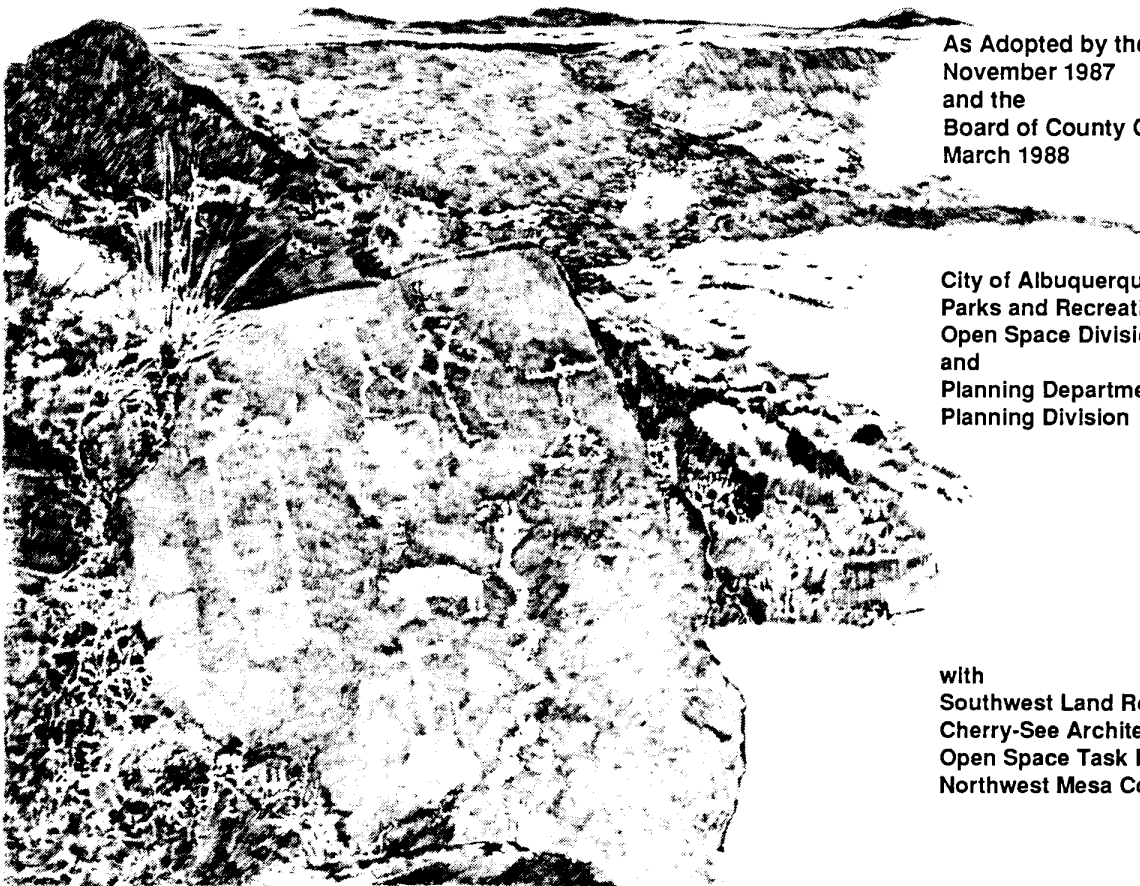


Northwest Mesa Escarpment Plan



As Adopted by the City Council
November 1987
and the
Board of County Commissioners
March 1988

City of Albuquerque
Parks and Recreation Department,
Open Space Division
and
Planning Department,
Planning Division

with
Southwest Land Research, Inc.
Cherry-See Architects
Open Space Task Force
Northwest Mesa Committee

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Gene Romo, Chief Administrative Officer
Frank Martinez, Deputy Chief Administrative Officer
Bill Mueller, Deputy Chief Administrative Officer

COUNTY OF BERNALILLO

Ron Olguin, County Manager

OPEN SPACE ADVISORY BOARD

Cliff Anderson, Chairman
Ron Brown, Vice Chairman
Jeanne House
Aubrey Cookman
Peter Garcia

CITY of ALBUQUERQUE
EIGHTH COUNCIL

COUNCIL BILL NO. C/S R-383 ENACTMENT NO. 97-1989

SPONSORED BY: Nadyne C. Bicknell

RESOLUTION

AMENDING THE NORTHWEST MESA ESCARPMENT PLAN CONCERNING BOUNDARIES OF THE CONSERVATION AREAS, AND ALLOWABLE BUILDING HEIGHTS.

WHEREAS, the boundaries of the Conservation and Impact Areas are in part based on the boundaries of public open space along the escarpment; and

WHEREAS, the City of Albuquerque is acquiring additional public open space within the Paradise Bluff Subdivision, creating a need to adjust boundaries of the Conservation and Impact Areas; and

WHEREAS, the acquisition of this additional open space area, combined with topographic conditions, eliminates the need for the Northwest Mesa Escarpment Plan's special building height restrictions within a portion of the Paradise Bluff Subdivision.

BE IT RESOLVED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF ALBUQUERQUE:

Section 1. The boundaries of the Northwest Mesa Escarpment Plan boundaries of the Conservation Area and Impact Area, within the Paradise Bluff Subdivision, shall be amended as shown on Exhibit 1.

Section 2. A height variance be granted to eliminate the special building height restrictions within the Impact Area of the Northwest Mesa Escarpment Plan for a portion of the Impact Area within the Paradise Bluff Subdivision, as shown on Exhibit 2.

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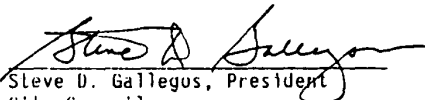
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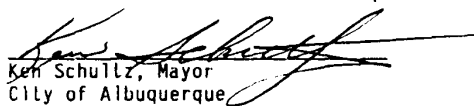
PASSED AND ADOPTED THIS 19th DAY OF JUNE, 1989.


BY A VOTE OF 8 FOR AND 0 AGAINST.

Yes: 8
Excused: Chapman


Steve D. Gallegos, President
City Council

APPROVED THIS 28th DAY OF June, 1989.


Ken Schultz, Mayor
City of Albuquerque

ATTEST:

City Clerk

6

- EXISTING CONSERVATION EASE
- PROPOSED CONSERVATION EASE
- EXISTING IMPACT EASE
- PROPOSED IMPACT EASE

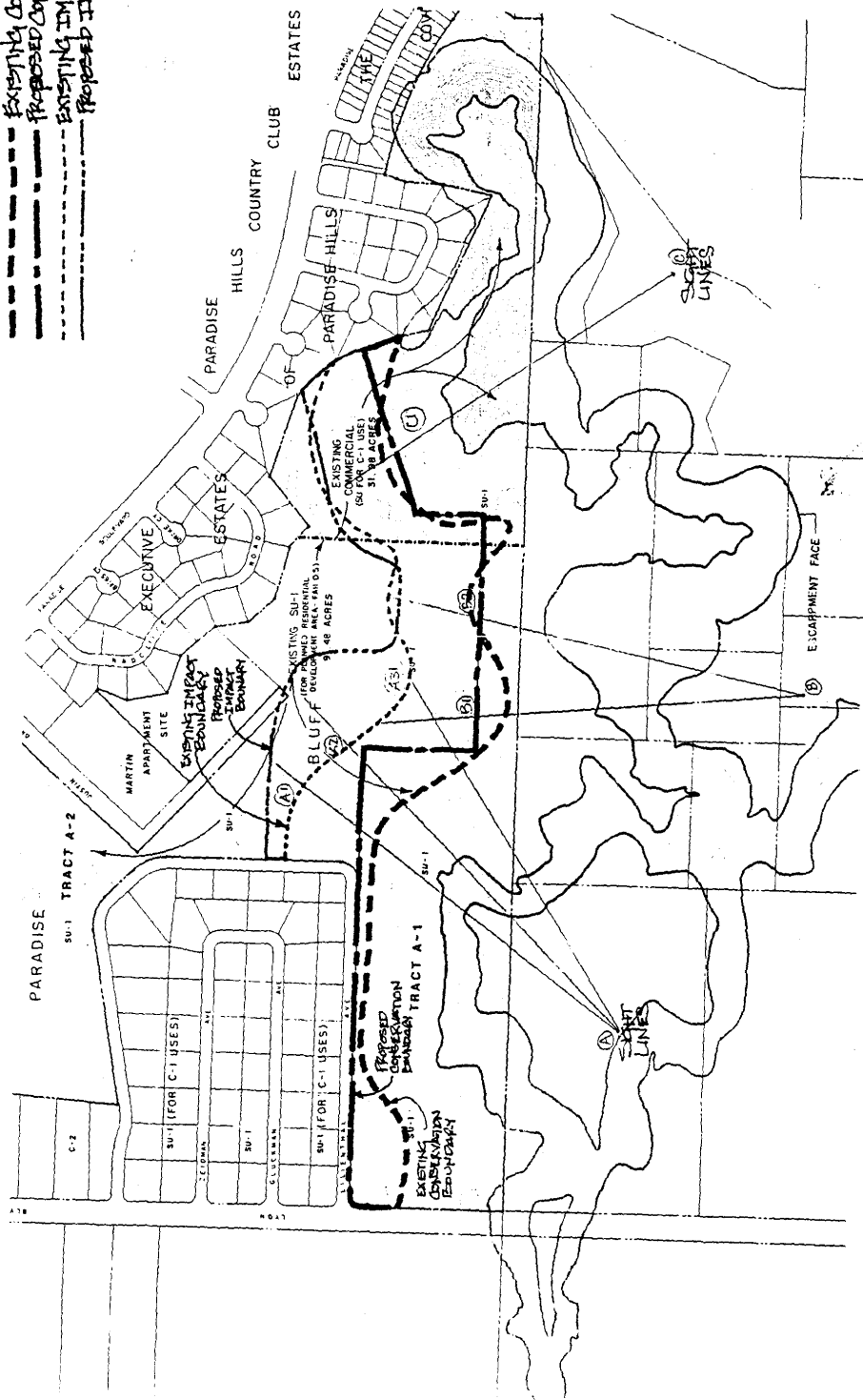

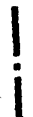
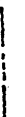


EXHIBIT # 1

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-  AREA OF HEIGHT VARIANCE
-  PROPOSED CLABIFICATION BOUNDARY
-  PROPOSED IMPACT BOUNDARY

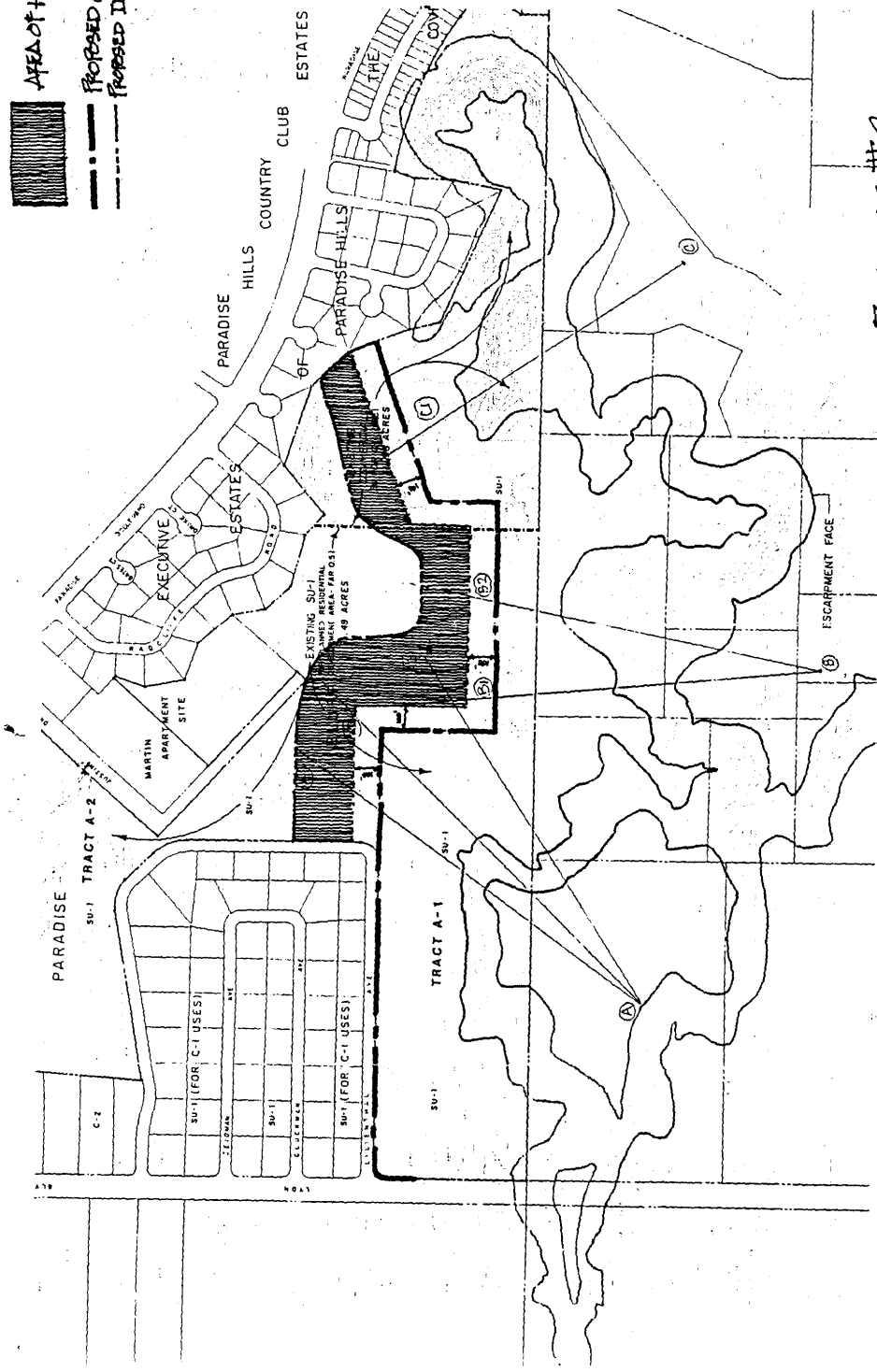


EXHIBIT #2

NORTHWEST MESA ESCARPMENT PLAN

As Adopted by the Albuquerque City Council
November 1987
And the Board of County Commissioners
March 1988

City of Albuquerque
Parks and Recreation Department, Open Space Division
and
Planning Department, Planning Division

with

Southwest Land Research, Inc.
Cherry-See, Architects
Open Space Task Force, West Mesa Committee

CITY of ALBUQUERQUE
SEVENTH COUNCIL

COUNCIL BILL NO. R-339 ENACTMENT NO. 4-1988

SPONSORED BY: Patrick J. Baca

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RESOLUTION

1
2 ADOPTING THE RANK THREE NORTHWEST MESA ESCARPMENT PLAN; AND ADOPTING
3 A DESIGN OVERLAY ZONE.

4 WHEREAS, the Albuquerque/Bernalillo County Comprehensive Plan
5 calls for preservation of the volcanoes and the volcanic escarpment
6 as a unique and significant landform; and

7 WHEREAS, the Northwest Mesa Area Plan establishes protection of
8 the nine percent slope to preserve the volcanic escarpment and
9 requires that a continuous trail system be evaluated; and

10 WHEREAS, the Open Space Advisory Board has identified the
11 volcanic escarpment as one of its first priorities for acquisition;
12 and

13 WHEREAS, an archaeological survey completed in 1986 identified
14 over 10,500 petroglyphs along the volcanic escarpment; and

15 WHEREAS, the volcanic escarpment is designated a historic
16 district on the State Register of Cultural Properties and the
17 National Register of Historic Districts; and

18 WHEREAS, the National Park Service has conducted an analysis of
19 both the cultural and the natural resources of the area and has
20 concluded that the area is of national significance; and

21 WHEREAS, the Northwest Mesa Escarpment Plan is the culmination
22 of a planning effort that included technical staff, property owners
23 and conservation groups; and

24 WHEREAS, the Environmental Planning Commission in their capacity
25 as advisory to the City Council, has held public hearings on the
26 Northwest Mesa Escarpment Plan and has recommended adoption of the

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1 plan; and

2 WHEREAS, the Northwest Mesa Escarpment Plan constitutes a Rank
3 Three plan detailing the Rank One Comprehensive Plan and the Rank
4 Two Northwest Mesa Area Plan, specifying the area to be conserved as
5 open space, design regulations for adjacent development and an
6 acquisition and management program.

7 BE IT RESOLVED BY THE COUNCIL, THE GOVERNING BODY OF THE CITY OF
8 ALBUQUERQUE:

9 Section 1. The Northwest Mesa Escarpment Plan attached as part
10 of this resolution is adopted as a Rank Three Plan for the area
11 within the planning jurisdiction of the City of Albuquerque.

12 Section 2. The Administration, in coordination with the
13 Departments of Parks and Recreation and Planning, is instructed to:

14 A. Undertake a regulation and conservation program and
15 begin phased acquisition of portions of the Conservation Area, all
16 according to the implementation program and policies described in
17 the plan.

18 B. Conduct a review of the progress made by the Federal,
19 State and City governments towards implementation of the Plan
20 twenty-four months after adoption of the Plan by City Council, and
21 recommend any necessary changes to either the boundaries or the
22 implementation program.

23 C. Develop a draft of the boundaries and design guidelines
24 necessary to establish a Historic Overlay Zone for the Conservation
25 Area described in the plan and present at the same time as the
26 twenty-four month review.

27 Section 3. The Northwest Mesa Escarpment Plan design Overlay
28 Zone, as specified in the attached plan, is hereby adopted; the zone
29 map, adopted by Article 7-14 R.O. 1974 is hereby amended to reflect
30 the boundaries shown on Figures 2 and 12 of the attached plan for
31 the area within the zoning jurisdiction of the City of Albuquerque.

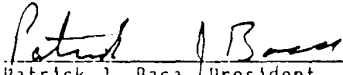
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1 PASSED AND ADOPTED THIS 30th DAY OF November,
2 1987.

3 BY A VOTE OF 8 FOR AND 0 AGAINST.
4 Yes: 8
5 Excused: Baca

6 
7 Patrick J. Baca, President
8 City Council

9
10 APPROVED THIS 5th DAY OF January, 1987.

11
12 
13 Ken Schultz, Mayor
14 City of Albuquerque

15 ATTEST:

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18 City Clerk

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BERNALILLO COUNTY

BOARD OF COUNTY COMMISSIONERS

RESOLUTION NO. 14-88

1
2 ADOPTING THE RANK THREE NORTHWEST MESA ESCARPMENT PLAN; AND ADOPTING A
3 DESIGN OVERLAY ZONE.

4 WHEREAS, the Albuquerque/Bernalillo County Comprehensive Plan calls
5 for preservation of the volcanoes and the volcanic escarpment as a unique
6 and significant landform; and

7 WHEREAS, the Northwest Mesa Area Plan establishes protection of the
8 nine percent slope zone to preserve the volcanic escarpment and requires
9 that a continuous trail system be evaluated; and

10 WHEREAS, the Open Space Advisory Board has identified the volcanic
11 escarpment as one of its first priorities for acquisition; and

12 WHEREAS, an archaeological survey completed in 1986 identified over
13 10,500 petroglyphs along the volcanic escarpment; and

14 WHEREAS, the volcanic escarpment is designated an historic district
15 on the State Register of Cultural Properties and the National Register of
16 Historic Districts; and

17 WHEREAS; the National Park Service has conducted an analysis of both
18 the cultural and the natural resources of the area and has concluded that
19 the area is of national significance; and

20 WHEREAS, the Northwest Mesa Escarpment Plan is the culmination of a
21 planning effort that included technical staff, property owners and
22 conservation groups; and,

23 WHEREAS, the County Planning Commission has held a public hearing on
24 the Northwest Mesa Escarpment Plan and has recommended adoption of the
25 plan; and,

26 WHEREAS, the Northwest Mesa Escarpment Plan constitutes a Rank Three

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1 plan detailing the Rank One Comprehensive Plan and the Rank Two Northwest
2 Area Plan, specifying the area to be conserved as open space, design
3 regulations for adjacent development and an acquisition and management
4 program.

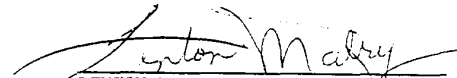

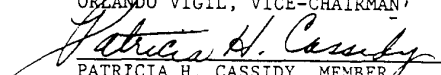
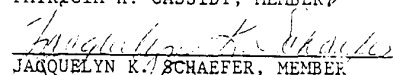
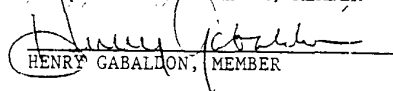
5 BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS, THE GOVERNING BODY
6 OF THE COUNTY OF BERNALILLO:

7 Section 1: The Northwest Mesa Escarpment Plan attached as part of
8 this resolution is adopted for the area within the planning jurisdiction
9 of the County of Bernalillo.

10 Section 2: The Northwest Mesa Escarpment Plan Design Overlay Zone,
11 as specified in the attached plan, is hereby adopted; The zone map is
12 hereby amended to reflect the boundaries shown on Figures 2 and 10 of the
13 attached plan.

