clay loam, 0 to 3 percent slopes-----	
4A	Taxonomic Unit 4 clay, 0 to 3 percent slopes-----	
4B	Taxonomic Unit 4 complex, 0 to 3 percent slopes-----	
5	Taxonomic Unit 5 sandy clay loam, 3 to 7 percent slopes-----	
6	Taxonomic Unit 6 sandy clay loam, 3 to 8 percent slopes-----	
7	Taxonomic Unit 7 sandy clay loam, 1 to 4 percent slopes-----	
8A	Taxonomic Unit 8 clay loam, 1 to 4 percent slopes-----	
8B	Taxonomic Unit 8 sandy loam, 1 to 4 percent slopes-----	
8C	Taxonomic Unit 8 sandy loam, 3 to 8 percent slopes-----	
9	Taxonomic Unit 9 gravelly sandy clay loam, 3 to 7 percent slopes-----	
10	Taxonomic Unit 10 sandy loam, 1 to 4 percent slopes-----	

Letters circled in red indicate soil type locations.



1:3000

10-10-77

W.H.M. - GRANADO

2-3

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N



1:3000

10-10-77

N.M. GANADO

2-2

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1:3000

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U.N.M. - GANADO

1-2

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8