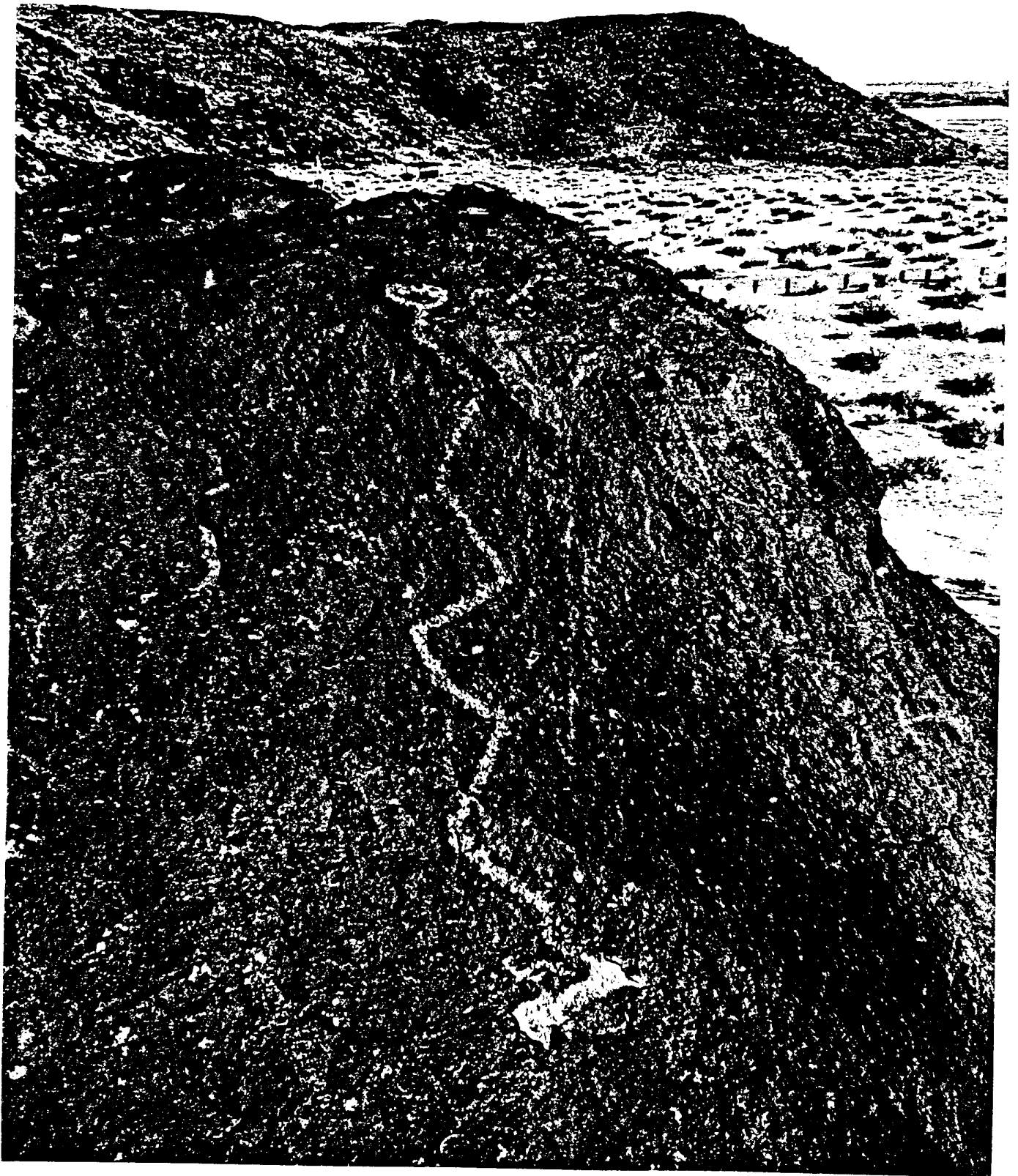
14 DONE, this 15th day of March, 1988 in Bernalillo
15 County, New Mexico.
16

17
18 BOARD OF COUNTY COMMISSION

19
20 
21 LENTON MALRY, CHAIRMAN
22 
23 ORLANDO VIGIL, VICE-CHAIRMAN
24 
25 PATRICIA H. CASSIDY, MEMBER
26 
27 JACQUELYN K. SCHAEFER, MEMBER
28 
29 HENRY GABALLON, MEMBER

30 ATTEST:

31 
32 GLADYS M. DAVIS, COUNTY CLERK
33



Steven W. Donahue, photographer

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NOTE TO THE READER

This document contains a number of policies, regulations and recommendations intended to direct land use and design decisions.

"Policies" provide a definite course or method of action selected to guide and determine present and future courses of action. Policies form the basis for more detailed "regulations", which are mandatory rules to be followed with regard to land use and design decisions. "Recommendations" describe courses of action that will receive favorable attention, and as such, are not mandatory.

For the sake of clarity, all policies, regulations and recommendations appear in this document as follows:

Policies:

POLICY #0. ALL POLICIES ARE NUMBERED, CAPITALIZED AND UNDERSCORED.

Regulations:

O-1 Detailed regulations are numbered according to the policy which they are intended to implement.

Recommendations:

- Recommendations are indented under the appropriate policy and are marked by "bullets" rather than numbers.

FOREWORD

It is a rare and wonderful occasion when a community can collectively touch a dream. Since the adoption of the 1975 Albuquerque/Bernalillo County Comprehensive Plan our community has had an official dream - the creation of an open space system which respects the spectacular land forms which surround and weave throughout our neighborhoods. The open space system envisioned in the Comprehensive Plan is a recreational system with educational opportunities which glorifies who we are and where we are. The desire of the community to understand and protect our cultural and physical heritage is replete in the concept.

Without even consciously recognizing the action, we all look to the Sandia mountains to the east and the black line of the escarpment to the west many times each day. Their presence orients us, stabilizes us and assures us that within the daily frustrations and tasks and joys we each experience there is a constancy - we are linked to our earth.

In the 1970's, the face of the Sandias was threatened by development. The individuals of the community rallied to the mountain's defense. The result is that the view to the mountain peaks and use of the wilderness are not marred by the intrusion of development.

Today people have come to the defense of the escarpment. Although policy states that it will remain unbuilt, development is pushing against its edges and the community has not yet been guaranteed its protection. Presently there is much interest in the escarpment. The City and the State have finished a study which documents thousands of petroglyphs and many archaeological sites in the area. The area is a designated historic district. The National Park Service is drafting options for a National Monument which will be presented to Congress later this year. There have been articles in the national and international press about this little black line on our horizon.

Much can be said about the rationale of the open space system as envisioned by the policy-makers. Open space is intended to define the form of the City. The proposed open space network encompasses those areas that are not suited for development because of unstable or rocky soils, excessive slopes, susceptibility to flooding, or lack of water. Development of this land, in addition to posing a threat to the public health and safety, would require substantial utility costs to develop. These open areas conserve natural resources in areas of great scenic beauty, provide open areas for recreation and satisfy a psychological need for space.

But the bottom line is what the system means to each individual in the community. The escarpment lies between the volcanoes to the west and the river and mountain to the east. It is traversed by arroyos which connect it to other important cultural sites such as the Mann site which contains the remains of a prehistoric pueblo with hundreds of rooms. It has the potential to be a major piece of an open space system that combines recreation, educa-

tion, research and economic development. It contains keys to mankind's history which are unique. It is a reminder of our past, a solace to our present and a legacy for our children.

We have often been told to make no little plans. It is wise counsel. The greatness of a community, the heart of a community, is that which is unique - that which explains its soul to the world at large. Such a gesture can not be taken without study, cost and a little risk. The dream now needs to be embraced by each of us for each of us.

EXECUTIVE SUMMARY

The 1975 Albuquerque/ Bernalillo County Comprehensive Plan adopted policies leading to the creation of an open space system based upon the physical and environmental setting of the metropolitan area. The major elements of the system include the foothills of the Sandia Mountains, the Rio Grande bosque, the arroyos and the black edge of a volcanic flow called the escarpment. Although the City and County officially recognized the importance of this last feature in the Plan, they were not the first to do so. Hundreds of thousands of years ago, prehistoric peoples left their marks on the basalt boulders which make up the surface of the escarpment. The documentation of these petroglyphs and associated archaeological sites by the City of Albuquerque's Parks and Recreation Department in conjunction with the State of New Mexico's Office of Cultural Properties last year drew national public attention to the vast heritage at our doorstep. Most recently, the National Park Service has drafted a report on the feasibility of establishing a Petroglyph National Monument.

The Northwest Mesa Escarpment Plan is a Rank 3 plan which further defines and implements the Rank 1 Comprehensive Plan. The document includes background information about the physical and man-made characteristics of the escarpment, and about adopted plans and policies pertinent to the area. The Plan establishes governing concepts which recognize the importance of the escarpment and adjacent areas to both this and the world-wide community. Four areas are mapped and established: the Escarpment Face (the area within the nine percent slope), the Conservation Area which includes the Escarpment Face and the immediately surrounding land, the Impact Area and the View Area.

Development is prohibited on the Escarpment Face. The Conservation Area is proposed for conservation as open space in its entirety. The Impact Area and View Area are proposed for private development. A design overlay zone is established with requirements for each area. Management, conservation and acquisition of the Conservation Area are proposed to be shared by local, Federal and State governments. An extensive discussion of funding and management needs is included with ideas and suggestions for obtaining the funds required to create a world-class amenity. The Northwest Mesa Escarpment Plan was coordinated with the National Parks Service's feasibility study for a National Monument at the southern end of the escarpment.

The Plan is scheduled for a review in twenty-four months to assess the progress made by the City, State and Federal governments in implementing the Plan. At that time, the boundaries of the Conservation Area will be reassessed and firmly established, in order to designate the area a Historic Overlay Zone pursuant to the State Historic Districts and Landmarks Act and the City Landmarks and Urban Conservation Ordinance.

The Plan develops a conceptual trail network and recommends management and public education strategies to create a program which respects the heritage of the escarpment while providing recreational opportunities. The role of the escarpment as a major part of a larger open space system is emphasized.

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Anthropomorphic Shield Figure, Petroglyph State Park.
photographer. copyright 1987

Isaac Eastvold,

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CHAPTER 1: INTRODUCTION

REASON FOR THE STUDY

The Northwest Mesa Escarpment Plan has been developed to continue implementation of adopted Albuquerque/Bernalillo County Comprehensive Plan policies. These policies include the maintenance of the volcanic escarpment as open space for public health, welfare and safety reasons, as well as to define the urban form and satisfy other open space needs. A plan incorporating policy and implementation is required to assure compatibility of development and conservation with these policies.

GENERAL INTRODUCTION

The northwest mesa escarpment is a seventeen-mile-long face of exposed volcanic basalt and associated soils approximately 50 to 200 feet high which runs north to south along the northwest mesa. The study area for this Plan encompasses a substantial area to the east, west and south of the escarpment itself. (Maps 1 and 2) The escarpment is one of the largest rock art sites in North America. An archaeological survey completed in 1986 identified over 10,500 petroglyphs in various concentrations distributed almost continuously along the volcanic escarpment. It is now estimated that over 14,000 petroglyphs are located along the escarpment. Many associated cultural sites representing a broad time range were also identified.

POLICY FRAMEWORK

This Plan is a Rank 3 Plan which must agree in policy with the Rank 1 Comprehensive Plan and all Rank 2 plans which cover the same geographic area. Pertinent adopted plans and completed studies as well as known planning studies presently underway are discussed in Appendix A.

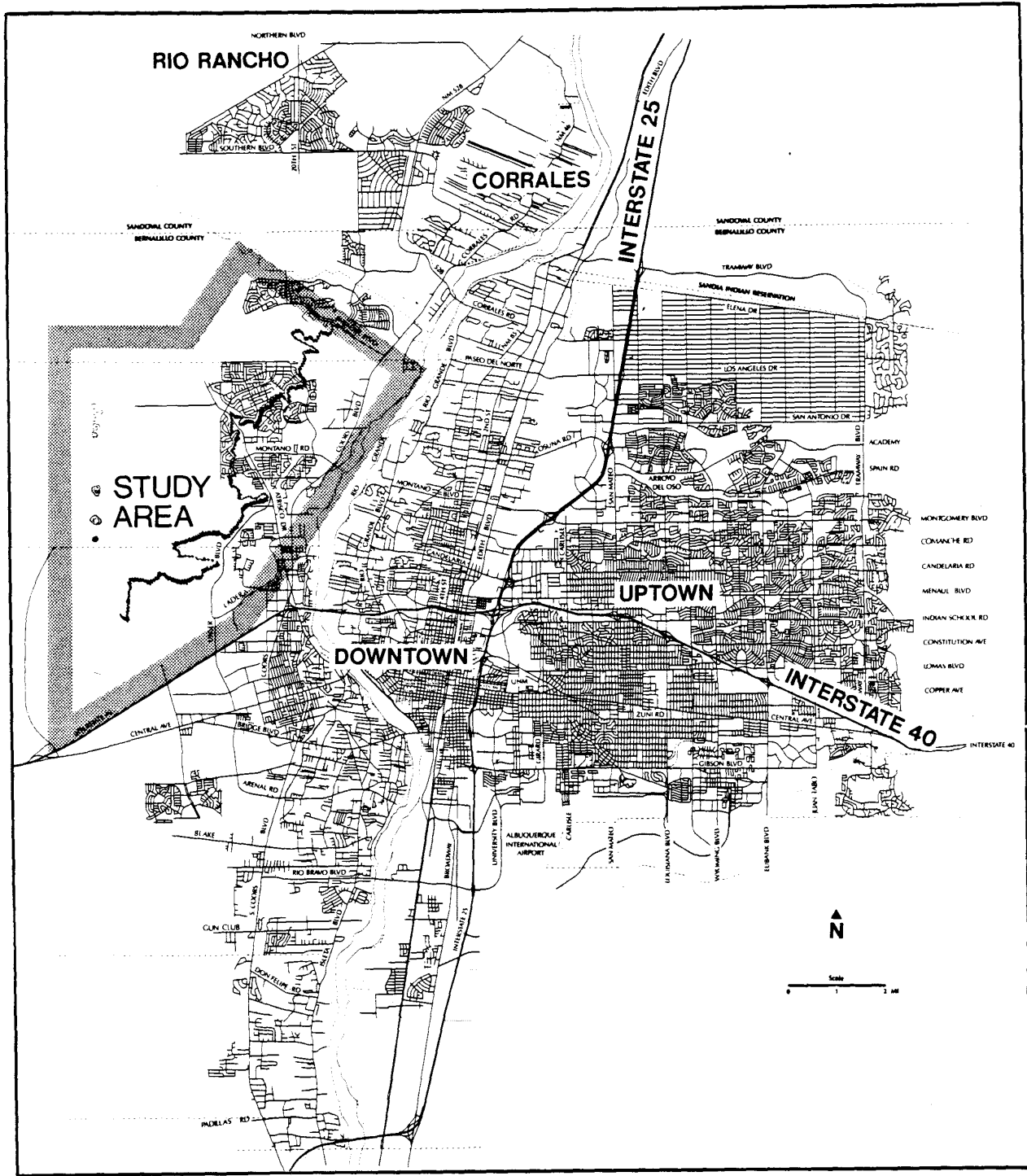
Pertinent goals and policies of the Comprehensive Plan are:

"A. Land Use"

"1. Urban and Rural Form"

"THE GOAL IS TO PRESERVE THE UNIQUE NATURAL FEATURES OF THE METROPOLITAN AREA BY ACHIEVING A PATTERN OF DEVELOPMENT AND OPEN SPACE RESPECTING THE RIVER LANDS, MESAS, MOUNTAINS, VOLCANOES, AND ARROYOS."

"a. The mesas offer the best sites for urban development. Development which is harmonious with natural features should be encouraged on suitable portions of the west, northeast, and southeast mesas."



LOCATION MAP

MAP 1

"d. The City and County should preserve the volcanoes, key portions of the basalt flow, and the escarpment as major natural open space."

"2. Urban Areas"

"b. Selected buildings and areas which explain our past and which give Albuquerque identity, individuality and cultural richness shall be preserved, enhanced and reused where appropriate."

"3. Rural Areas"

"g. In highly scenic areas, development design and materials should be in harmony with the landscape. Siting should minimize clearing of wooded areas and minimize visibility of structures from scenic corridors and scenic vista areas."

"4. Open Areas"

"THE GOAL IS TO ENHANCE RECREATIONAL OPPORTUNITIES AND PROVIDE VISUAL RELIEF TO URBANIZATION BY SETTING ASIDE ACCESSIBLE AND USEABLE OPEN SPACES WITHIN EACH NEIGHBORHOOD."

"d. Open space design at the neighborhood level should tie into major community open space where appropriate to create an open space network."

"6. Education and Recreation"

"THE GOAL IS TO PROVIDE A WIDE VARIETY OF EDUCATIONAL AND RECREATIONAL OPPORTUNITIES AVAILABLE TO CITIZENS FROM ALL CULTURAL, AGE AND EDUCATIONAL GROUPS."

"d. Efforts should be made to integrate educational programs with the natural and cultural environments."

Pertinent goals and policies of the Plan for Major Open Space element of the Comprehensive Plan are:

"B. Functions of Open Space

In order to discuss 'open space,' it is useful to clearly define what the term means and what functions it serves. For the purposes of this Plan, major open space is any large area of land (or water) which is left primarily undeveloped. It can serve one or more of four major functions:

1. Conservation of natural resources
2. Protection of the public from flooding or other hazards
3. Provision of recreational services
4. Satisfaction of psychological needs for space

This first open space function, conserving natural resources, occurs in areas possessing great scenic beauty, unique vegetation, or existing or potential agriculture use. Many of these areas are also least suitable for typical urban development.

Identification and maintenance of areas to remain as open space can serve to protect the public from dangers such as flooding, rock slides or soil instability.

Open space as parks or regional open areas provides areas for all types of recreation, such as picnicking, ball games, swimming, etc.

Also, open areas can satisfy psychological needs for space. Relief from the urban environment is provided by large open spaces within or near the urban area, and the urban area itself can be made more liveable and aesthetically pleasing by including open space as an important part of the built environment.

Any particular open area can serve several or all of these purposes. This Plan describes a system of open spaces which will optimize these purposes. The urban park system can be designed to protect certain natural resources such as using grass to minimize soil erosion, in addition to providing recreation. Similarly, regional open spaces can provide scenic areas serving recreational functions while also accomplishing some or all of other open space functions. It should be noted, however, that adoption of the open space system concept does not imply that multiple functions are always possible or desirable."

"b. Northern Volcanoes and portions of basalt flow and escarpment.

The City has in the past purchased portions of the volcano basalt area. It is proposed that an additional (approximately) 4,000 acres as depicted on the attached map, become publicly owned for scenic-recreational purposes. This area, part of which is owned by the state and part privately owned, includes several volcano cones north of those already owned. Much of the area is covered by shallow lava

flow and broken lava rubble, ranging from 5-100 feet thick. The area is elevated, forming an important part of Albuquerque's skyline, and is visible from almost all parts of the metropolitan area. Due to the lava subsoil condition, the cost of extending utilities to this area would be considerably more than adjacent areas. The potentials for unstructured recreational use and scenic benefits, however, are great. Although this area is presently beyond the developing urban area of Albuquerque, development in the future may ultimately surround the volcano area. Preservation of this area, then, would provide the visual and recreational relief that future residents of metropolitan Albuquerque might enjoy."



Parks and Recreation Department



Steven W. Donahue, photographer

CHAPTER 2: EXISTING CONDITIONS

NATURAL CHARACTERISTICS

Topography

The Northwest Mesa is part of a long, uplifted plain that extends approximately 20 miles north and 50 miles south of Albuquerque. Sometimes referred to as the Llano de Albuquerque, it slopes gently eastward and southward. Steep slopes of 15% or greater characterize the face of the escarpment at the eastern edge of the mesa. The escarpment drops more than 200 feet into Rinconada Canyon, but is less pronounced in other areas. The dissected terraces below the escarpment also slope eastward to the river. Elevations on the mesa range from about 5250 to 5760 feet above sea level. Those on the terraces below the escarpment range from about 5120 to 5620 feet above sea level. (Bryan, 1983: 1016; Kelley, 1974: 2, 5, 27-29.)

The Northwest Mesa Area Plan identifies areas with nine percent or greater slopes as unable to support development based on the easily erodible soils found at the base of the escarpment. Areas along the escarpment with nine percent or greater slopes based on topographic maps with contours at intervals of two feet are shown on Map 3.

Geology

The Santa Fe Formation underlies the basalt and other superficial deposits on the mesa and the terraces at the base of the escarpment. It consists primarily of unconsolidated to loosely consolidated fine-grained sand, silt, gravel, and clay deposited in the Rio Grande depression millions of years ago. Approximately 190,000 years ago, molten lava rose from considerable depths through a system of fissures or cracks in the uplifted mesa. Since the surface of the land sloped eastward, the lava flowed towards the ancestral Rio Grande. The first series of flows were relatively fluid and may have spread over as much as 40 or 50 square miles. Subsequent flows were more viscous and moved only a few hundred feet from the fissure. The last series of explosive eruptions resulted in the formation of the cinder cones known as the Albuquerque Volcanoes. Before cutting the inner valley as little as 20 thousand years ago, the ancestral Rio Grande meandered over a broad flood plain. It eroded away much of the lava from the first flows and created the escarpment seen today. The stringers or peninsulas that project out onto the terraces were low lying areas (i.e. arroyos) when the eruptions occurred. The layers of lava that collected in them have been relatively resistant to erosion, and over time their outline has been maintained through a uniform rate of erosion. The nearly level areas below the escarpment are old terraces that the river abandoned when it began cutting the inner valley. A layer of calcium carbonate or caliche has formed around the embedded boulders of basalt, and even minor dislocations of the boulders expose it and produce visual discontinuities. (Bjorklund, 1961: 14, 19; Kelley, 1974: 27-35, 98-104; Kelley and Kudo, 1978: 11-14.) See Table I and Appendices K and L for additional information on the geology of the area.

TABLE I - GEOLOGIC RESOURCE INVENTORY
(Provided by the National Park Service)

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Pre-Lava History</u></p> <p>Poorly consolidated sand and gravel of the upper buff formation (Santa Fe Group) and younger alluvium underlie the <u>Albuquerque Volcanoes</u> basalt, and are common along the east and south base of the escarpment. These rocks are near the top of 10,000 feet of sediment that filled the Rio Grande trough as it subsided during the past 10 million years.</p>	<p>Yellowish-gray cross-bedded sand and pebbles and cobbles are exposed in several places.</p>	<p>This soft alluvium is widespread in the Rio Grande valley. Alluvial processes are common in many units of the National Park System (hereinafter called the System).</p>	<p>Along with the view of Sandia Mountains, the sediments can be interpreted to tell the story of subsidence of Albuquerque Basin.</p>	
<p>Fossils from the Upper buff formation found elsewhere in the Albuquerque area are Pleistocene and include mollusks, horse, camel, and hare. The fossils indicate a floodplain bordered by woodland and meadow, with arid grasslands nearby.</p>	<p>Rounded waterworn pebbles and cobbles of many types of rock are common in the sand.</p>	<p>These fossil species are also known from other Pleistocene rocks in the West.</p>	<p>The paleoenvironment can be interpreted in exhibits or literature.</p>	
			<p>The white, gray, brown, red, and black cobbles of chert and petrified wood were a local source of material for prehistoric people making scrapers, projectile points, etc.</p>	<p>The colorful pebbles are clearly visible in outcrops and streambeds and can be compared to artifacts made of the same materials in exhibits.</p>

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Basalt Flows</u></p> <p>Six flows issued from fissures related to subsidence of the Albuquerque Basin. Age 190,000 years. All eruptive activity probably began and ended in a matter of months.</p>	<p>Each basalt flow is slightly different in mineralogy, showing chemical trends that are normal.</p> <p>There is a consistent paleomagnetic anomaly in all six flows. The flows record a major excursion in the earth's magnetic field that was "frozen" in the rock as it cooled 190,000 years ago.</p>	<p>Magmatic differentiation is universally common.</p> <p>This particular excursion, found only in the Albuquerque Volcanoes basalt, appears to be a radical and unexpected departure from all previous paleomagnetic records and has global significance. It is not known if major excursions have been found in other rocks in the System.</p>	<p>Distribution and petrology of the flows could be interpreted with maps and photographs in exhibits and literature.</p> <p>The excursion cannot be seen but can be interpreted in exhibits or publications.</p>	
<p>Successive flows decrease in temperature and increased in viscosity. Flows 1 and 2, the hottest and most fluid, spread toward the east over a gently eroded surface with broad washes.</p>	<p>The first flow to pour onto sediment in any particular area baked the soil and oxidized the iron present.</p> <p>The contacts between individual flows are sharp, with dense basalt of the overlying flow lying directly on the vesicular surface of the underlying flow.</p>	<p>Baked zones are extremely common beneath lava flows, including several documented in the System.</p> <p>Unweathered contacts show a very short time between each basalt flow. Both weathered and unweathered flow surfaces are common worldwide and in the System.</p>	<p>A reddish baked zone can be seen at the base of flow 1 where the road ascends the escarpment west of Petroglyph State Park.</p> <p>Fresh, thin contacts between flows 1 and 2 can be seen and interpreted along the south end of the escarpment.</p>	

Description and
Origin of Resource

Basalt Flows (cont.)

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
Basalt Flows (cont.)	<p>Viewed from a distance, superposition of flows (one on top of another) is most obvious between flows 1 and 2. These two flows also show many examples of columnar joints (vertical cooling fractures).</p> <p>Long, linear features have been detected beneath the surfaces of some of the earlier flows by means of electrical resistivity studies. These features are roughly parallel to the direction of flow, and are either open or clogged with sediments that have less density than the surrounding basalt.</p>	<p>Superposition of flows and columnar joints are common worldwide and in the System.</p> <p>These features may be lava tubes, which are a common type of linear cavity in basalt flows both in and outside the System. A short lava tube is exposed at the Rinconada, and others have been reported.</p>	<p>There are clear examples of flow 2 on top of flow 1, and joints in both along the southern sections of the escarpment. Superposition of flows can also be seen and interpreted in the "geologic windows."</p> <p>Lava tubes open to the surface are few; therefore, direct interpretation is limited.</p>	
	<p>Flow 1 was most fluid and in three places flowed east along stream channels eroded in the alluvial surface. Two of these channel fillings have since eroded differentially and become lava capped ridges that extend out from the escarpment south of the Boca Negra and Rinconada drainages. A lava-capped salient at the south end of the escarpment also may be a channel filling.</p>	<p>Lava-capped ridges are common worldwide where erosion has cut into softer underlying sediments. Many lava flows in the System are very young compared to the 190,000 years for the Albuquerque basalts. Thus, lava salients occur in only a few units of the System (JODA, BIBE, and ZION).</p>	<p>The three salients along the south half of the escarpment are major geographic features that can be interpreted.</p>	

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<u>Basalt Flows</u> (cont.)				
Flow 3 was smaller but like 1 and 2 issued along the entire fissure system. Flow 4 was even more viscous and issued only along the southern part of the fissure.	Weathered surfaces, usually covered with soil and vegetation, are characteristic of all six flows and have been developing for 190,000 years.	Very common in flows as old as the Albuquerque basalt. Flows in the System vary from recent to much older, with all stages of weathering represented.	Low in visual interest.	
Flows 5 and 6, yet more viscous and much smaller, were restricted to individual vents. The localized eruptions of flows 5 and 6 resulted in the line of five "volcanoes" on the west horizon of Albuquerque.	Flow (6) at JA, Black, and Vulcan cones represents maximum viscosity and gas spatter were explosively ejected into steep mounds. Small flows poured down the flanks from summit craters. In some cases, pools of lava broke through the crater walls and cascaded down the cones in small "dribble" flows that resemble candle wax in form and behavior.	(Footnotes 2 and 3) All five major cones show lava pooling and leakage down the flanks as small flows. Spatter and cinders in lines of small, steep cones; small dribble flows from craters; and collapse of lava ponds are fairly common volcanic phenomena. However, all of these phenomena may be represented only in one unit of the System (CRMO).	See specific comments (all five cones are described separately below).	See specific comments below.
	Four-wheel-drive roads pass around, onto, or into the five major cones.		The road network is highly visible from the sides and tops of the cones.	The roads could be closed and landscaped to natural condition, then replaced with a planned system of roads with far less visual impact.

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Basalt Flows (cont.)</u></p> <p><u>JA Cone</u>, southernmost and second highest of the five prominent cones, is a broad base of dense, black lava (flow 5) topped by a steep cone of red and black spatter and cinder (flow 6).</p>	<p>The steep upper cone is composed mainly of pyroclastics. Lava poured down the north and southeast sides and formed small flows. A few small dribblet flows are only one to three feet wide. Finally, a pond of lava broke through the crater wall and poured down the east side. The margins of this pond tilt inward around the crater rim. JA is in many respects the most interesting of all the five cones.</p>	<p>Small basalt cones made of ejecta and spatter are very common, occurring in the Albuquerque Basin and in several units of the System. Spatter cones are found at HAVO and LABE. Collapse of craters and release of lava pools is more common in some volcanic provinces than others, but within the System, it is documented only at CRMO.</p>	<p>All features described can be seen and interpreted.</p>	
<p>A small cave near the top of JA on the north side is a steep lava tube formed when liquid lava drained from beneath a hardened crust. The ceiling has lavacicles and the floor has an air vent.</p>		<p>"Drainout" cavities are common in most basalt flows.</p>	<p>The cave is accessible on foot and can be interpreted.</p>	

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Basalt Flows</u> (cont.)</p> <p><u>Black Cone</u> is a broad mound of lava (flow 5) topped by two steep cones (flow 6).</p>	<p>The larger southern cone is black lava with only minor cinder and spatter. It has a flat floored crater and four small flows on the outer flanks which probably overflowed the rim.</p>	<p>Black is the only cone in the group made mostly of flows, and it adds diversity to the other types represented. Small cones built up from lava extruded from central vents, without much cinder, are common in some volcanic fields, but may not be represented in the System.</p>	<p>All features described can be seen and interpreted.</p>	
<p>The smaller northern cone was composed mainly of black cinder. Most of it was removed by mining sometime between 1952 and 1968.</p>	<p>This hill was the only classic cinder cone in the line of volcanoes. Its type is common in Albuquerque Basin (particularly at Cat Hills) and it is very common in the System.</p>	<p>Not much remaining; greatly diminished in interpretive potential.</p>	<p>The original conical form was destroyed by mining. A common but distinct type of volcanic landform that would have complemented the story has been irreversibly lost. The remaining 112,000 cubic yards in its base could be moved to the cinder pit at Vulcan and the two sites landscaped to reduce the visual impact of mining.</p>	

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Basalt Flows</u> (cont.)</p> <p><u>Vulcan Cone</u>, middle and highest of the five prominent cones, also has a flow 5 base. Flow 6 is a steep cone with lava flows and cinders varying in proportion.</p>	<p>The steep upper cone is made of both flows and pyroclastics; in type it is a small "mixed" volcano. Lava pools formed both on the top and on the lower north shoulder. The pool on the north shoulder leaked in dribblets onto its north flank. The lower pool appears to have collapsed and released short flows over lowered rims on the east and west sides.</p>	<p>Yet another variety, differing from the other cones in the southern group in its mix of flows and pyroclastics, yet similar in its eruption of flows from craters. This type is not common among basalt cones in the System. In one case at CRMO lava welled up in a cinder cone and overflowed the crater; the collapse of Vulcan's lower pool may be similar. Vulcan's cone contrasts with numerous classic cinder cones in the System where flows emerged at the base.</p>	<p>All features described can be seen and interpreted.</p>	<p>This large pit locally impacts the natural volcanic landscape. About 167,000 cubic yards are missing but could be partly backfilled with debris remaining from mining at Black cinder cone, then both sites landscaped.</p>
<p>Small caves near the top of Vulcan formed when liquid lava drained from beneath hardened crusts.</p>	<p>Small caves near the top of Vulcan formed when liquid lava drained from beneath hardened crusts.</p>	<p>"Drainout" cavities are common in most basalt flows.</p>	<p>The caves are far less accessible than those on JA and Bond cones.</p>	<p>The pit exposes a thick section of red and black cinder and bombs not seen elsewhere. Part of this man-made cross section may have interpretive potential.</p>
<p>A large quarry excavated on the lower southeast side of Vulcan reveals that cinder and small bombs make up this part of the volcano.</p>	<p>A large quarry excavated on the lower southeast side of Vulcan reveals that cinder and small bombs make up this part of the volcano.</p>			<p>This large pit locally impacts the natural volcanic landscape. About 167,000 cubic yards are missing but could be partly backfilled with debris remaining from mining at Black cinder cone, then both sites landscaped.</p>

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Basalt Flows (cont.)</u></p> <p>Bond Cone is a small, steep mound of both lava and cinder on top of a lower rise.</p>	<p>Bond is a "mixed" volcano like Vulcan. The crater is small and vague and filled with lava that passes onto the outside flank with a reversal in dip. A small cave on east side of the cone was formed when molten lava drained out from beneath a hardened crust.</p>	<p>Reverse dips are sometimes seen where lava flows from craters. The phenomenon is recorded in one case at CRMO, but is not known in other units of the System. The cave, a common type of volcanic feature, contains evidence of prehistoric human use.</p>	<p>The lava-filled crater and cave are accessible on foot and can be interpreted.</p>	
<p><u>Butte Cone, northernmost of the five prominent cones, is similar to Bond in its shape and low profile. This small cone has been breached and is strongly eroded.</u></p>	<p>Butte is another "mixed" type. The crater is a shallow pan littered with cinder and small bombs.</p>	<p>Features here are no better developed than on the other major cones.</p>	<p>The products of eruption and erosion can be seen but there are no unusual features.</p>	
<p><u>Other vents, some six low mounds lying between Bond and Butte, and north of Butte, were minor points of extrusion along the northern part of the fissure.</u></p>	<p>Low, obscure mounds of lava, cinder and bombs, some deeply eroded. Some may be collapse features or pressure ridges in flows.</p>	<p>Collapse and compression features in flows and erosion debris are common in many older basalt flows.</p>	<p>See earlier comments under Butte Cone.</p>	

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p><u>Post-Lava History</u></p> <p>West Mesa tributaries of the Rio Grande River have undercut the edges of the lava flows during the past 190,000 years, producing an <u>escarpment up to 150 feet high</u>.</p>				
<p>Flows 1 and 2, both highly fluid, once covered larger areas to the east, but have since been reduced by <u>erosion of the escarpment</u>.</p>	<p>The edges of the flows retreat westward as the soft alluvium erodes from below. Blocks of basalt break along joints and tumble down from the overlying rim.</p>	<p>The process is very common in units of the System where there are alternating layers of hard and soft sedimentary rock. Retreating rims of lava rock are less common, but do occur at BIBE, JODA, and ZION.</p>	<p>The rimrock and bouldery slope can be interpreted in many places.</p>	
	<p>The basalt rim and the angular blocks below are coated with a black substance called desert varnish. The "varnish," a thin layer of iron and manganese oxides, forms through weathering processes not fully understood. More than 95 percent of the petroglyphs were carved through the varnish on rocks from flows 1 and 2.</p>	<p>Desert varnish occurs in many places in the arid Southwest. It was the most common surface selected for carving of figures by prehistoric artists in many units of the System. Repatination of some of the figures along the Albuquerque escarpment infers greater age of those particular petroglyphs.</p>	<p>The desert varnish and its use for carving petroglyphs can be interpreted in many places along the escarpment.</p>	

Description and
Origin of Resource

Post-Lava History (cont.)

Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p>Prehistoric gardens occupy several small flat areas between exposed flows and behind accumulations of boulders. These plots are sheltered pockets of soil that were watered by adjacent flow surfaces and had long growing seasons because of the nearness of dark heat-absorbing rock. Prehistoric farmers were observant and resourceful users of favorable micro-climates along the escarpment.</p>	<p>Unknown; perhaps there are examples elsewhere.</p>	<p>Level areas suitable for small scale farming can be reached on foot and interpreted.</p>	
<p>The bottom of basalt boulders in contact with the underlying calcite-rich sand are encrusted with white "caliche." Where slopes have been disturbed by recent human activity, boulders are overturned, exposing white caliche surfaces.</p>	<p>Caliche deposits are common in several parts of the Southwest.</p>	<p>Overturned boulders are common on slopes near modern residential development. The white caliche surfaces contrast with the darker surroundings; some can be seen half a mile away.</p>	<p>White-faced boulders diminish the integrity of the natural and cultural landscape. Restoration is desirable where prehistoric ambience is important.</p>
<p>Excavation into soft sediment below the escarpment causes slope collapse and accelerates erosion by wind and water.</p>		<p>Local blowouts are visually intrusive and can enlarge rapidly.</p>	<p>Human built environment is replacing natural environment in some areas along the base of the escarpment. Without planned siting of development and proper landscaping, wind erosion can be a problem.</p>

Description and Origin of Resource	Specific Feature	(1) Comparative Significance	Visibility and Interpretive Potential	Resource Integrity
<p>Post-Lava History (cont.)</p> <p>Flows 1, 2 and 3 are exposed in three geologic "windows" along the three main tributaries of Boca Negra Arroyo on West Mesa.</p>	<p>Flows 1 and 2 are exposed in the walls of North Window. Flows 1, 2 and 3 are exposed in the smaller Middle and South windows. The windows penetrate all the volcanic rocks at each site, exposing the older alluvium below. This has been explained by their having been "kipukas" or ridges of alluvium that were surrounded by lava flows and later eroded down to form basins. Alternatively, they may be eroded collapse features.</p>	<p>(2) The windows reveal to geologists the presence or absence of rock layers below the general surface, greatly improving knowledge about the distribution of the earlier flows. These windows are locally significant but are not unique as "holes" that reveal stratigraphic information. If they are negative landforms representing removal of kipukas they are probably unrepresented in the System.</p>	<p>Superposition of flows can be interpreted in the windows.</p>	
<p>All flows, 1-6, erupted 190,000 years ago and have weathered and eroded so that few original surfaces remain.</p>	<p>Primary crusts are obscure on the eroded edges of flow units. In contrast, erosion of some of the cones has been so deep as to remove entire layers of lava and pyroclastics and to expose underlying volcanic structures. These structures include cinder and spatter, lava pools and flows, and small caves.</p>	<p>Compared to very fresh surfaces of recent flows in several units of the System, the Albuquerque flows lack surface detail. However, erosion on the steep cones has exposed interesting features which otherwise might be covered.</p>	<p>Eroded flow surfaces diminish the impression of dynamic volcanism, but increase opportunities to interpret weathering, soil development, and adaptation of plants to rocky surfaces. Erosion of the cones has enhanced their interpretive potential.</p>	
<p>Petroglyphs have been recorded in all three windows.</p>	<p>Petroglyphs probably correlate to the prehistoric carvings common on the escarpment.</p>	<p>These petroglyphs are fewer in number than on the escarpment, but can be interpreted.</p>		

Footnotes:

- (1) Several units of the National Park System contain rock of basaltic composition or landforms comparable to those at Albuquerque Volcanoes. Comparisons between the volcanoes west of Albuquerque and those in the System are based on review of geologic literature and telephone interviews with U.S. Geological Survey and NPS personnel. The four-letter codes are standard abbreviations.

ANIA - Aniakchak NM, AK	JODA - John Day Fossil Beds NM, OR
BIBE - Big Bend NP, TX	KATM - Katmai NP, AK
CAMO - Capulin Mountain NM, NM	LABE - Lava Beds NM, CA
CRLA - Crater Lake NP, OR	LAME - Lake Mead NRA, AZ/NV
CRMO - Craters of the Moon NM, ID	LAVO - Lassen Volcanic NP, CA
DEVA - Death Valley NM, CA	MORA - Mount Rainier NP, WA
DEPO - Devils Postpile NM, CA	SUCR - Sunset Crater NM, AZ
HALE - Haleakala NP, HI	YELL - Yellowstone NP, WY
HAVO - Hawaii Volcanoes NP, HI	ZION - Zion NP, UT

- (2) Geologic features: at Albuquerque Volcanoes that are not documented or well represented in units of the National Park System.
- (3) Kelley and Kudo (1978) interpret the final events at JA and Vulcan as intrusion of domes and radial dikes followed by explosions. I cannot find evidence for the domes or explosions, and most if not all of the dikes appear to be dribblet flows. However, should their explanation be correct, the final events at JA and Vulcan are rather unusual among volcanoes in general and are unique in the System. (Only at ANIA is there a record of an intruded cone and explosion; however, the rock is dacite, not basalt.)

Note: The descriptions of geologic resources at the Albuquerque volcanoes are from these sources:

Kelley, V.C., and Kudo, A.M., 1978, Volcanoes and related basalts of Albuquerque Basin, New Mexico: New Mexico Bureau of Mines and Mineral Resources, Circular 156, 30 p.

Kelley, V.C., 1969, Albuquerque, its mountains, valley, water, and volcanoes: New Mexico Bureau of Mines and Mineral Resources, Scenic Trips to the Geologic Past, No. 9, 3rd ed., 1982, 106 p.

Lambert, P.W., 1968, Quaternary stratigraphy of the Albuquerque area, New Mexico: Ph.D thesis, University of New Mexico, 329 p.

In addition to these publications, a geophysical survey of the West Mesa conducted by Steve Elston circa 1975 reveals information about possible lava tubes in the flows. John Geissman of the University of New Mexico has provided information about the major paleomagnetic anomaly recorded in the Albuquerque basalts, and he is preparing to publish.

HAGOOD
NPS/DSC/TCE
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Hydrogeology

While the surface of the land slopes eastward, the ground water table west of the inner valley slopes westward. As a result, the depth to ground water is estimated to be as much as 800 feet below the surface of the mesa above the escarpment and as little as 160 feet below the surfaces of the terraces below the escarpment. The Santa Fe Formation is exceptionally permeable, and significant aquifer recharge occurs throughout the area as water permeates fissures in the basalt flow. The rate of recharge is especially high along the base of the escarpment. Several wells tap the Santa Fe Formation above and below the escarpment. All yield large quantities of water, and it is generally of adequate quality. However, the quantities decrease and the temperatures and total dissolved solids increase from the escarpment to the volcanoes. Water quantity and quality improve west of the volcanic ridge and decrease again towards the Rio Puerco basin. (Bjorklund, 1961: Plate 1a, 19-21, 44-46, 58-59.)

Surface Water Drainage

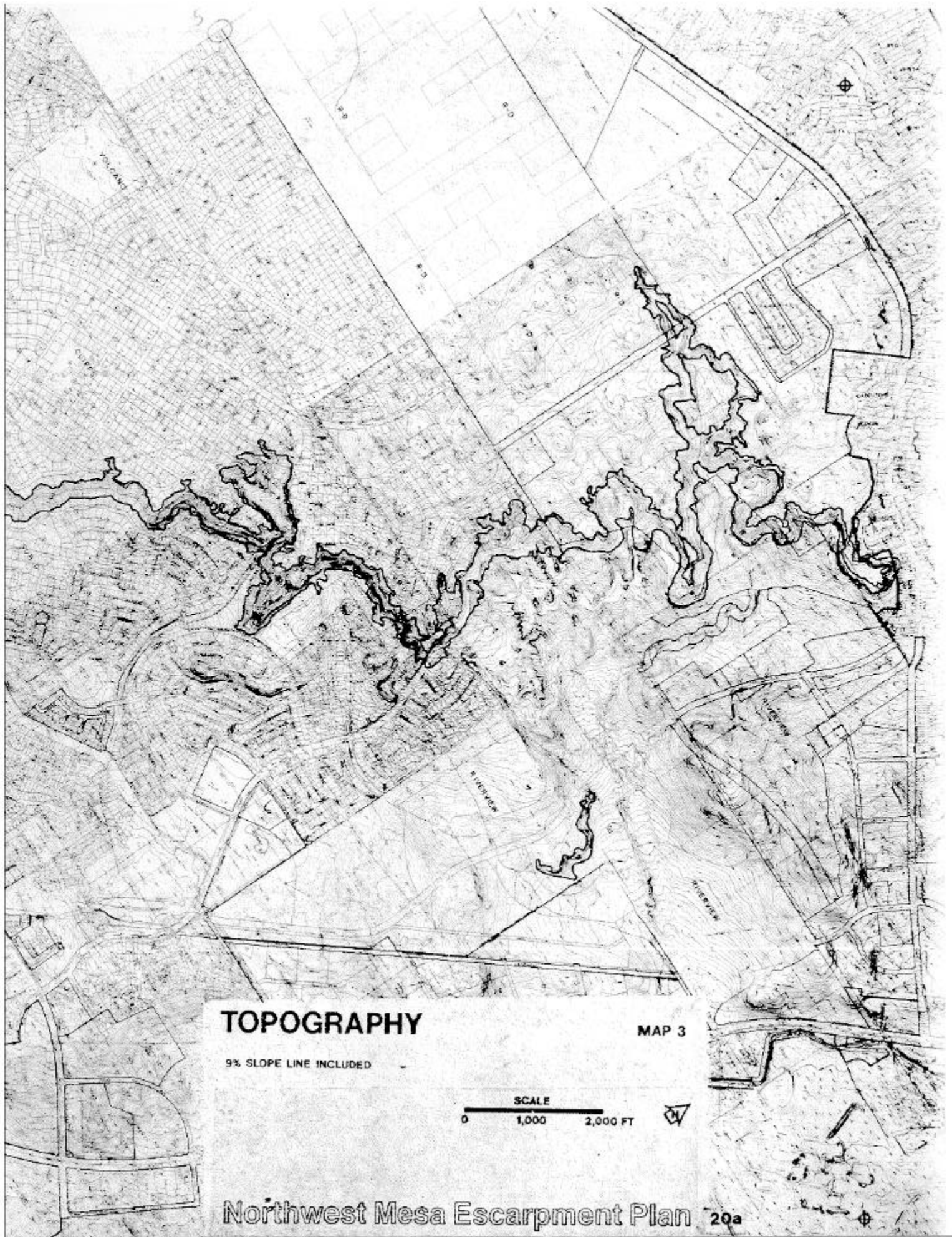
Seven ephemeral streams drain the escarpment area - Piedras Marcadas Arroyo, Mariposa Arroyo, Boca Negra Arroyo, San Antonio Arroyo, Rinconada Arroyo, Ladera Arroyo, and Mirehaven Arroyo. All flow in an eastward or southeastward direction. The depth of their channels decreases progressively downstream because increasing sediment loads, and surface flows generally disappear before reaching the Rio Grande. (Bjorklund, 1961: 49-52.)

On the Northwest Mesa, drainage treatments such as rip-rap and gabions have generally been used. All drainage facilities have been constructed within the last ten years. During this time, little or no upstream development has impacted them. However, the most recent planning for drainage management in the vicinity of the escarpment assumes unrestricted flows from upstream development. (Bohannon-Huston, 1986: 15-22.)

The erosive effect of developed runoff on the escarpment is a concern. Anticipated flow rates from upstream development, historical and visual significance of the area, and topographic constraints, including soil type, slope, and rock outcrops, are factors to be considered in the selection of treatment types of future drainage facilities. (Bohannon-Huston, 1986: 29.)

The National Park Service's (N.P.S.) "Albuquerque West Mesa Petroglyph Study" (June 1987 draft) includes a cursory analysis of engineering limitations affecting construction of facilities along the escarpment relative to soil and drainage constraints. (See Soils Section, page 22.) Two days of field observations and soil examinations were conducted in February 1987 by a N.P.S. Geologist and Geotechnical Specialist in the area north of Petroglyph Park above the escarpment. The following are excerpts from these preliminary field observations. (See Appendix L for complete N.P.S. trip report):

"We concentrated our investigation on the areas above the escarpment immediately north of Petroglyph Park. The area is platted, many lots are already in individual ownership, and some of the lots extend over and down the face of the escarpment and are coterminous with lots below."



TOPOGRAPHY

MAP 3

9% SLOPE LINE INCLUDED

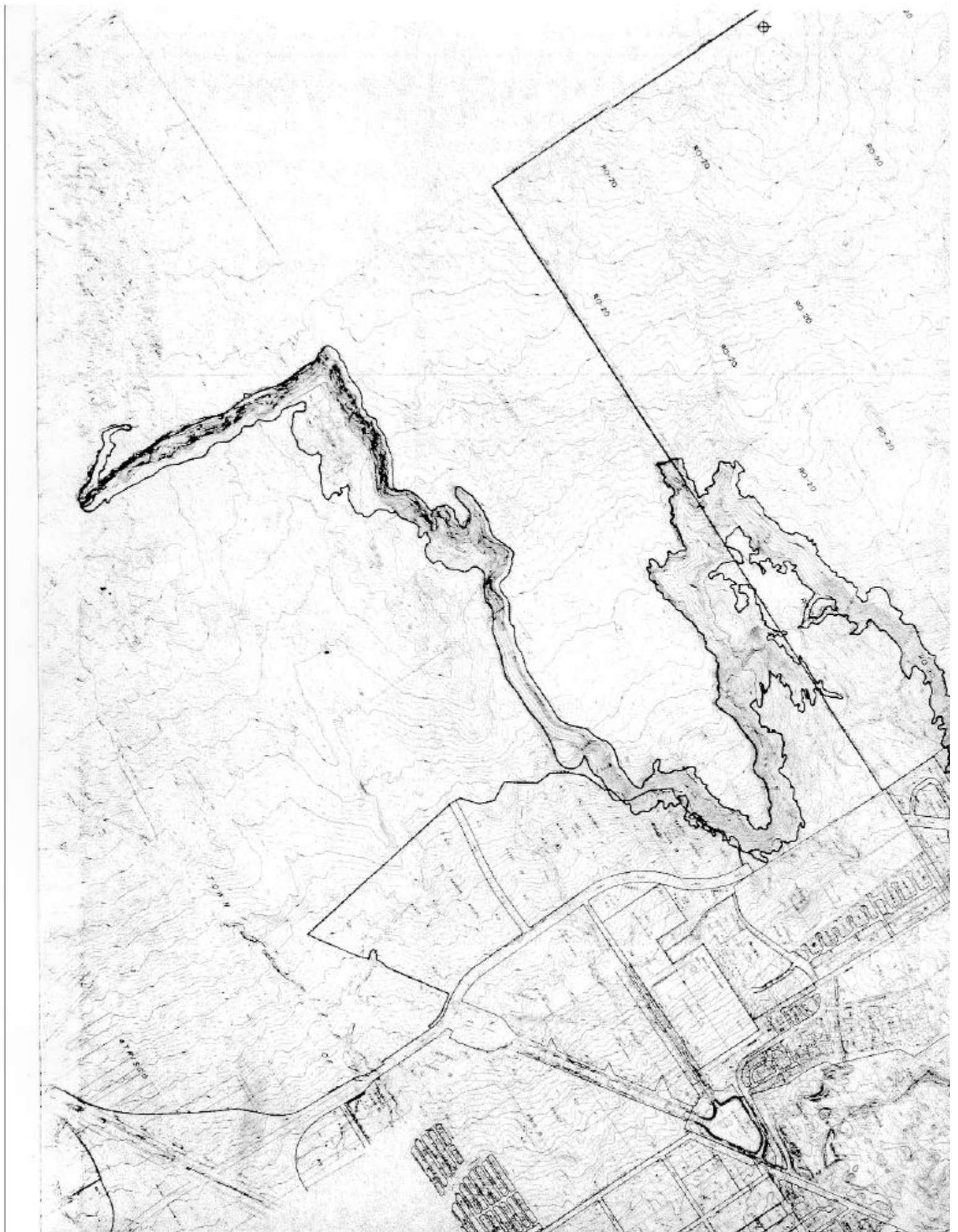
SCALE
0 1,000 2,000 FT



Northwest Mesa Escarpment Plan

20a





"We noted the joints in the basalt (columnar cooling crack) and remarked that trenching may collect percolating surface water and could channel some of it into vertical fractures in the basalt and finally into the soft sediments that support the margin of the cliff. Indiscriminate use of explosives to construct trenches could locally increase instability at the base of cliff blocks, and it is possible in some places the cliff would collapse. Property damage and human safety are the concerns; but there was no opportunity in this rapid examination to identify any areas of actual instability. A detailed geotechnical study is needed to identify the specific areas along the rim where tumbling of the cliff face is active or potentially active."

"An interesting issue on the West Mesa is what happens to water from precipitation. How is it dissipated?"

We examined the bed of Boca Negra arroyo in this area and could not find a clearly defined channel. There is little evidence of any recent deposition or scouring. Furthermore, where Boca Negra passes over the cliff there are numerous boulders below, but not much evidence of a streambed. Naturally, wind action might soon obscure the signs of stream action, but still it appears that channelized runoff is below average. Seepage at the base of the basalt has probably softened the foundation material and allowed the cliff blocks to tumble onto the boulder talus.

Most atmospheric water enters the soil directly. Some water is retained but most dissipates gradually through evaporation and transpiration; possibly in this arid climate these processes account for removal of 60 percent or more.

Water retained by the soil percolates and follows the top of the basalt until it either passes into the bedrock through joints or emerges at low spots along the rim and pours over. Heavy rain may result occasionally in floods that pour over the rim. Whether the flow is on the surface or through joints, wherever water encounters permeable silt either under the basalt or in the arroyo below, it probably passes to depth very soon and joins the regional water table approximately 400-500 feet below the top of the mesa. Other than at Boca Negra we did not see much evidence of springs, seeps, or well defined soil creep at the base of the rimrock or in the underlying steep slope. This suggests relatively little lateral migration of water under the basalt toward the cliff edge."

"We are concerned that any heavy discharge into the arroyos or elsewhere along the rim, if not effectively diverted, could accelerate the natural rate of undermining and collapse of the rimrock. Water following utility ditches incised in the bedrock could [infiltrate] joints near the edge and eventually weaken some blocks to the point of collapse.

We have already suggested that the city employ geotechnical specialists to pinpoint local suspect areas in and beneath the cliff.

The city also could inspect builder's plans for procedures to preclude piping and saturation, increased flow into unstable areas or the indiscriminate use of explosives.

A conservative approach might be to require a setback for development to an area where collapse of rimrock is not considered a problem and where soil has sufficient depth to bury utility lines and to provide for natural dissipation of excess groundwater. What such a setback would be might vary by site, depending on local conditions, but it should be determined as a result of testing and analysis by qualified specialists. General soil testing including depth to bedrock throughout the larger areas of Volcano Cliffs Subdivision should provide information useful to contractors and city engineers concerned with expense of installing utilities and with soil moisture retention and discharge."

Soils

Information regarding surface soils on the Northwest Mesa was obtained from the Soil Survey of Bernalillo County and Parts of Sandoval and Valencia Counties (Hacker, 1977). Soils and their distribution are shown on Map 4. Soil characteristics are described in Table II, provided by the National Park Service.

Four types of soils overlie the basalt along the upper edge of the volcanic escarpment. The predominant type is Alameda sandy loam. Only moderately deep and well drained, it occurs on slopes of 0% to 5% in many areas along the upper edge of the escarpment from Piedras Marcadas Canyon to La Mesa Prieta. (See Map 2 for names and locations of specific areas of the escarpment.)

Runoff is medium, wind erosion is moderate to severe, and water erosion is slight. Its shallow depth to bedrock severely limits its use for excavations and dwellings and moderately limits its use for local streets and roads. It is useful for picnic areas, paths, and trails.

The fine sandy loams of the Madurez-Wink association are deep and well drained. They occur on slopes of 1% to 7% along the upper edge of the escarpment south of Indian Petroglyph State Park on the Marsh Peninsula, and south of La Mesa Prieta. Runoff from the association is low, and wind erosion is moderate to severe. Its shrink/swell potential moderately limits use of the Madurez soil for dwellings and local streets and roads, and its dustiness moderately limits use of the Wink soil for picnic areas and paths and trails.

The Akela component of the Akela-Rock outcrop complex is a cobbly sandy loam. It is shallow and well drained. Runoff from the Akela soil is medium, and water erosion is slight or moderate. The underlying basalt is exposed throughout 20% of the complex. Runoff from the Rock outcrop is very rapid, and water erosion is moderate. The complex occurs on slopes of 1% to 9% along the upper edge of the escarpment north of Indian Petroglyph State Park and Rinconada Canyon. Its shallow depth to bedrock and small stones severely limit use of the complex for the engineering and recreational purposes listed in the above paragraph.

TABLE II - SOIL INVENTORY
(Provided by the National Park Service)

MSP UNIT (1)	SOS SOIL SYMBOLS COMBINED IN UNIT (2)	SLOPE	DEPTH TO BEDROCK (FT)	PARENT MATERIAL	CHARACTERISTICS KEYED TO MSP UNIT										NOTES
					GENERAL ENVIRONMENTAL	REPRESENTATIVE TEXTURE	PERMEABILITY	SHRINK SWELL POTENTIAL	GENERAL EMISSION	SEPTIC TANK ABSORPTION	DIMES & ORNAMENTS	SMELLINGS LOCUS	WITHOUT ROADS & DRIVEWAYS	PIENIC AREAS	
I	ME Rock outcrop- flats complex	10-50%	0-1	Basaltic lava rock	Weathered bedrock with shallow, discontinuous soils	Rock outcrop and coarse gravel loam	Moderate; well drained	Low	Water & wind slight to moderate	Severe; depth to rock	Severe; thin layer, large stones	Severe; depth to rock	Severe; depth to slope, small stones	Moderate	
	MAc Basalt rock out- crop complex	1-5%													
II	MAb Fluvial sandy loam	1-4%	1-4	Eolian sand over basalt	Weathered bedrock with stabilized wind-laid sand	Sandy to coarse gravel/ cobble loam	Moderate; well drained	Low	Water slight wind moderate to severe	Severe; depth to rock	Severe; piping (3), low strength	Moderate; depth to rock	Slight	Slight	Rating for human use based on MAc
	LU8 Latene sandy loam	1-5%	5+	Water & wind laid alluvium (post- lava)	Deep soil developed on uncon- solidated alluvium	Fine sandy and sand/clay loam	Moderate; well drained	Low to moderate	Water & wind moderate	Moderate; depth to rock	Severe; piping (3), low strength	Moderate; shrink swell	Slight	Slight	Rating for human use based on MAc
III	MAp Madurez-Hink association	1-5%													
	MR Kokan-rock outcrop association	25-40%	0-7	Water- laid alluvium fine- level and boulders from caprock	Steep colluvial slope on poorly consolidated sand and gravel	Sand/gravel loam and scattered boulders	Very rapid; successively well drained	Low	Water moderate	Moderate to severe; slope	Severe; seepage slope	Moderate to severe; slope	Severe; stones	Severe; stones	

TABLE II - SOIL INVENTORY

MAP UNIT (1)	SCS SOIL SYMBOLS COMBINED IN UNIT (2)	SLOPE	DEPTH TO BEDROCK (FT)	CHARACTERISTICS NEVED TO MAP UNIT				LIMITATIONS FOR HUMAN USE NEVED TO MAP UNIT				NOTES		
				GENERAL PARENT MATERIAL	GENERAL ENVIRONMENT	REPRESENTATIVE TEXTURE	PERMEABILITY	SHRINK SWELL POTENTIAL	GENERAL EROSION HAZARD	SEPTIC TANK ABSORPTION	DIKES & EMBANKMENTS		WELLINGS WITHOUT BASEMENTS	LOCAL ROADS & STREETS
V	BkD Bluepoint-Hokan association	5-40%	5+	Water-laid alluvium sand pre-lava Sanka Fe Group	Deep soil on poorly consolidated sand & gravel	Sand/gravel loam	Rapid; very well drained	Low	Water moderate to severe; wind severe	Slight to moderate; slope	Severe; piping(3), seepage	Slight to moderate; slope	Slight to moderate; slope	Severe; dusty, too sandy
	BCC Bluepoint loamy fine sand	1-5%												
	PAC Pajarito loamy fine sand	1-5%												

FOOTNOTES:

- (1) Refer to special map prepared on 'Petroglyph National Monument' base.
- (2) Combined symbols, characteristics and limitations derived from 1977 SCS 'Soil Survey of Bernalillo County, etc., New Mexico'.
- (3) Piping defined in above report as 'formation by moving water of tunnels or pipeline cavities in the soil.'



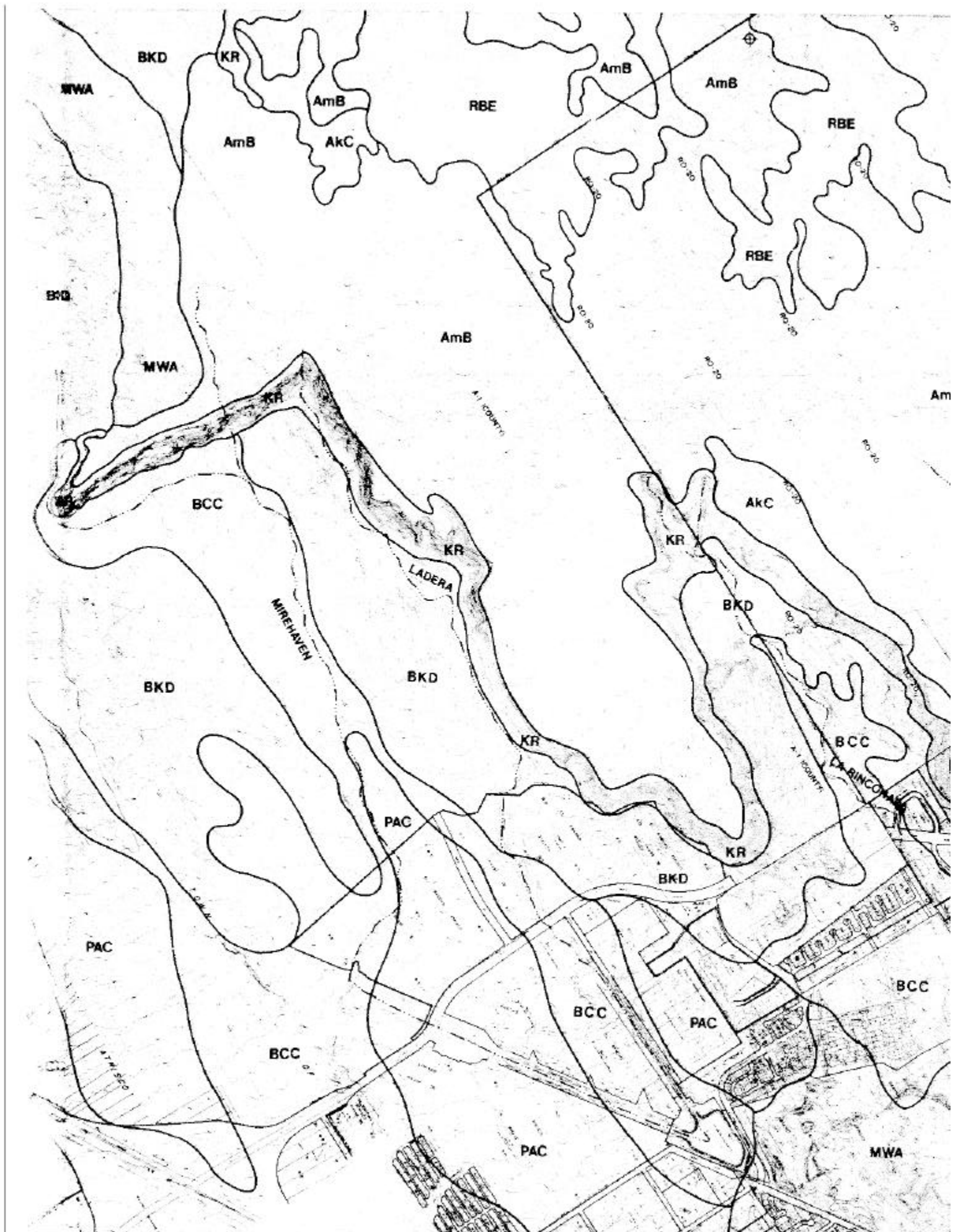
SOILS

Symbol	Soil Name
AkC	Akela-Rock outcrop complex, 1-9% slopes
AmB	Alemeda sandy loam, 0-5% slopes
BCC	Bluepoint loamy fine sand, 1-9% slopes
BKD	Bluepoint-Kokan association, hilly
KR	Kokan-Rock outcrop association
LiB	Latene sandy loam, 1-5% slopes
MWA	Madurez-Wink association, gently sloping
PAC	Pajarito loamy fine sand, 1-9% slopes
RBE	Rock outcrop-Akela complex, 10-50% slopes
To	Tome very fine sandy loam

MAP 4

SCALE
0 1,000 FT





Latene sandy loam is deep and well drained. It occurs on slopes of 1% to 5% along the upper edge of the escarpment south of Indian Petroglyph State Park. Runoff is medium, and water and wind erosion are moderate. Its small stones moderately limit its use for excavations, but it is useful for the other previously mentioned engineering and recreational purposes.

The Kokan-Rock outcrop association characterizes the face of the volcanic escarpment. The slopes of the basalt flow at the top of the escarpment are nearly vertical. Basalt boulders three to four feet in diameter cover 40% of the escarpment face. Runoff is rapid, and water erosion is slight. The Kokan component is a gravelly sand which occurs on slopes of 25% to 45% near the base of the escarpment. Runoff from the Kokan soil is slow, and the hazard of water erosion is slight. Its shallow depth to bedrock, steep slopes, small stones, and inability to maintain cut slopes severely limit use of the complex for the engineering and recreational purposes listed above.

The predominant soil association along the base of the volcanic escarpment and on the bluffs south of La Mesa Prieta is the Bluepoint-Kokan association. The Kokan component occurs on slopes of 15% to 40%. The Bluepoint component occurs on slopes of 5% to 15%. Runoff from the association is slow, and water erosion is moderate to severe. Their tendency to cave severely limits use of both soils for shallow excavations, and their dustiness, sandiness, and small stones severely limit their recreational use. On slopes of 8% to 15%, their use for dwellings and streets is moderately limited. On steeper slopes, their use for those purposes is severely limited. Both soils are deep and excessively drained.

Bluepoint loamy fine sand occurs on slopes of 1% to 9% at the base of the escarpment in the Piedras Marcadas Canyon area and between La Mesa Prieta and Interstate 40. Soil characteristics and limitations are the same as those of the Bluepoint component of the Bluepoint-Kokan association.

The following summary of the complex interrelationships between soils, geology and drainage, is excerpted from the National Park Service's report entitled "Albuquerque West Mesa Petroglyph Study", June 1987 draft (see Table II):

"Soil has formed on West Mesa as the rocks have slowly weathered. The common parent materials are basalt and fine alluvial silt and sand. Sand is common in this environment and, if not part of the parent rock, is soon added by the wind. On the mesa top, soil varies in depth from 0 on the escarpment rim and volcanic cones to more than 5 feet in broad areas of little slope.

Mesa top soils impose certain constraints on development. Vertical joints along the rim of the escarpment are planes of weakness, and as the soft sediments below the basalt are weakened by water passing down the joints, blocks of rock detach and roll down the slope. This instability would be increased by indiscriminate use of explosives and by utility line trenches channeling surface water into the joints. Care should be taken in the use of explosives and in trenching for utility lines to avoid

channeling surface water into the joints. Back from the rim where the soil is deep enough to bury utility lines without disturbing bedrock, development would have less impact and would be less costly. An additional problem is low soil density and therefore low bearing strength. To correct this problem, the soil should be precompacted before constructing streets and building foundations. Another constraint is susceptibility to wind erosion. Piping (formation of horizontal conduits below the surface) could be a problem if soils are locally saturated for extended periods.

Below the mesa, especially along the northern and central parts of the escarpment, the soil is fine silt and sand requiring construction techniques such as precompaction and as little cut-and-fill as possible. Beyond the south end of the escarpment the soil has similar constraints, but because it is coarser sediment -- sand and gravel in addition to silt -- it has greater bearing strength. Trails on sandy flats and on the steep sand-and-boulder slopes below the rim should be aligned and constructed with special care."

Vegetation

The soils in the escarpment area support four different native plant communities. These plant communities are described in the soil survey (Hacker, 1977), and summarized by the National Park Service in Table III. The first consists primarily of grasses mixed with some shrubs and annual plants. It is supported by the Alameda sandy loam, the Madurez-Wink association, and the Latene sandy loam on the mesa above the volcanic escarpment. The native plant community normally covers approximately 15% of the soil surface. Black grama is the dominant grass. Sand dropseed, mesa dropseed, galleta, and other grasses occur less abundantly. Juniper and long leaf sage are the dominant shrubs, and woody plants are found in the drainageways. Tansy mustard, Indian paintbrush, woolly Indian wheat, and other annual plants increase in years with above average precipitation. If the plant community is disturbed, sand dropseed becomes prominent, and the annual plants, cactus, catclaw mimosa, and broom snakeweed increase significantly.

The second native plant community also consists primarily of grasses. It is supported by the Akela component of the Akela-Rock outcrop complex on the mesa above the volcanic escarpment. The native plant community covers approximately 10% of the soil surface. Galleta and black grama are the dominant grasses. Sand dropseed, spike dropseed, mesa dropseed, and other grasses occur less abundantly. Fourwing saltbush, winterfat, and wolfberry are the dominant shrubs. Annual plants include loco weed, groundsel, fiddleneck, and verbena. If the plant community is disturbed, the black grama and bush muhly decrease and the sand dropseed and annual plants increase.

The third native plant community consists of grasses and shrubs. It is supported by the Kokan component of the Kokan-Rock outcrop association that characterizes the face of the volcanic escarpment and the Bluepoint-Kokan association that occurs along the base and southwest of the volcanic

TABLE III - VEGETATION INVENTORY
(Provided by the National Park Service)

MAP UNIT (1)	ASSOCIATED PLANT SOIL UNITS (TABLE II) NAME	SLOPE & DEPTH TO BEDROCK (FT)	DRAINAGE & TEXTURE	POTENTIAL FOR REESTABLISHING HABITAT (2)			SCS PLANT COMMUNITY NUMBER	PLANT SPECIES (3)			NOTES
				WILD SHRUBS	WILD HERBS	RANGELAND WILDLIFE		GRASSES (4)	SHRUBS (4)	ANNUALS (4)	
A	I Galleta/Black Grass GRASSLAND	1-50% 0-1	Shallow well-drained sand & gravel on basalt bedrock	Poor to fair	Poor	Poor	6	GALLETA (6) BLACK GRASS (5) sand dropseed (6) spike dropseed mesa dropseed bottlebrush squirreltail Indian ricegrass bush wuhly (5) silver bluestem three-awn	FOUR-WING SALTBRUSH WINTERFAT WOLFBERRY creosote bush broom snakeweed rubber rabbit brush	loco (7) groundsel fiddleneck verbena sunflower labbsquarters Russian thistle cheatgrass six-weeks grass	Two species classified as sensitive by the State of New Mexico are unlikely but potentially could occur in the area within any of the four map units. These are <i>Astragalus feensis</i> and <i>Pediocactus pappiracantha</i> (verbal communication, Paul Knight)
B	II & III Black Grass GRASSLAND (some shrubs)	0-25 1-5	Frequently deep well-drained sand & gravel	Poor to fair	Poor to fair	Poor	4	BLACK GRASS sand dropseed (6) mesa dropseed galleta three-awn blue grass alkali sacaton bush wuhly Indian ricegrass	APACHE PLUME broom snakeweed (6) broom dalea prickly pear cactus (6) small soapweed cholla cactus (6) winterfat catclaw mimosa (6)	tansyestard (7) Indian paintbrush woolly Indian wheat labbsquarters Russian thistle bladderpod	
C	IV Four-wing Saltbush/Black Grass MIXED SHRUB GRASSLAND	25-10% variable	Deep excessively drained sand/gravel/boulders	Very poor	Very poor	Poor	3	BLACK GRASS BUSH WUHLY Indian ricegrass bottlebrush squirreltail needle and thread feathergrass sand dropseed mesa dropseed three-awn galleta	FOUR-WING SALTBRUSH (7) sand sagebrush creosotebush winterfat broom snakeweed squawcurrant brickell bush rubber rabbitbrush sotol cholla cactus prickly pear cactus	fiddleneck (7) labbsquarters Indian paintbrush loco	Map shows community present in north windrow Sec. 17, R2E, T11N. Although not mapped, community may also be present in middle and south windrows respectively, Sec 20 and Sec 20 & 29, R2E, T11N.

TABLE III - VEGETATION INVENTORY

POTENTIAL FOR REESTABLISHING HABITAT (2)

PLANT SPECIES (3)

MCP UNIT (1)	ASSOCIATED PLANT COMMUNITY (TABLE II) NAME	SLOPE X & DEPTH TO BEDROCK (FT)	DRAINAGE & TEXTURE	WILD LIFE			SCS PLANT COMMUNITY NUMBER	GRASSES (4)	SHRUBS (4)	ANNUALS (4)	NOTES
				SHRUBS	HERBS	WILD ANIMALS					
D V	Sand sagebrush/ Indian Ricegrass MIXED SHRUB GRASSLAND	0-4% 5+	Deep, very well drained sand and gravel	Fair	Poor	Poor	2	INDIAN RICEGRASS black grama giant dropseed bush mahly galleta sand dropseed mesa dropseed spike dropseed sand bluestem little bluestem	SAND SAGEBRUSH (7) four-wing saltbush Morson tea wolfberry rubber rabbitbrush winterfat broom delia broom snakeweed bushmint cholla cactus	jimsonweed fiddleneck daisy verbena tansymustard aster laabsquarters	If community is disturbed, wind becomes active and blowouts in- crease in size and number. Dalea scariosa which is state sensitive (3C) but not being consid- ered for federal classification is very likely present in sandy areas of this map unit (verbal communication, Paul Knight).

FOOTNOTES

- (1) Refer to special map prepared on 'Petroglyph National Monument' base.
- (2) SCS ratings
- (3) Species expected on undisturbed sites. Grazing and other human influences have significantly altered the natural proportions of plants on most sites, particularly in map units A, B, and D. For example, broom snakeweed is much more common now than would be expected under natural rangeland conditions.
- (4) Listed in descending order of dominance.
- (5) Species decreasing with disturbance.
- (6) Species increasing with disturbance.
- (7) With disturbance, all plants of the group (i.e., shrubs or annuals) tend to increase.

escarpment. The native plant community covers approximately 10% of the soil surface. Black grama and bush muhly are the dominant grasses. Indian ricegrass, bottlebrush squirreltail, and needle-and-thread occur less abundantly. Fourwing saltbush is the dominant shrub. Sand sagebrush and winterfat are also present. Annual plants include fiddleneck, lambsquarters, and Indian paintbrush. If the plant community is disturbed, the annuals increase in number, the shrubs increase in number and size, and pricklypear and cholla cacti invade.

The fourth native plant community also consists of grasses and shrubs. It is supported by the Bluepoint component of the Bluepoint-Kokan association and the Bluepoint loamy fine sand that occurs at the base of the escarpment in the Piedras Marcadas Canyon area and between La Mesa Prieta and Interstate 40. The native plant community covers approximately 15% of the soil surface. Indian ricegrass is the dominant grass. Black grama, giant dropseed, and bush muhly occur less abundantly. Sand sagebrush is the dominant shrub. Fourwing saltbush, Mormon tea, and wolfberry are also present. Annual plants include jimsonweed, fiddleneck daisy, and verbena. If the plant community is disturbed, soil erosion is severe and blowout areas become more dominant. Shrubby plants also increase.

Within the Rock outcrop component of the Akela-Rock outcrop association and the Kokan-Rock outcrop association, observers have noted that some of the boulders collect small quantities of water, and the soils between them remain moist for several days after a storm. Areas of grasses, annuals, and relatively dense stands of shrubs, including squawberry, skunkbush and wax current occur in areas where moisture is thus retained. (Milford, 1984: Informal Field Lecture; Stiner, 1986:3.6.)

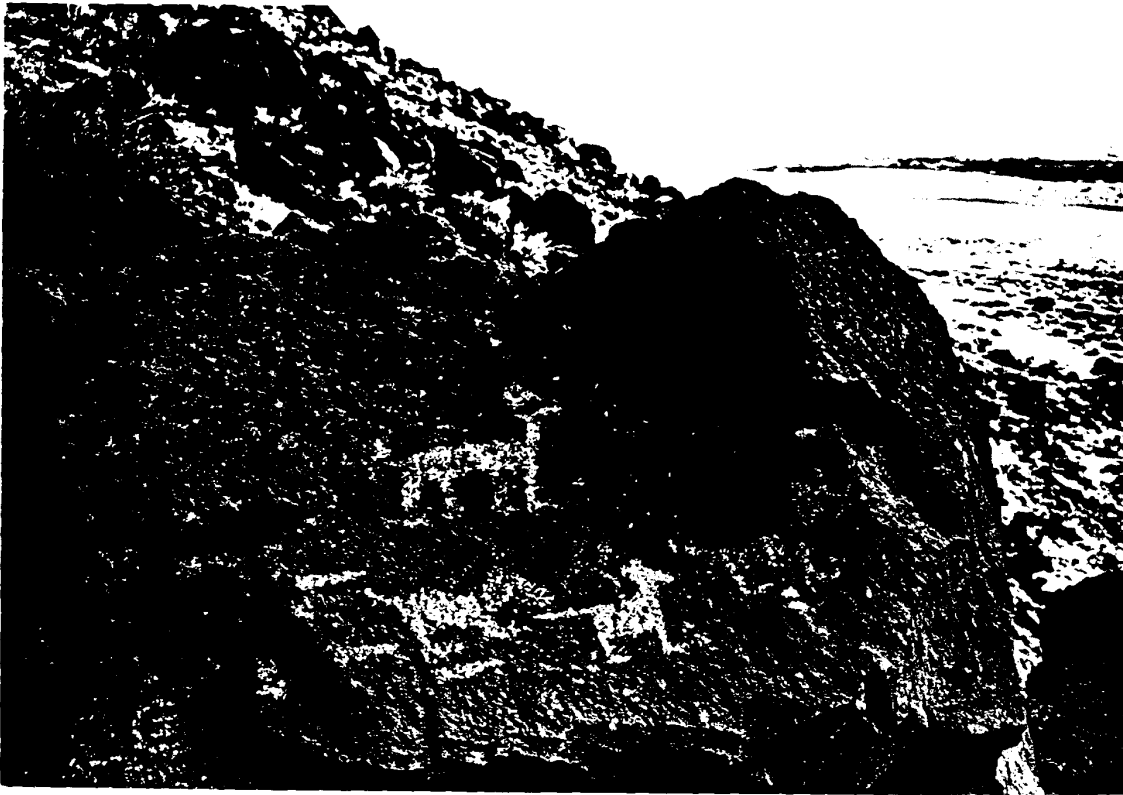
Two areas along the escarpment where high quality, relatively undisturbed native plant communities have been observed are the areas immediately east of La Mesa Prieta and Rinconada Canyon.

Animal Life

There has been no formal zoological study of the entire escarpment, but portions of it have been studied by biologists and ecologists for more than a decade, principally through the University of New Mexico (UNM) Biology Department. The National Park Service has provided a wildlife inventory -- see Table IV. Extensive research projects in the area have included studies of the co-evolution of plants and insects, the scorpion population, and desert millipedes, termites, and other detritus eating organisms. Biological values associated with the escarpment and the mesa open space adjacent to it include its ecological diversity and its value for biological study of this desert region.

In addition to the UNM studies, an archaeological team which surveyed the escarpment in 1985 recorded a number of wildlife observations during its work in the field. The basalt-littered mesa scarp provides abundant shelter and den locations for local animals. A large number of old dens (associated bone debris and digging marks in the soil suggest that many were used by canids), numerous owl roosts, and frequent sightings of fox, hawk (*Buteo* sp.), diamond

back and prairie rattlesnakes, rabbits, and lizards were observed by all team members during the month of August 1985. Exceptionally high numbers and varieties of species were associated with the "Dune Series" plant regime. This vegetation generally occurs in low lying areas below the face of the escarpment in the northern two-thirds of the archaeological survey area. It includes dense stands of Indian ricegrass and fruit bearing shrubs. The high quality of the forage and/or protective cover was considered to be responsible for the significant number of small mammals, reptiles, and birds sighted in the area. (Stiner, 1986: 3.4, 3.6, 3.8.)



Steven W. Donahue, photographer

TABLE IV - WILDLIFE INVENTORY
(Provided by the National Park Service)

MNP UNIT (1) SOIL VEGETATION	ASSOCIATED UNITS (2) (TABLES II & III)	HABITAT DESCRIPTION	MAMMALS (3)										REPTILES (3)			INVERTEBRATES	
			CARNIVORES	UNGULATES	LACRIMIPES & RODENTS	LAGOMYS	BATS	SEPTORS	BIRDS (3)	GROUND & PERCHING	SNAKES	LIZARDS	INSECTS	ARACHNIDS & DIPLUPODS			
1	I, II, & III	mesquite - weathered lava flows, stony soils on slopes and flats. Grassland, some shrubs.	Coyote Bobcat	Pronghorn (H)	Black-tailed jack-rabbit Desert cottontail Whitethroat woodrat squirrel Spotted ground squirrel (H) Valley pocket gopher Mangrove rats (Merriam, Banner-tail) Beaver mouse White-footed mouse Rock pocket mouse	Western pipit (H)	Great horned owl (N,F) Burrowing owl (N,F) Red-tailed hawk (F) Swainson hawk (H) Golden eagle (F) Marsh hawk (N,F)	Scaled quail Raven Horned lark Others Migrants on flyway	Prairie rattlesnake Belted snake Western coachwhip	Six-lined racerunner (trip-tail) Prairie (and other Sceloporus spp.) Lesser earless Sceloporus spp. Round-tailed horned	Harvester ant Grasshopper spp. Barkling beetles Tarantula hawk Beetles Robberflies Sucking bugs Moths Others	Wolf spider and others Sun spider (solpugid) Scorpions incl. Paruroctonus aguilonialis					
2	IV	Escarpment Slope - well watered bouldery colluvium steep-slopes. Mixed shrub-grassland.	Gray fox (D) Striped skunk (D) Longtail weasel (B) Raccoon (D) Ringtail (H) Coyote Bobcat (B)	Whitethroat wood-rat (H) Antelope ground squirrel (H) Rock squirrel (H) White-footed mouse Rock pocket mouse Porcupine (D)	Western pipit (H) Big freetail (H)	Great horned owl (H) Burrowing owl (P,F) Red-tailed hawk (H)	Raven Rock wren Mourning dove Say's phoebe Others Migrants on flyway	Prairie rattlesnake Great plains rat snake (H) Night snake (H)	Six-lined racerunner (whip-tail) Prairie (and other Sceloporus spp.) Great plains skink (H) Leopard (collared)	Same as above plus scathilids	Wolf spider and others Scorpions incl. YELOVIS sp. Common desert millipede (Orthopodius ornatis) Rare endemic millipede (Cosmochellus sp.)						

TABLE IV - WILDLIFE INVENTORY

PPP UNIT(1) BOTL	ASSOCIATED UNITS (2) (TABLES II & III)	VEGETATION	HABITAT DESCRIPTION	MAMMALS(3)			BIRDS(3)			REPTILES (3)			INVERTEBRATES		
				CARNIVORES	UNBILATES	LAGOMORPHS & RODENTS	BATS	RAPTORS	PERCHING	SWANES	LIZARDS	INSECTS	DIPLOPODS	ARACHNIDS & DIPLOPODS	
3	V D		Sandy Flats - sandy, well-drained areas including hills, flats and washes. Mixed shrub-grassland.	Gray Fox (F) Kit fox (B) Striped skunk (F) Longtail weasel (F) Raccoon (D) Badger Coyote Bobcat	Neotoma (D)	Black-tailed jack-rabbit Desert cottontail Antelope ground squirrel (F) Spotted ground squirrel (H) Valley pocket gopher Kangaroo rats (Dob, Merriam, Bennett) Beaver White-footed mouse Silky pocket mouse Plains pocket mouse (H) Grasshopper mouse (H) Porcupine (D)	Great horned owl (F) Burrowing owl (M,F) Red-tailed hawk (F) Swainson hawk (H) Spurrow hawk (F) Golden eagle (F) Marsh hawk (M,F)	Scaled quail Road runner Raven Horned lark Hudsonian (Western or Rio Grande) Brown towhee (H) Sage thrasher (H) Western kingbird Horning dove Others Migrants on flyway	Prairie rattlesnake Bullsnake Western coachwhip Western hognose (H) Prairie land other <u>SEE ABOVE</u> spp. Lesser earless Round-tailed horned	Same as above minus scorpions	Wolf spider and others Sun spider (scorpion) Scorpions incl. Paruroctonus <u>equilonis</u>				

FIGURE 2:

(1) Refer to special map prepared on 'Petroglyph National Monument' basin.
(2) Some animals are associated with certain vegetation and soil types; others which are highly mobile such as insects and carnivores may range widely. In some cases an animal may den or nest in one habitat, and forage in another.

(3) Key to abbreviations used below:

- B - Den
 - H - Hypothetical based geographic range and habitat requirements.
 - R - Roost
 - N - Nest
 - P - Perch
 - F - Forage
 - O - Occasional
 - Y - In washes
- All others have been observed or reported highly likely by wildlife biologists.

NOTE: Many of the species and their habitats are based on information from Clifford Crawford of the University of New Mexico and David Haffner of the New Mexico Museum of Natural History.

There are no animals species in the area that are threatened or endangered on either federal or State of New Mexico lists. However, the willipede *Couachellus* is probably endemic and is restricted to a very small geographic area.

The escarpment has special ecologic significance. This long, narrow zone consisting of the cliff and slope and sand flats below is an ecotone where many species interact and where natural conditions are easily disrupted by humans. Impacts increase as residential and other development expand into the corridor. For example, domestic cats reduce lizard and rodent populations. Another impact is shooting of raptors and songbirds in areas open to target practice. This narrow zone is still a primary 'natural gallery' but it is becoming fragmented as development continues. Large integral tracts that remain in natural condition, such as the southern end and Rinconada sections of the escarpment, will be increasingly important ecologic units.

Significant Views

The eastern edge of the mesa offers a panoramic view of Albuquerque and its natural environment. Western vistas encompass the upward sweep of the mesa, terminating with the volcanic cones. Eastern vistas include elevated perspectives of the City and the bosque and dramatic views of the Sandia and Manzano Mountains. The face of the escarpment generally forecloses western vistas from the base, but the southern volcanoes can be seen from the mouth of Rinconada Canyon. Eastern vistas from the base are generally the same as those on the mesa. By blocking all other views, the encircling walls of Lower Piedras Marcadas and Rinconada Canyons emphasize the eastern vista. In contrast, a series of rolling ridges along the base of La Mesa Prieta block all views of the City, creating a sense of isolation. Appendix C further explains viewing the mesa and escarpment top, and provides part of the rationale for the regulations in the design overlay zone (Chapter 4).

Climate

Meteorologic conditions on the Northwest Mesa differ only slightly from those in other areas of Albuquerque. Midday winter temperatures are mild. Nighttime winter temperatures are usually 1 to 5 degrees below freezing. Midday summer temperatures often approach and sometimes exceed 100 degrees F., but the nights are cool, with temperature drops of 40 to 50 degrees being common. Thermal retention by the dark rocks tends to prolong the growing season on the basalt flow. Direct sunshine is recorded on an average of 360 days each year. The average annual precipitation is about 8.7 inches. About 45% of it occurs during July, August, and September in the form of localized thunderstorms. The storms are sometimes torrential and can cause flash floods, although the rapid runoff from the mesa is quickly absorbed by the escarpment sands and gravels. The prevailing winter winds are from the north. Winds from the west and northwest are also common. Prevailing summer winds are from the southwest or south. March and April are months of frequent wind storms. Severe winds from the east are less common on the Northwest Mesa than in other areas of Albuquerque. (Chambers-Campbell-Isaacson-Chaplin, Inc., 1980: 3.5-3.8.)

MAN-MADE CHARACTERISTICS

Roads and Road Corridors

The escarpment is crossed by one paved roadway, Atrisco (Unser) Drive at Petroglyph State Park, and by several unimproved and/or unofficial roads which provide access to private properties in the general proximity. Two other significant crossings are: an unnamed road which is cut into the basalt immediately south of the Marsh Peninsula and Calle Nortena, a bladed road in the Volcano Cliffs Subdivision which connects to Taylor Ranch Drive.

The Long Range Major Street Plan designates several major streets in the proximity of the escarpment. The arterial and collector streets with specified alignments include 98th Street, Unser Boulevard, Paseo del Norte, Taylor Ranch Drive and a portion of Calle Nortena, immediately east of the escarpment. Several streets will need to cross arroyos (Map 5).

General corridor study designations are identified for 81st Street/Unser Corridor and the Ladera Extension. The 81st Street/Unser Corridor study is to evaluate the need for a major facility across the mesa top to directly link Unser Boulevard, west between Unser Boulevard, south of Rinconada Canyon, and Atrisco Drive above Petroglyph Park. A new crossing of the escarpment would be required to construct such an alignment. The Ladera Extension study is to evaluate the need for a major facility to link existing 98th Street at I-40 with Paseo del Volcan at the Double Eagle II Airport/Volcano Park. This corridor does not cross the basalt escarpment but contains a potential alignment (a.k.a. Paseo del La Merced) which parallels the Ladera/Mirehaven Arroyo west to the upper mesa. The arroyo skirts the southernmost tip of the basalt escarpment. The potential road alignment would stay south of the arroyo.

Unser Boulevard is a composite alignment of existing facilities linked together to form a continuous alignment. It begins at Interstate 40, heads north staying below the escarpment, joins former Atrisco Drive at the Marsh Peninsula, and crosses the escarpment at Petroglyph State Park, then joins former Kimmick Boulevard in the Volcano Cliffs Subdivision area, continues northerly keeping west of the Piedras Marcadas Canyon, then joins the former Lyons Boulevard in Paradise Hills. It continues in a northeasterly direction until it joins 20th Street at the Sandoval County Line. This facility is proposed to be developed initially as a four lane, staged construction, access controlled principal arterial. The required right-of-way of 156 feet can accommodate up to eight lanes. The existing crossing of the escarpment currently bisects Petroglyph State Park. An alternate alignment which would cross the escarpment south of the park has been proposed and will be considered at the time of roadway design.

Paseo del Norte is proposed to be developed initially as a four lane, staged construction, access controlled principal arterial. The required right-of-way of 156 feet can accommodate up to eight lanes. It should be noted that during Environmental Planning Commission review of the Paradise Corridor Study which defined the Alameda Grant Line alignment for Paseo del Norte, it was specified the escarpment crossing as six lanes with a reduced median cross section (as small as six feet wide).

Calle Nortena was recently removed from the Long Range Major Street Plan and is now designated as a local street. The downgrade in classification also reduces the design requirements for right-of-way, street cross-section and grade.

Other local roads may be designated for development in platted areas. (Middle Rio Grande Council of Governments of New Mexico, 1986:Long Range Major Street Plan for the Albuquerque Urban Area; Mitchell, 1986: Field Observations.)

Bikeways

The 1986 Bikeways Master Plan for the Albuquerque Urban Area identifies several bikeway facilities as existing, programmed, or proposed in the general vicinity of the escarpment. (Map 6) A bike route now exists along Atrisco Drive from Indian Petroglyph State Park to Ladera Drive. Ultimately, this

facility is proposed to be included in a proposed trail along Unser which extends from I-40 north to the Sandoval County line. The Unser facility currently exists from I-40 north to Ladera Drive.

Paradise Boulevard is currently programmed as a route, with the ultimate facility proposed as a lane. Paseo del Norte is programmed for a lane from Golf Course Road west to above the escarpment, and a trail west of Calle Nortena. Calle Nortena is currently proposed as a bike route as it ascends the escarpment. Atrisco Road west of Unser is proposed as a trail connecting northward to the Sandoval County line via Rainbow Boulevard. La Paz Drive is proposed as a lane from Unser northward to Paradise Boulevard. A bike trail is also proposed along the Unser/81st/Kimmick extension study corridor above the escarpment.

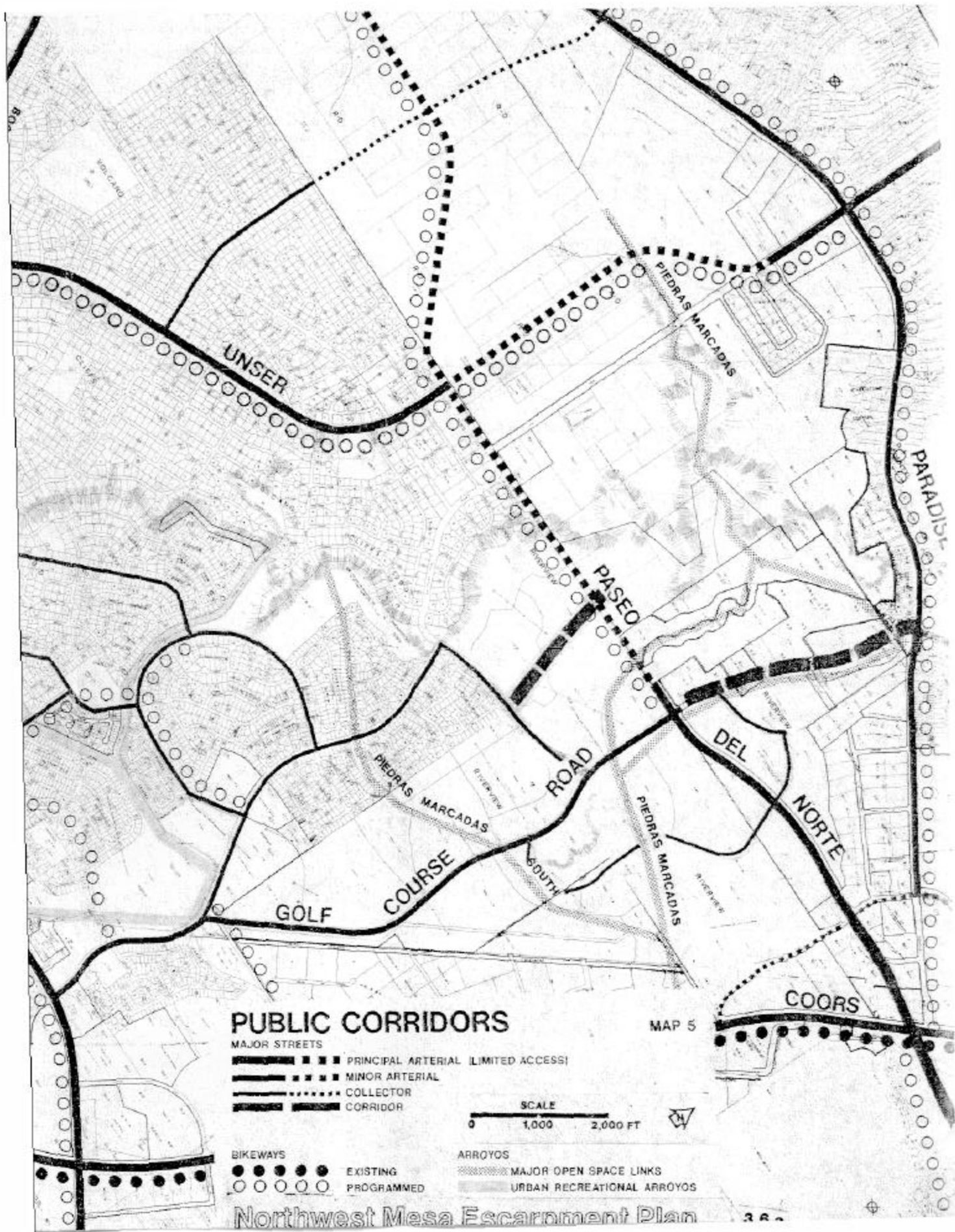
In addition, several recreation oriented bike trails are proposed along drainage and open space corridors in the area. Among others, trails are proposed along the Rinconada, Calabacillas, Mariposa, Ladera (between Unser and 98th Street), Piedras Marcadas, San Antonio, and La Boca Negra drainageways below the escarpment. An additional recreational trail is proposed along the top of the escarpment beginning above the northeastern edge of Rinconada Canyon, extending west along the top edge of the escarpment to Paseo del Volcan south of Double Eagle II Airport. This recreational bike trail could conflict with protection and management of the natural and cultural resource values of the Rinconada and La Mesa Prieta.

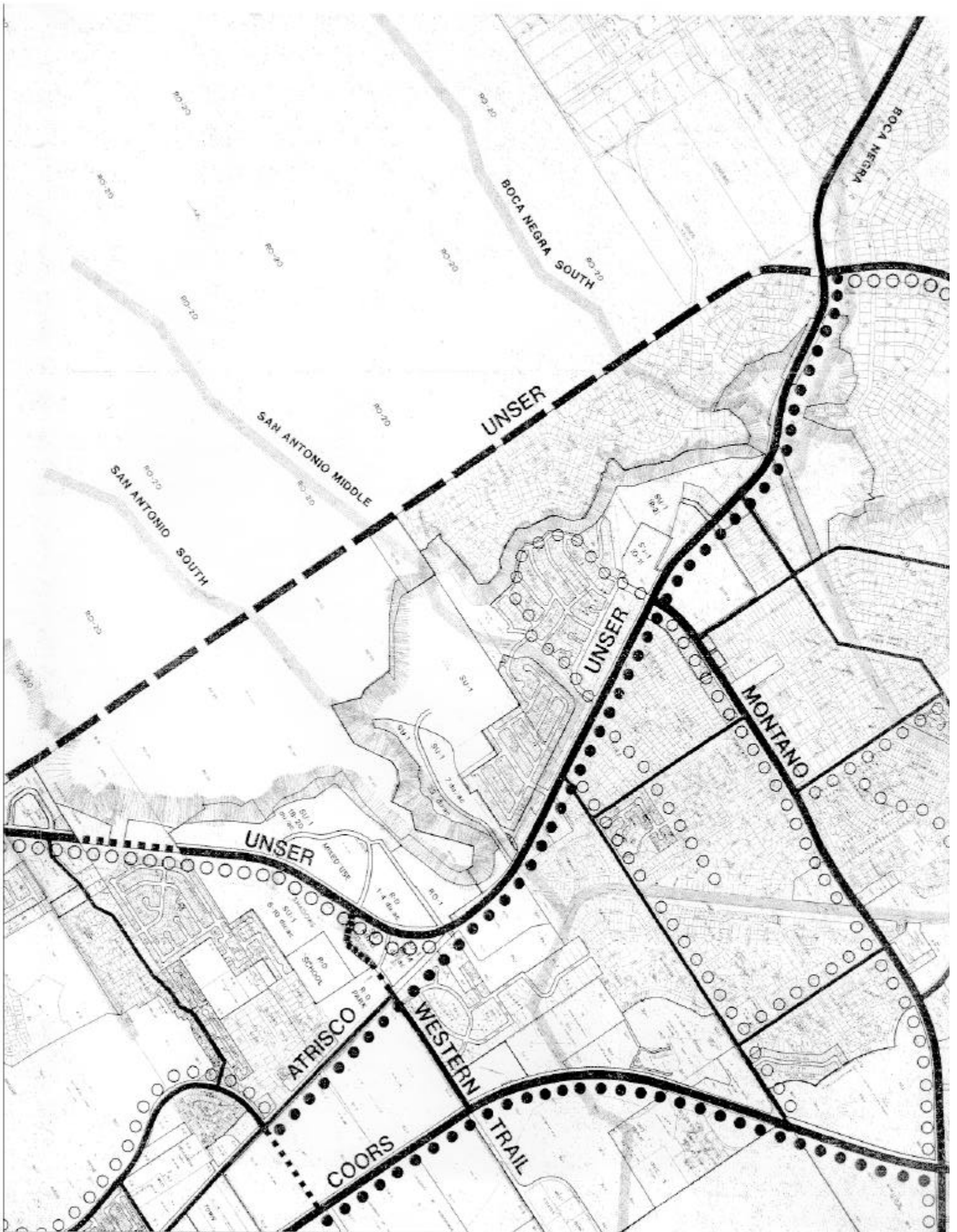
Air Traffic

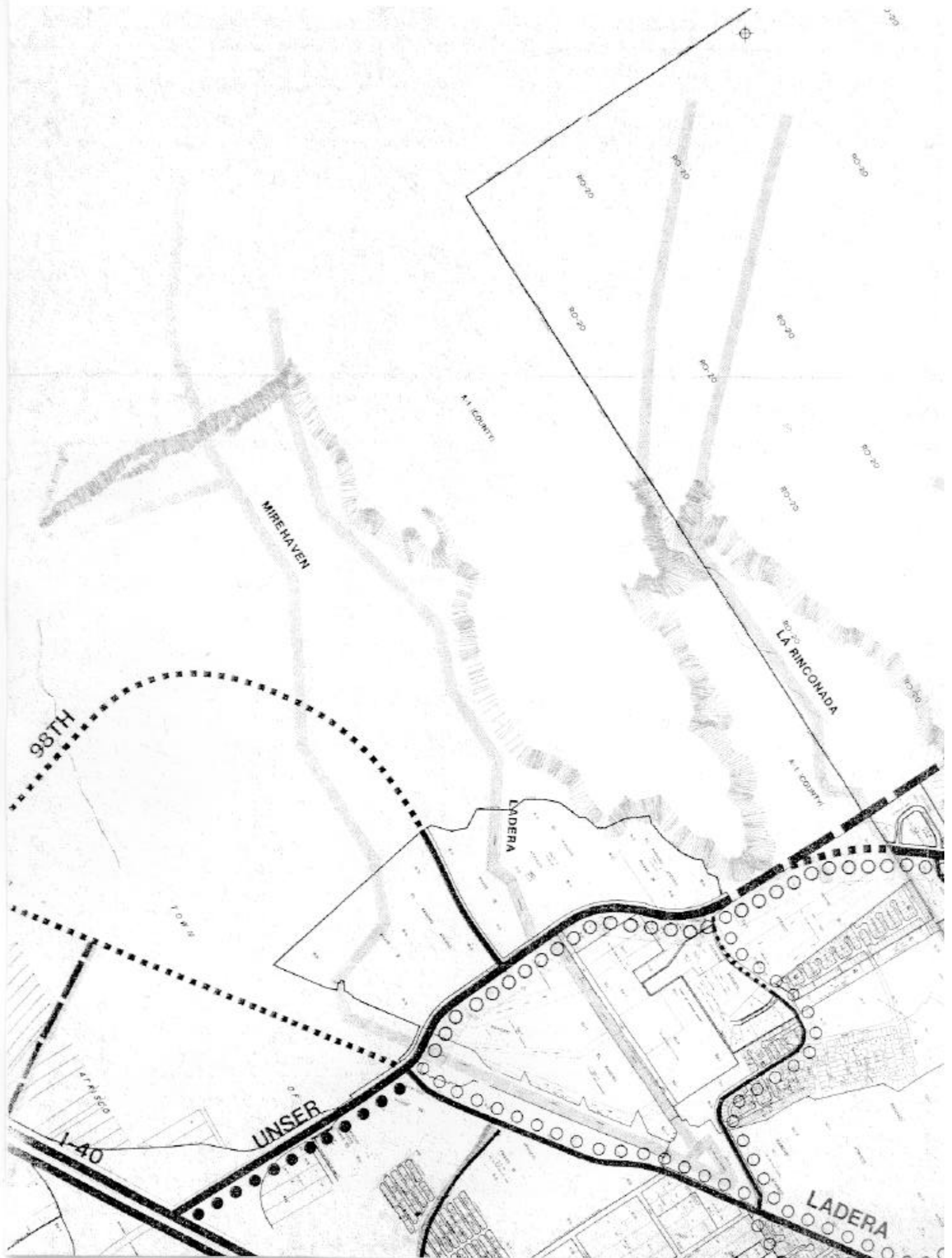
Aircraft using the Albuquerque International Airport follow random traffic patterns that occasionally cross the escarpment. Noise levels from aircraft using Double Eagle Airport will be below levels which necessitate noise attenuation measures. (Chambers-Campbell-Isaacson-Chaplin, Inc., 1980: Figure E-17.)

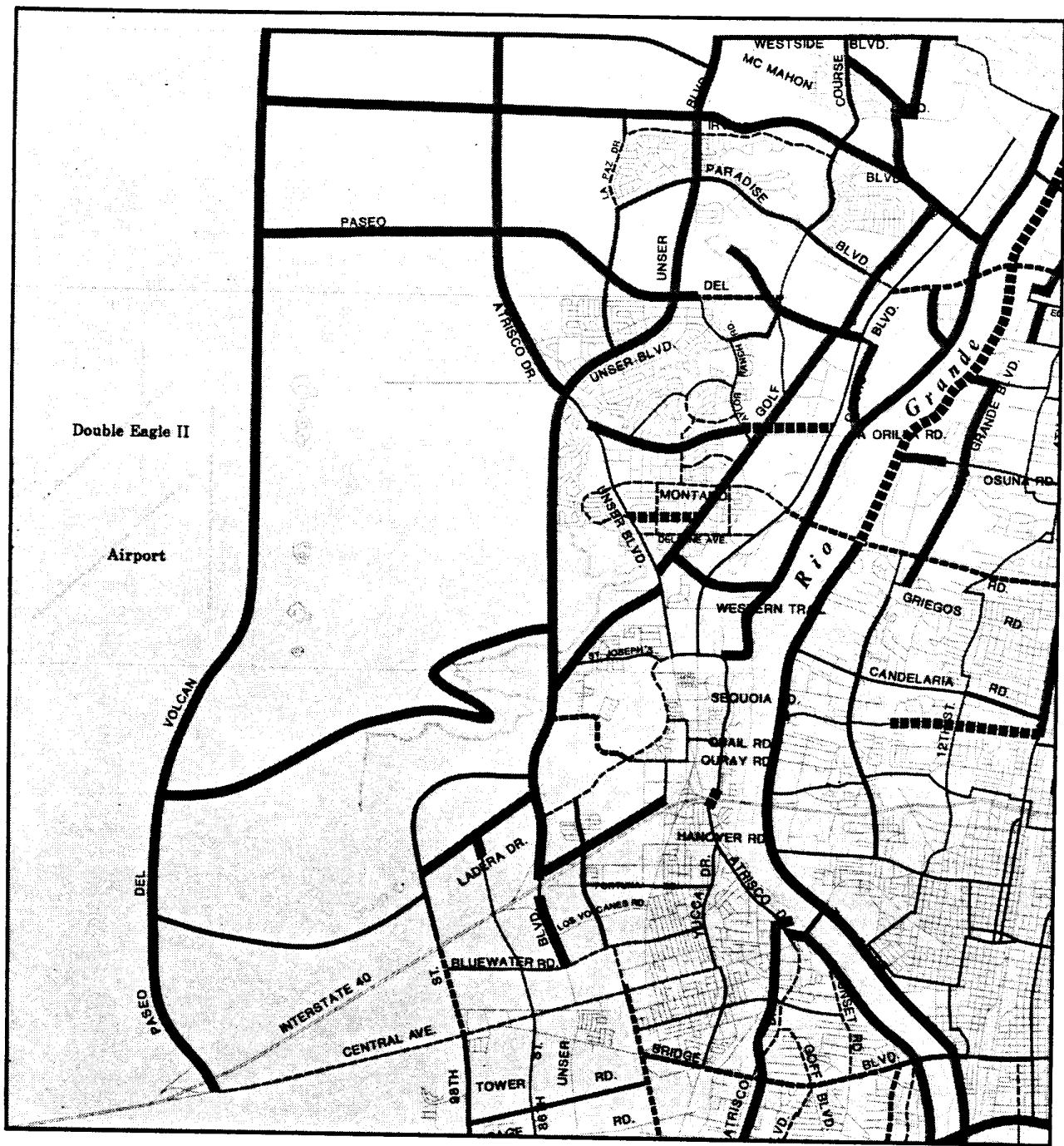
Utilities

There are currently a few points along the escarpment where utility lines cross the volcanic rock or serve the area above the escarpment. (Map 7) A 16-inch - 600 psi gas line traverses the escarpment near Atrisco Blvd. The line is buried four to five feet within a 100-foot easement. At Rinconada Canyon, five high voltage (115 KV or above) overhead electric lines cross the escarpment. A 24-inch water line in a 48-inch casing was recently placed through the Marsh Peninsula and serves development below the escarpment north of Marsh Peninsula. There is an existing 24" water line from the reservoir which crosses the escarpment to serve the area below. A 2-inch water line from the existing reservoir serves the Horse Complex in Boca Negra Park. Electrical distribution and telephone service have been provided to the Horse Complex by an overhead line which crosses the escarpment south of Unser. In some cases, these utility lines have disturbed the escarpment, causing visible scarring at points of disturbance.









BIKEWAYS MASTER PLAN

MAP 6

TYPE \ STATUS	STATUS		
	Existing	Programmed	Proposed
Trail	—————		—————
Lane	—————	—————	—————
Route	—————	—————	—————

Source: Middle Rio Grande Council of Governments

Archaeological and Historical Resources

An archaeological survey of the volcanic escarpment was completed February 1, 1986. The volcanic escarpment and all areas within 50 meters of the top and bottom of the escarpment were surveyed. The general purpose of the study was to obtain a broad base of information that could be used for planning purposes. (Schmader and Hays, 1986.)

The survey recorded over 10,500 petroglyphs in 130 concentrations and many more isolated groupings of petroglyphs distributed almost continuously along the volcanic escarpment. The actual number of petroglyphs may be as high as 15,000. The escarpment is indisputably one of the largest and most concentrated rock art sites in North America, making the escarpment an historical landmark.

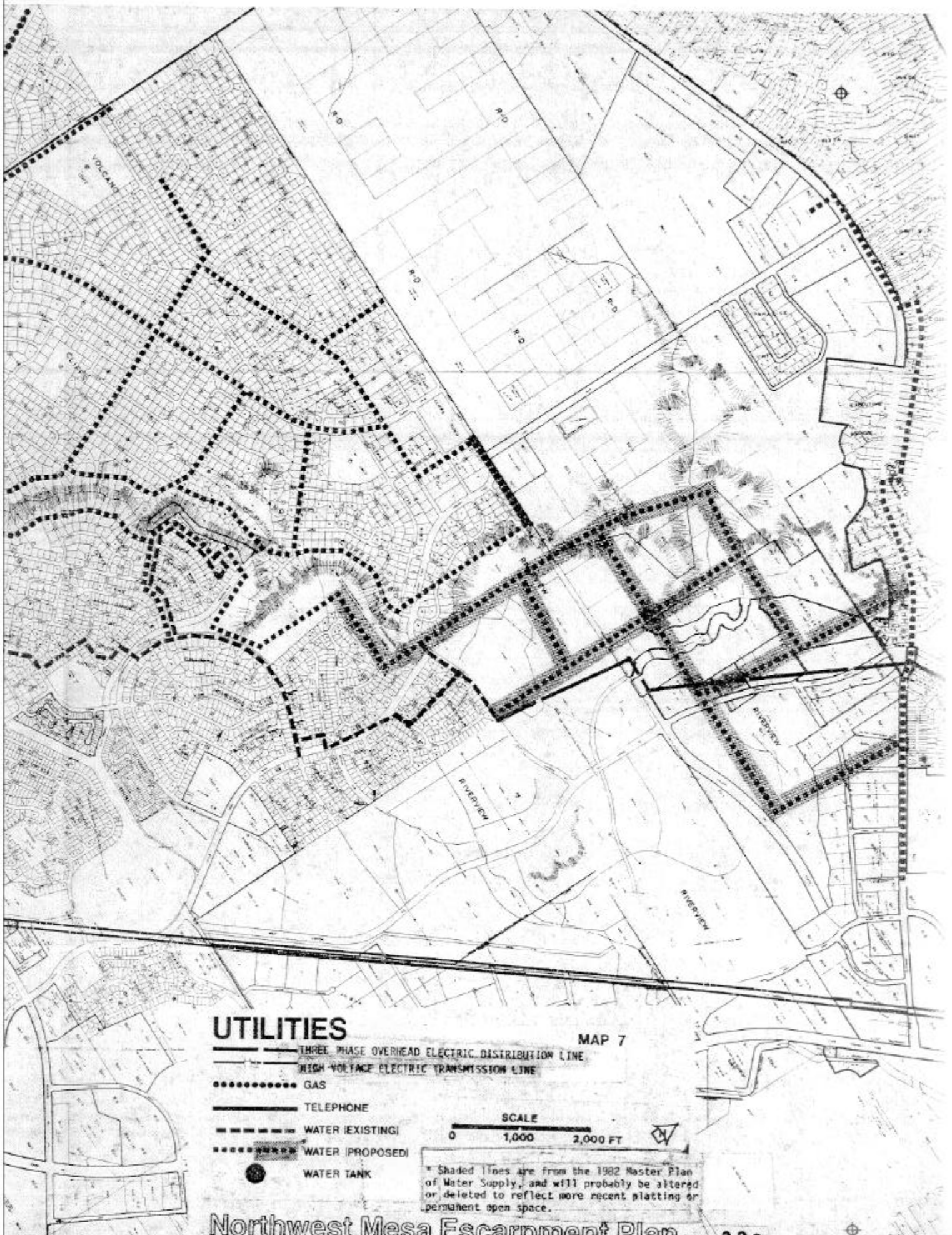
The style and patina of the petroglyphs suggest that a few may date to late Archaic times (ca. 500-1800 B.C.). Some may be early Anasazi (ca. 1000 A.D.), but most are probably late Anasazi (ca. 1300-1540 A.D.). The highest proportion (20.4%) are of indeterminate form; the second highest proportion (18.2%) are zoomorphs; and the third highest proportion (16.8%) are geometrics. Although they are less abundant than many of the prehistoric motifs, historic initials and Christian crosses were also documented. (Archaeological sites are not mapped in this Plan in order to keep the sites confidential and protect the resource.)

The survey located 67 archaeological and historical sites in addition to the petroglyphs. These include areas for making stone tools, agricultural terraces, dams, fieldhouses or shelters, early Hispanic sheepherding camps and corrals, early ranching sites, and historical trash dumps. More than 300 grinding slicks or boulder metates were recorded. They indicate a widespread use of plants, and the unexpectedly large number of water and soil control features suggests that the escarpment was a significant prehistoric agricultural area. There appears to be a strong correlation between concentrations of petroglyphs and associated archaeological sites. As a result of the survey, an understanding of the importance of the area to both prehistoric and historic inhabitants is emerging.

The surveyed area is a designated historic district and is on the State Register of Cultural Properties and the National Register of Historic Places. These designations will ensure that appropriate procedures are followed when state and federal funds are used for projects undertaken in the district. They provide land owners with financial incentives to protect and/or enhance the archaeological values associated with their properties. In addition, they render the district eligible for federal grants-in-aid whenever Congress makes such funds available.

Different densities and types of archaeological resources are associated with different parts of the escarpment, and comparative evaluations were developed for each of six areas.

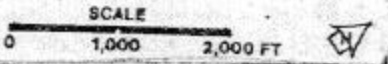
The northern 1/5 of the escarpment, referred to as Piedras Marcadas Area, is vital to the successful management of the whole. More than 3,500 petroglyphs, approximately 1/3 of the total assemblage, are located in the area.



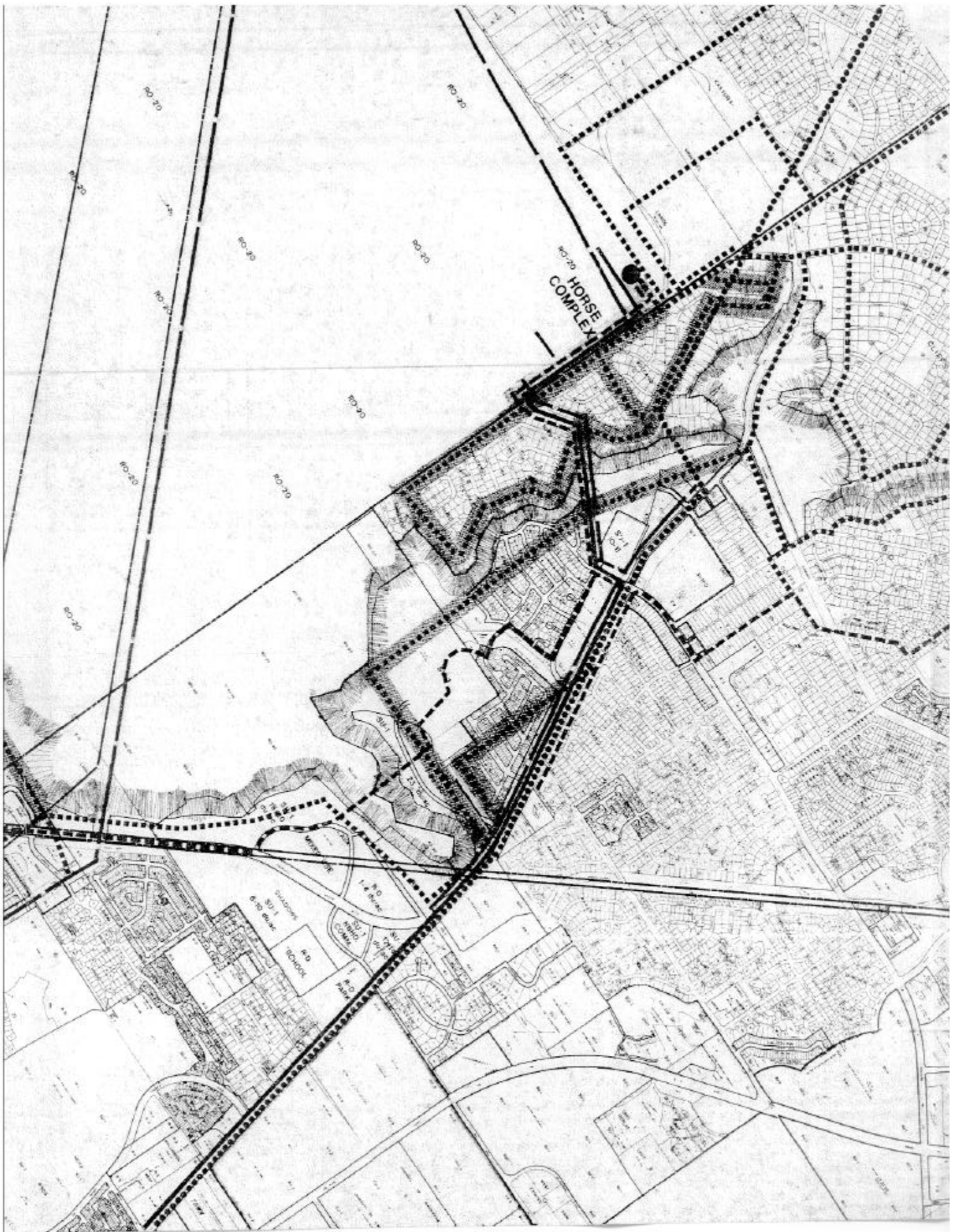
UTILITIES

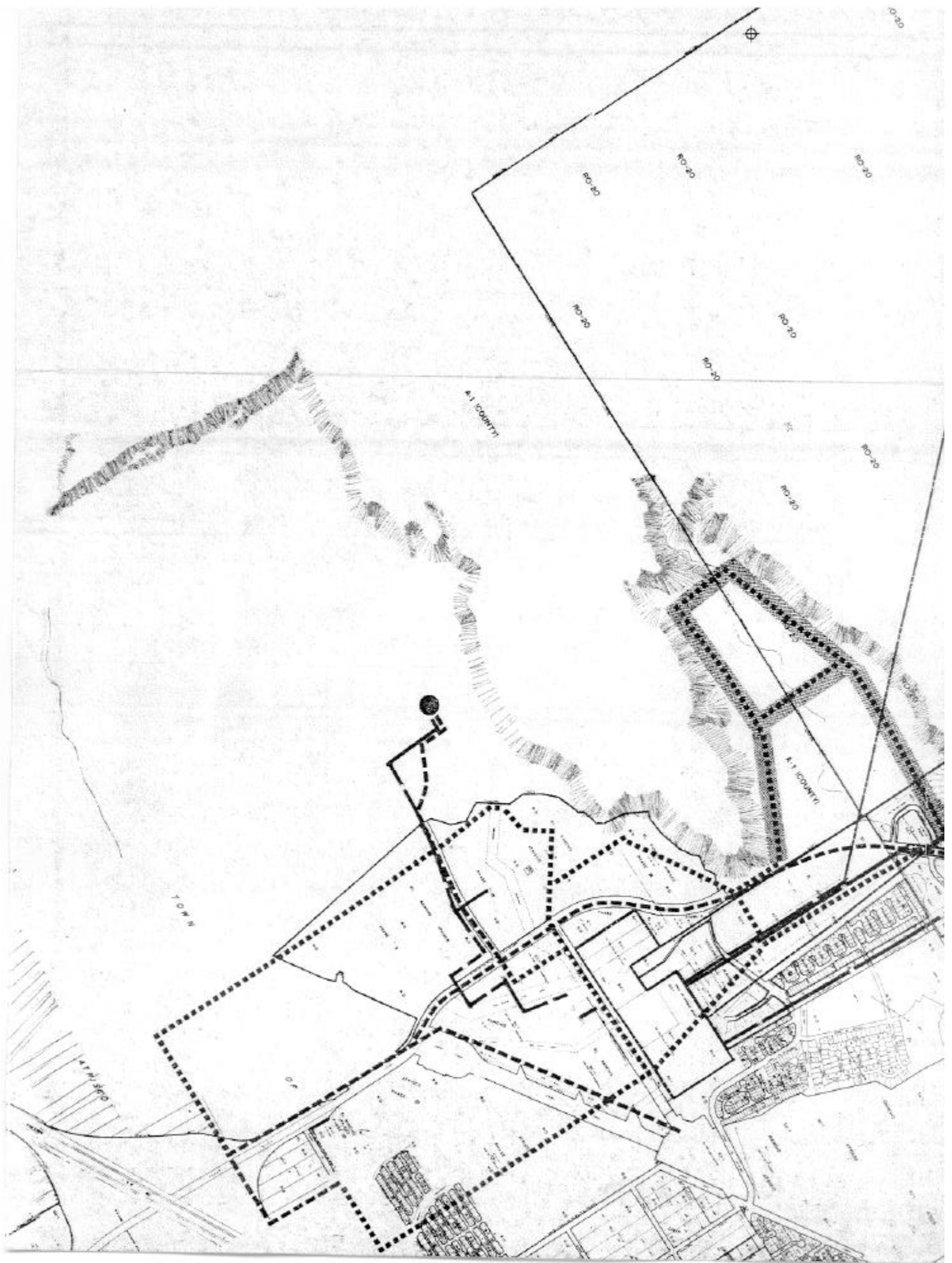
MAP 7

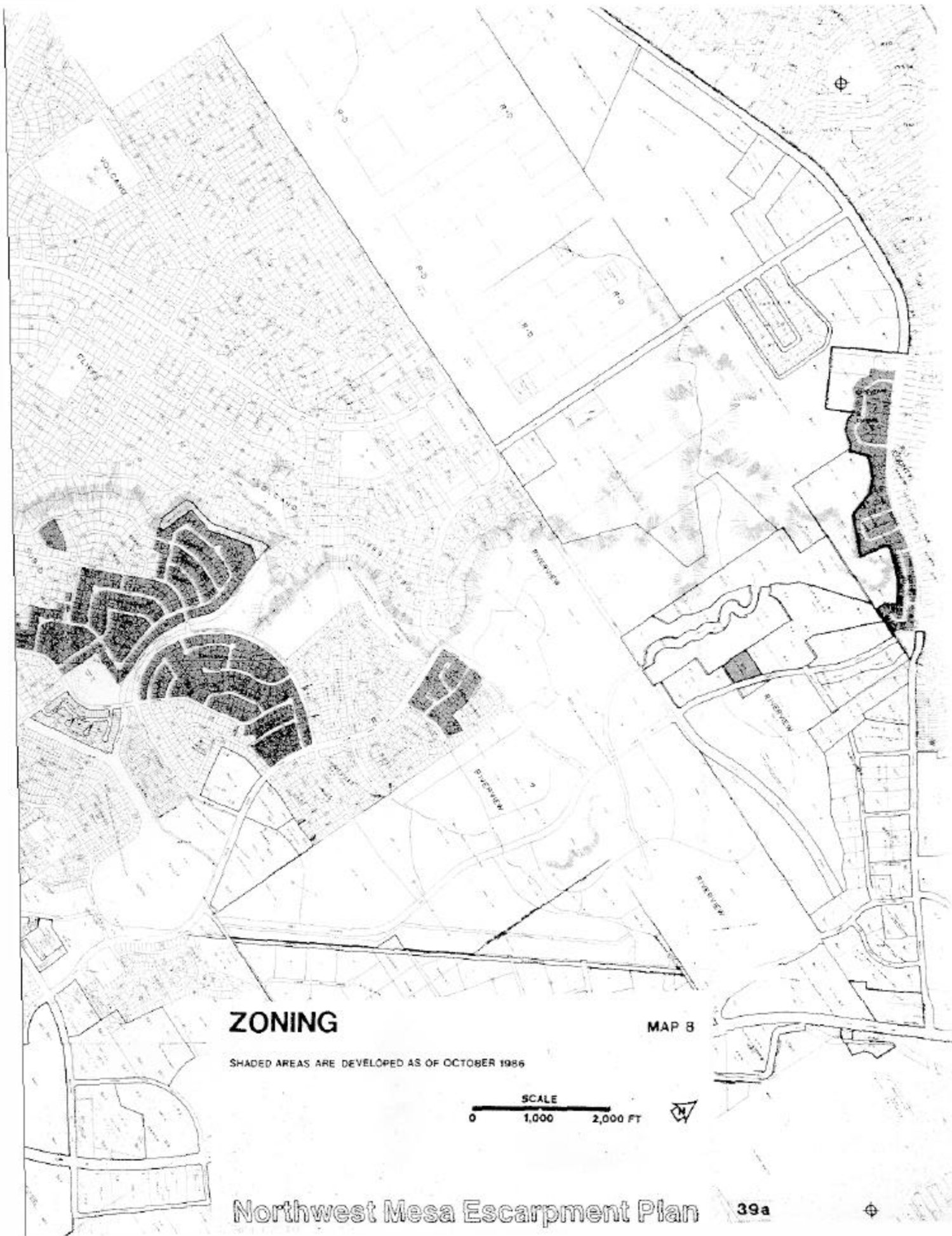
- THREE PHASE OVERHEAD ELECTRIC DISTRIBUTION LINE
- HIGH VOLTAGE ELECTRIC TRANSMISSION LINE
- GAS
- TELEPHONE
- - - - - WATER (EXISTING)
- WATER (PROPOSED)
- WATER TANK



* Shaded lines are from the 1982 Master Plan of Water Supply, and will probably be altered or deleted to reflect more recent platting or permanent open space.







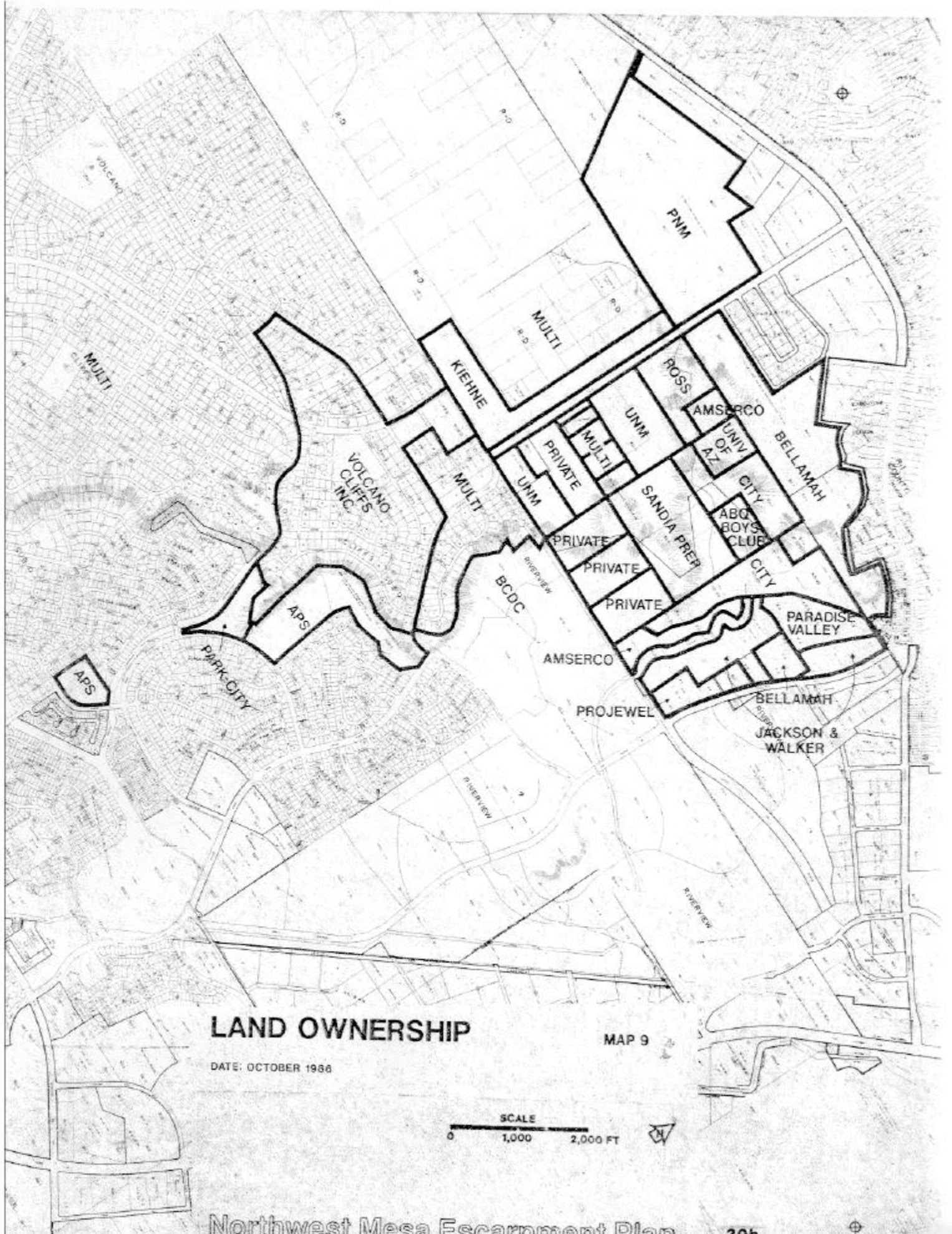
ZONING

MAP 8

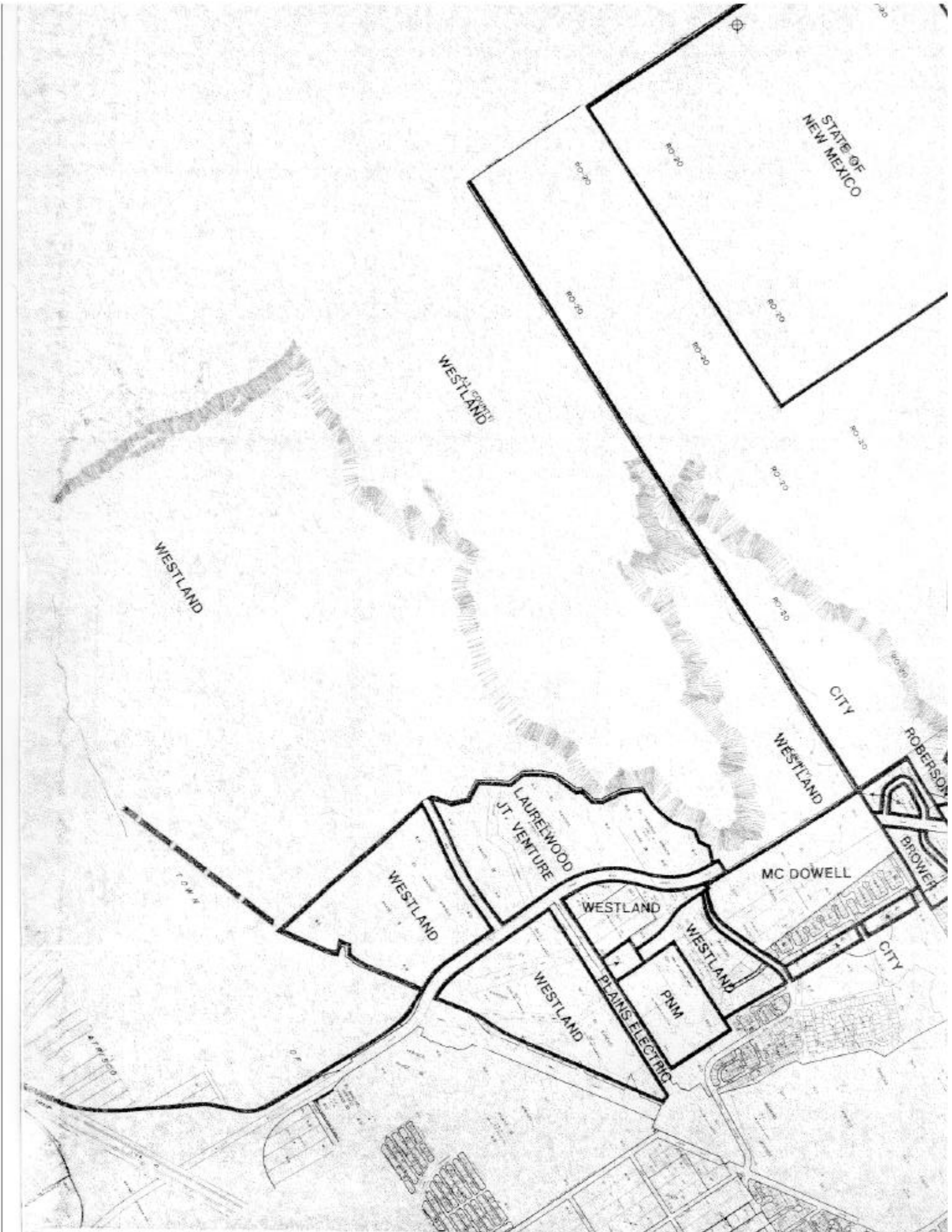
SHADED AREAS ARE DEVELOPED AS OF OCTOBER 1986

SCALE
0 1,000 2,000 FT









The escarpment is less pronounced and covered with significant amounts of sand south of Piedras Marcadas Canyon. There are fewer petroglyphs, and the distances between concentrations are greater there than in other areas.

Petroglyph State Park is a useful facility which highlights the petroglyphs. High densities of petroglyphs were recorded north of Petroglyph Park, but fewer were found south and west of the facility

Large concentrations of petroglyphs were located in all three branches of the San Antonio Arroyo area. A portion of the area above the escarpment appears to be used by Native Americans for religious purposes.

While the northern half of Rinconada Canyon is owned by the City, the southern half is part of the Atrisco Land Grant. The significance of the area is due in part to the size of the canyon, which is the largest in the escarpment area, as well as to its high density of petroglyphs. It appears to have been used prehistorically for agricultural purposes and, historically, for herding.

Approximately 1/4 of the escarpment lies within the Atrisco Land Grant. Thirty-two previously undocumented archaeological sites and at least 3,000 petroglyphs were located in the area. Some of the most spectacular concentrations were found along La Mesa Prieta at the southern tip of the volcanic escarpment. The area is comparatively undeveloped at this time.

Current Zoning and Land Use

Current zoning and platting and areas covered by sector development plans are shown on Map 8. Most of the land at the base of the escarpment is platted and zoned for urban uses. The land south of the Rinconada Canyon is not yet zoned for urban uses although preliminary planning by the owner has begun.

Volcano Cliffs, a single family subdivision platted in 1964, is located adjacent to the escarpment; and, in portions of the subdivision, lots are platted over the escarpment face. A sector development plan for Volcano Cliffs is in progress.

Structures

Single family residences have been built at the base of the escarpment north and south of the Marsh Peninsula. Developed sites within 2000 feet of the escarpment are shown on Map 8. In some areas, notably Taylor Ranch and Paradise Hills, homes are built into the escarpment.

Property Ownership

Approximately 25 percent of the 17 mile length of the escarpment rock face is now in public ownership or reserved as private open space through the R-Dzone. The remainder is in private ownership. Major land ownership is shown on Map 9.

The southern quarter of the escarpment, from Mesa Prieta to the middle of Rinconada Canyon, is within the Town of Atrisco Land Grant. The northern half of Rinconada Canyon is in public ownership. Lands within several miles north and south of Petroglyph Park are platted in small lots with individual ownership. In the Piedras Marcadas Arroyo area, large lot sizes and mixed institutional/private ownership predominates.

Population Growth

The area north of I-40 and west of the Rio Grande has been a significant growth area for several years. As land east of the river becomes more fully developed, development pressures in the northwest are becoming more intense. In 1970, the population of the Northwest Mesa was 10,000. By 1980, the population had increased 240 percent to 24,000. By 1995, the population of the Northwest Mesa is projected to be over 62,000 (City of Albuquerque, 1986).



Steven W. Donahue, photographer

CHAPTER 3: GOVERNING CONCEPTS AND IDENTIFICATION
OF RESOURCE AREAS

GOVERNING CONCEPTS

The process of creating the Northwest Mesa Escarpment Plan is undertaken with appropriate consideration of the environment and surroundings, its importance to the worldwide as well as local community, and existing policy. An ad hoc citizen's committee in conjunction with technical staff discussed objectives which guided the development of governing concepts for the Plan (Appendix B). Therefore:

POLICY #1. THE FOLLOWING NINE GOVERNING CONCEPTS FOR DEVELOPMENT AND CONSERVATION ARE ESTABLISHED.

- a. The unique environmental, visual, recreational, archaeological and historical qualities and opportunities of the escarpment are to be conserved.
- b. The escarpment area is recognized as a fragile and valuable environmental resource which harbors plant and wildlife within a unique geologic formation. Disturbances to the natural environment, in particular to the drainage, basaltic caprock, slopes and vegetation could result in erosion and caving of slopes and boulders and pose a threat to the public safety and welfare by impacting existing and future downstream and downslope development.
- c. The escarpment is to be conserved as an entire unit with a recognizable relationship to the volcanoes which created it, the mesa top which borders it, and the arroyos which bisect it.
- d. The black escarpment face is recognized as giving physical order to the community and as acting as a visual reference point. Views to it and from it are recognized as important.
- e. The archaeological/historical resources are recognized as inexorably linked to their setting. The resources and the setting must always be considered in relationship to each other as well as to other influences.
- f. The natural setting and archaeological/historical resources of the escarpment combine to provide recreational and educational opportunities which are to be developed in ways which will not damage either the setting or the resource. Management and maintenance are recognized as intrinsic needs.

- g. The escarpment is not an isolated portion of the community. It is recognized as physically, culturally and economically integral to the rest of the community and as providing physical, cultural and economic benefit to the community.
- h. Conservation of the escarpment rock art, and related archaeological sites allows for further research and discoveries of the people who inhabited the Middle Rio Grande Valley. The art is not only an artistic expression of the prehistoric peoples, but is a record of their culture and history. The physical and historical connection from the mesa to the valley through an open space network will create significant educational, research and recreational opportunities.
- i. The escarpment's archaeological/historical resources are recognized as important to the world as well as the local community. The benefits of having the resource in our community carries with it a corresponding responsibility to the larger world community.

RESOURCE AREAS: THEIR DEFINITION AND INTENT

The plan's technical team and the ad hoc citizens' task force discussed and determined general importance of resource areas. Their recommendations were used to set the boundaries of the following areas. The following policies and regulations are established pursuant to stated governing concepts and adopted Comprehensive Plan policy.

POLICY #2. FOUR AREAS, INCLUDING THE ESCARPMENT AND SURROUNDING LANDS, ARE ESTABLISHED FOR DIFFERENT DEGREES OF CONSERVATION AS SHOWN ON MAPS 10 AND 2: THE ESCARPMENT FACE, THE CONSERVATION AREA, THE IMPACT AREA AND THE VIEW AREA.

THE ESCARPMENT FACE

The Escarpment Face includes the Kokan-Rock outcrop and lies within the area of nine percent or greater slope along the length of the escarpment. The location of the nine percent or greater slope on Maps 3 and 10 was determined from 1"-200' ortho-topo aerial photographs with 10 and 20 foot contours. It generally follows the base and top of the escarpment. Conservation of the Escarpment Face as open space is intended to:

- protect the petroglyphs and significant archaeological/historical sites located within the boundary.
- protect the public safety and welfare by preventing disturbances to the basaltic caprock and potential caving of the underlying loosely consolidated soils which form the slope, resulting in erosion impacting downstream and downslope development.

to protect the highly visible black line which defines the mesa edge.

Consistent with the adopted policies of the Comprehensive Plan and the Northwest Mesa Area Plan, no development is to be allowed within the nine percent or greater slope boundaries, with exceptions as outlined below. Therefore:

POLICY #3. THE ESCARPMENT FACE SHALL BE KEPT OPEN AND UNDEVELOPED, CONSISTENT WITH THE COMPREHENSIVE PLAN AND THE RANK 2 PLANS FOR THE NORTHWEST MESA.

3-1 No public or private development shall be allowed within the area of nine percent or greater slope as identified on Maps 3 and 12 or as defined through a land survey approved by the City Engineer, with the following exceptions:

- a. Streets which are existing or proposed on the Long Range Major Street Plan as of the date of adoption of this plan. Public and private infrastructure, including drainage improvements, water and sewer trunk lines, bikeways, and private utility transmission lines within the right of way acquired for the final alignment of these streets, subject to the restrictions identified in this plan.
- b. Equestrian and pedestrian trails on existing cuts of the escarpment as shown conceptually on Map 11.

3-2 The nine percent slope line which is the reference line for all four of the areas has been cartographically determined for this plan. Upon adoption of this plan, the reference line will be verified by computer generated mapping and the boundaries for the four areas will be drawn on the official zone maps of the City. These lines will be the official boundaries of the four areas until such time that either A) the City field-verifies the nine percent slope line at the top and base of the escarpment, stakes its location, the location is agreed to by the City and property owner, the survey recorded, and monuments placed, or B) the owner prepares and submits a survey acceptable to both the City Engineer and the City Planner which justifies the relocation of the nine percent slope or the other boundary lines. (If permission from the property owner to survey on privately owned land is not granted to the City, item "B" above applies.)

THE CONSERVATION AREA

The Conservation Area is the area which is appropriate for conservation as open space. The Conservation Area designation does not preclude a property owner's right to develop subject to the land use planning provisions of this plan and the Design Overlay Zone, except that no development will be allowed on the Escarpment Face.

The Conservation Area includes the Escarpment Face (with the exception of already developed properties as shown on Map 8) and areas above and below the Escarpment Face which are intended to:

- Preserve views.
- Protect the most fragile and sensitive areas - La Mesa Prieta, Rinconada Canyon, the Marsh Peninsula, the San Antonio Arroyo (Middle Branch), Petroglyph Park, and Piedras Marcadas Canyon - from vandalism and overuse.
- Protect petroglyphs and significant archaeological-historical sites.
- Provide for recreational trail locations.
- Provide for parking, handicapped access, and exhibits.
- Prevent damage to the basaltic caprock and underlying loosely consolidated soils which could result in erosion and/or caving of slopes and boulders and create a public hazard by impacting downstream and downslope development.

The Conservation Area is generally described as:

- 300 feet adjacent to all sides of the Escarpment Face above Piedras Marcadas Canyon and the interior of the canyon to allow for trails, parking areas and setback of development to protect one of the escarpment's most sensitive areas; and prevent erosion and/or caving of slopes and boulders.
- The double tier of lots platted over the Escarpment Face in the Volcano Cliffs area between Piedras Marcadas Canyon and Petroglyph Park, to protect views, the visual integrity of the landform, and to prevent disturbances to the basaltic caprock and underlying unstable soils, which could result in erosion and/or caving of slopes and boulders and pose a threat to the public safety and welfare. This proposed boundary will set a public roadway adjacent to open space which would allow for public access, views, trails and reduce the need for privacy fencing by eliminating rear lot lines abutting open space, while preventing disturbances to the Escarpment Face as noted above. The Conservation Area is expanded one or two lots to the west in several locations to preserve steeply sloping areas and allow for realigning the roadway to avoid traversing small canyons. The boundary of the Conservation Area below the escarpment within the Riverview Sector Plan conforms to the open space boundary identified in the plats for Shenandoah 3, 4, 5 and 6.

The portion of Volcano Cliffs south of Petroglyph Park, located between the Escarpment Face and Boca Negra Park, to allow for continuous views and trails. This finger of platted land presently separates the escarpment from existing public open space and is an area where the basalt is closest to the surface. Development of this area will be costly in terms of public utility expansion, have an adverse impact on views from a distance, and would cause disturbances to the basaltic caprock which could result in erosion and/or caving of boulders and slopes, and pose a threat to the public safety and welfare.

Rinconada Canyon and La Mesa Prieta which contain significant petroglyphs and other archaeological and historical sites, highly visible natural features, and some of the best native plant and wildlife communities along the escarpment. These areas are also prime locations for providing both visual and physical public access to major points within the open space preserve. The Conservation Area includes the entire Rinconada Canyon and a 250' buffer at the base of the Escarpment Face in order to set back development to an area where collapse of the caprock is not considered a problem and where soil has sufficient depth to bury utility lines and to provide for natural dissipation of excess ground water. The boundaries are coterminous with the National Park Service boundaries identified in alternate 2 of the "Petroglyph National Park - New Area Study" and proceed west to several pronounced knolls, and a 2000-foot wide area from the southern tip of the escarpment extending due west to the grant line located west of the volcanoes. The buffer adjacent to the southern tip is based upon topography and drainage patterns east of the tip. A series of knolls, ridges, and drainageways provide interesting topography and physical and visual separation from urban development to the east. This scenic and accessible area, which will be seen as one drives along 98th Street, is a logical location for major tourist oriented facilities to describe the escarpment, volcanoes, natural features, and archaeology of the area.

The northern geologic window is an important archaeological/historical site which is associated with the escarpment. The window is located on the northeast corner of Volcano Park and is a canyon-like feature where erosion has exposed many layers of separate volcanic flows. These exposed layers of basalt tell the geologic story of how the escarpment was formed. Many petroglyphs are sited on the exposed basalt, representing an historical resource.

* * *

The Conservation Area is intended to remain open space in perpetuity. It generally corresponds to the "Major Public Open Space" and "Public Easements or Rights" identified along the escarpment in the Plan for Major Open Space element of the Comprehensive Plan. It is the City's and County's intent that portions of the land within the Conservation Area be acquired for open space park purposes by public agencies in order to preserve the natural, archaeological and historical resources, and to protect the public safety and welfare. Other portions will not be acquired, but will be protected through the development process by disallowing development adjacent to the publicly owned areas in order to preserve the integrity of the publicly owned open space, preserve views of the escarpment as a landform, and protect the public health and safety.

All efforts shall be made by the City of Albuquerque to preserve the Conservation Area by using the following methods: purchase portions with City funds; establish open space through the planning, development, and annexation processes; arrange for purchase through the State or Federal Governments; acquire conservation easements; acquire the land through property exchanges; or preserve and protect the land in any other legal manner. Therefore:

POLICY #4. THE CITY DESIRES TO PROTECT THE CONSERVATION AREA FROM DEVELOPMENT. IT SHALL MAKE EVERY EFFORT, WITH ASSISTANCE FROM THE FEDERAL AND STATE GOVERNMENTS, TO ACQUIRE PORTIONS FOR OPEN SPACE PARK PURPOSES AND PROTECT THE REMAINDER THROUGH THE DEVELOPMENT PROCESS.

POLICY #5. THE CITY SHALL REVIEW THE IMPLEMENTATION OF THIS PLAN TWENTY-FOUR MONTHS AFTER THE DATE OF ITS ADOPTION TO ANALYZE PROGRESS. AT THAT TIME, THE BOUNDARIES OF THE CONSERVATION AREA WILL BE REASSESSED IN LIGHT OF FISCAL CAPABILITIES.

POLICY #6. WHEN THE BOUNDARIES OF THE CONSERVATION AREA ARE REASSESSED, THE CONSERVATION AREA WILL BE DESIGNATED A HISTORIC OVERLAY ZONE PURSUANT TO THE STATE HISTORIC DISTRICTS AND LANDMARKS ACT AND THE CITY LANDMARKS AND URBAN CONSERVATION ORDINANCE.

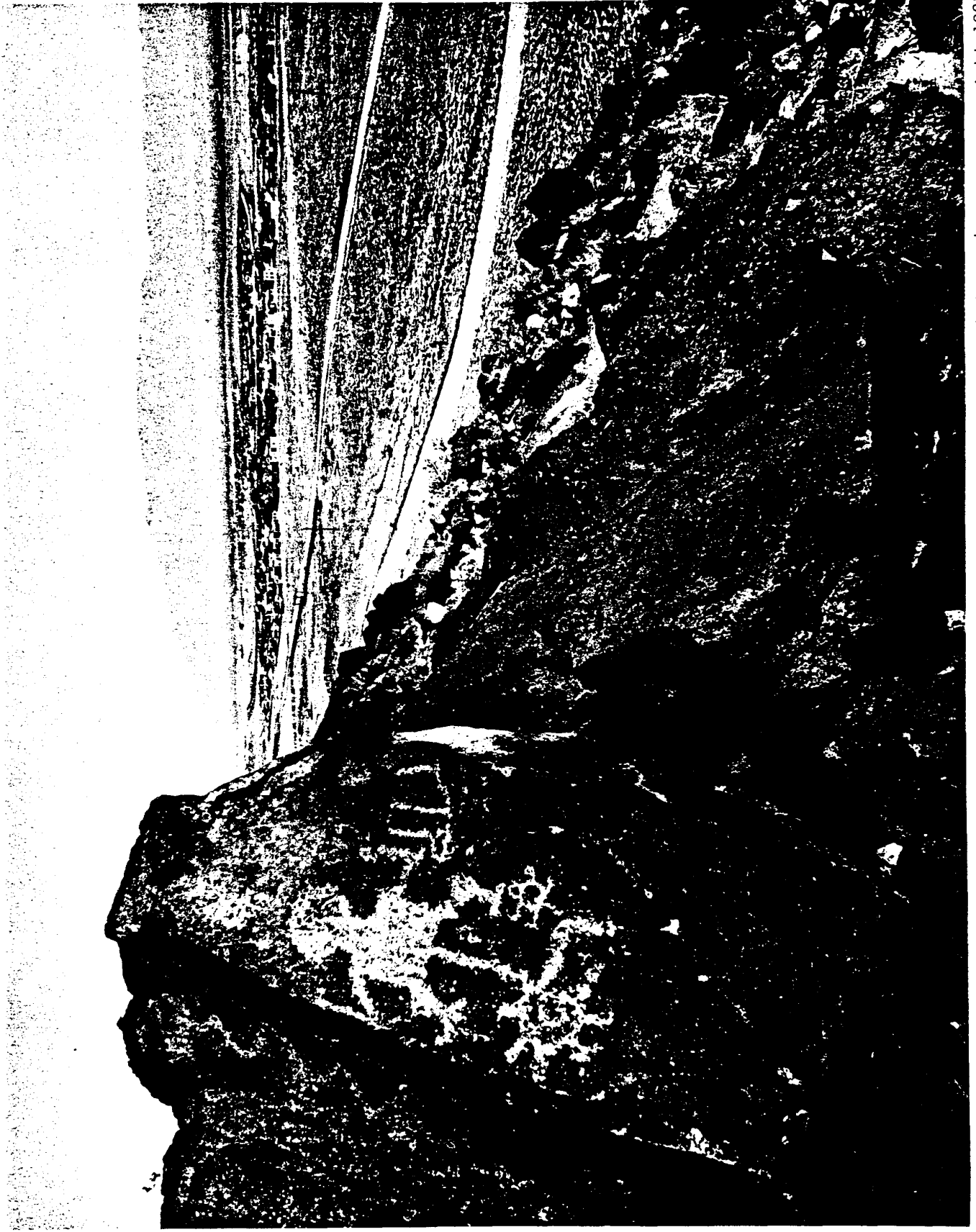
* * *

THE IMPACT AREA

The Impact Area is generally described as the 350 feet immediately adjacent to the Conservation Area, which by its proximity has significant visual and physical impact upon the escarpment or other open space. The Impact Area also includes major streets which are main entrances to the escarpment open space. The Impact Area is subject to design regulations which are intended to enhance the visual character of the development adjacent to the escarpment and associated open space, to protect the fragile nature of the landform and thereby, the public safety and welfare, and to provide a visual transition from open space to development.

THE VIEW AREA

The View Area generally extends west to the edge of the volcanoes, north to Paseo del Norte and Paradise Boulevard, east approximately 1000' from the base of the Escarpment Face to Unser Boulevard and south approximately 5000' from the southernmost tip of the Escarpment Face. This large area comprises the view from a distance. The view area is subject to design regulations which affect views from a distance and enhance the overall character of the area, and as such has fewer controls than the Impact Area.



West Mesa Development, Petroglyphs, 1982. Steven Donahue, photographer. copyright 1982.

CHAPTER 4: DESIGN OVERLAY ZONE

Note to the Reader

The following amendments to the Northwest Mesa Escarpment Plan were approved by the Board of County Commissioners when it adopted the plan on March 15, 1988, subsequent to adoption by the City Council on November 30, 1987. The amendments clarify the review process for development proposals made in Bernalillo County.

1. Bernalillo County does have a design overlay zone in its zoning code. Therefore, Policies 11 and 12 (see below) of the October 1987 draft were deleted in this document.

"The County of Bernalillo does not have a design overlay zone. Although such an overlay should be developed and applied in the plan area, interim protection, to the extent possible, is necessary. Therefore:"

"POLICY #11. LANDS UNDER THE ZONING JURISDICTION OF THE COUNTY OF BERNALILLO SHALL MEET THE ABOVE DESIGN OVERLAY REQUIREMENTS WHENEVER SITE DEVELOPMENT PLANS ARE REQUIRED."

"POLICY #12. A DESIGN OVERLAY ZONE SHALL BE DEVELOPED FOR THE COUNTY OF BERNALILLO."

2. The Board of County Commissioners added the following underlined text to Policy #7, p. 50:

"Site plan approval by either the City or County Planning Commission shall be conditional on plan amendment approval by the City Council and the Board of County Commissioners." [This language is understood to state that only those amendments which fall under the County's jurisdiction will be subject to the Board of County Commissioners' approval.]

3. The Board of County Commissioners added the following underlined text to Policy #8-2, p. 51:

"B. Site development plans on all other parcels, including development plans for single family detached housing, will be reviewed by either the City Planner or the County Zoning, Building and Planning Director, whichever is appropriate, for compliance with this plan."

4. The Board of County Commissioners added the following underlined text to Policy #12-2, p. 58:

"12-2 Application to allow exceptions to the 15' height limit will be reviewed as site plan submittals on a case-by-case basis by either the Environmental Planning Commission or the County Planning Commission, whichever is appropriate."

SECTION 1 - REGULATIONS FOR THE ENTIRE DESIGN OVERLAY ZONE

The City of Albuquerque's Comprehensive Zoning Code allows for a Design Overlay Zone for areas of at least 320 acres which meet at least two of the following three conditions (Appendix F):

- "a. Contain highly scenic natural features or physical setting, or have highly significant views.
- b. Have development potential which is likely to require unusually complex coordination of flood control, transportation, open space, and urban land uses.
- c. Have a strong role in the development of the form of the metropolitan area, arterial street corridors or critical areas near urban centers or historic zones."

The Conservation Area, Impact Area and View Area meet all three of the conditions in that each area contains highly scenic natural features or views; has development potential which will require a complex coordination of infrastructure, land use and open space; and can play a strong role in determining urban form. Therefore:

POLICY #7. FOR PROPERTY WITHIN THE CITY OF ALBUQUERQUE AND BERNALILLO COUNTY, A DESIGN OVERLAY ZONE IS ESTABLISHED WHICH COVERS THE CONSERVATION AREA, THE IMPACT AREA AND THE VIEW AREA AS SHOWN ON MAP 10. ALL DEVELOPMENT WITHIN THE DESIGN OVERLAY ZONE SHALL COMPLY WITH THE DESIGN REGULATIONS OF THIS CHAPTER. VARIANCES OTHER THAN THOSE SPECIFICALLY ALLOWED FOR IN THIS PLAN CONSTITUTE PLAN AMENDMENTS AND MUST FOLLOW THE STANDARD PLAN AMENDMENT PROCEDURE. A REQUEST FOR AMENDMENT TO THE PLAN MAY BE PROCESSED SIMULTANEOUSLY WITH A REQUEST FOR SITE PLAN APPROVAL. SITE PLAN APPROVAL BY EITHER THE CITY OR COUNTY PLANNING COMMISSION SHALL BE CONDITIONAL ON PLAN AMENDMENT APPROVAL BY THE CITY COUNCIL.

7-1 The Planning Director may approve minor changes to this Plan if they are consistent with the use and general scale and intensity as set forth in this Plan, and if the approving official finds that neither the City nor any person will be substantially aggrieved by the change.

* * *

The Development Process Manual (DPM) details submittal requirements for all levels of development approval. The DPM specifies that additional plan information may be required. The soils, slopes, archaeological resources, and other features of the escarpment and adjacent open space provide unique constraints and opportunities for development. As a result, adequate information about these features is necessary for informed development decisions. Therefore:

POLICY #8. WITHIN THE DESIGN OVERLAY ZONE, ADEQUATE INFORMATION TO ENABLE REVIEWING AGENCIES TO DETERMINE COMPLIANCE WITH DESIGN REGULATIONS SHALL BE REQUIRED. REQUIREMENTS OF THE DESIGN OVERLAY ZONE, APPROPRIATE TO THE STAGE OF APPROVAL, MUST BE MET PRIOR TO APPROVAL OF RANK 3 PLANS, LAND DIVISION, SITE DEVELOPMENT PLANS, FACILITY DESIGNS AND BUILDING PERMITS.

- 8-1 All submittals for development approval within the Conservation Area and Impact Area shall include information about soils, slopes, archaeological resources, and other features as shown in Table V. These requirements are in addition to other requirements of the DPM.
- 8-2 Site development plan review is required for development as follows:
- a. Development on parcels zoned SU-1 shall be reviewed through procedures described in the Comprehensive City Zoning Code.
 - b. Site development plans on all other parcels including development plans for single family detached housing will be reviewed by the City Planner for compliance with this plan.

* * *



John R. Holbrook, photographer

TABLE V - CONSERVATION AND IMPACT AREA
DEVELOPMENT PLAN SUBMITTAL REQUIREMENTS AND APPROVAL BODIES

Rank 3 Facility Plans, Corridor Plans	Sector Development Plans	Subdivision Plans	Site Development and Landscaping Plans, Facility Designs	Building Permits
Land Use and Facility Plans: *EPC, CPC Review CC, BCC Approval under joint jurisdiction Drainage Master Plans: PMD, AMAFCA, EPC, CPC Review BCC, CC Approval under joint jurisdiction Road Corridors: EPC, CPC, TCC, TPTG Review UTPPB, BCC and CC Approval under joint jurisdiction	EPC, CPC Review CC, BCC Approval	DRB	EPC, CPC Approval and may also be delegated to DRB	ZEO Approval and City Planner (respon- sible for some review items)
1. An assessment of alternative alignments; finding that no feasible alternative to crossing the Conservation Area exists.	•			
2a. Topographic map, 2-foot contours with nine percent slope line, Conservation and Impact Area boundaries and areas with petroglyphs and archaeological sites indicated, if appropriate.	•	•	•	
b. Plot plan indicating the location of basalt and the nine percent slope.				•
c. Proposed facility locations or alternatives, trail locations.	•	•	•	
d. Proposed building and/or development locations and densities, land proposed for detached open space dedication, or easements or setbacks, trail locations.	•	•	•	•
3. Archaeological survey report.	•	•	•	•
4. Photos of the site in its original condition, showing undisturbed basalt and vegetation		•	•	•

TABLE V. (Continued)

CONSERVATION AREA AND IMPACT AREA
DEVELOPMENT PLAN SUBMITTAL REQUIREMENTS AND APPROVAL BODIES

Rank	Facility Plans, Corridor Plans	Land Use and Facility Plans:	Sector Development Plans	Subdivision Plans	Site Development and Landscaping Plans, Facility Designs	Building Permits
3	Rank 3 Facility Plans, Corridor Plans	Land Use and Facility Plans: *EPC, CPC Review CC, BCC Approval under joint jurisdiction Drainage Master Plans: PWD, AMAFCA, EPC, CPC Review BCC, CC Approval under joint jurisdiction Road Corridors: EPC, CPC, TCC, TPTG Review UTPPB, BCC and CC Approval under joint jurisdiction	Development Plans CC, BCC Approval	DRB	EPC, CPC Approval and may also be delegated to DRB.	ZEO and City Planner approval (responsible for some review items)
5.	A description of the relationship of proposed facility(ies) or development to public open space, existing and planned trails, and other existing or planned recreational facilities.					
6.	A general description of measures to be taken to avoid damage to the slope, rock outcrop, petroglyphs, and archaeological sites. If damage is unavoidable, proposed mitigation measures must be described.					
7a.	Proposed exterior colors and materials for structures of any type; submittal of color samples and elevations.					
b.	Proposed street furniture, materials for drainage improvements, paving materials; submittal of color samples.					
8.	Landscaping plans, plant materials.					

* EPC = Environmental Planning Commission
 CPC = County Planning Commission
 CC = City Council
 BCC = Board of County Commissioners
 PWD = Public Works Department
 AMAFCA = Albuquerque Metropolitan Arroyo Flood Control Authority
 TCC = Transportation Coordinating Committee
 TPTG = Transportation Planning Task Group
 UTPPB = Urban Transportation Planning and Policy Board
 DRB = Development Review Board
 ZEO = Zoning Enforcement Officer

The configuration of buildings and landscaping, orientation of open space and other features adjacent to open space contribute to the visual quality of both the open space and adjacent development. Treatment of open space edges should provide a visual transition that is not harsh or abrupt. A boundary of healthy native plants is preferred to fences but fences will be allowed where vegetation cannot provide an adequate barrier. Their design should avoid monotony and visual clutter. Therefore:

POLICY #9. DEVELOPMENT AT THE EDGE OF PUBLIC OR PRIVATE OPEN SPACE SHALL BE DESIGNED TO COMPLIMENT AND ENHANCE THE OPEN SPACE.

- 9-1 On-site open areas shall be designed to connect with adjacent public or private open space and to be visually integrated with the open space system. Orientation of the on-site open areas to the larger open space system is required. In mixed-use developments, lower densities and less intense uses shall border the open space and higher densities and more intense uses shall be placed away from the open space. Site plans shall allow for shifting excessive density to a part of the premises outside of the Conservation Area boundary, whenever feasible.
- 9-2 Where the adjacent land use requires visual privacy, non-continuous, non-perimeter walls may be constructed. Varied set backs and landscaping are required. Platting of lots adjacent to the Conservation Area shall configure the perimeter facing the open space in order to avoid a strictly linear corridor appearance. Recommended fence materials include brick, stone, wood, stucco over concrete block, or textured concrete masonry units.
- 9-3 Height of walls and fences shall not exceed 6'0". Color of finish materials shall match Approved Color List (Appendix E).
- 9-4 Access to open space trails shall be provided with guidance from the Conceptual Trail Map 11 (page 87), and subsequent arroyo corridor plans, upon review by the City Planner.
- 9-5 Native or naturalized vegetation adjacent to the open space is required. Plant species shall be selected from the Plant Species List (Appendix D).

SECTION 2 - CONSERVATION AREA AND IMPACT AREA REGULATIONS

ARCHAEOLOGICAL SITE MITIGATION

POLICY #10. ARCHAEOLOGICAL SITES SHALL BE IDENTIFIED AND PROTECTED OR MITIGATED, AS APPROPRIATE.

- 10-1 A survey by a qualified archaeologist, as defined in Appendix H, is required for development approval. The surveys will be required at the earliest possible level of approval. A survey report, including recommendations on mitigation and/or preservation, must be submitted with a request for approval of a sector development plan, subdivision, or site plan or building permit. For private utility and public projects, a report must be submitted prior to approval of Rank 3 corridor plans or facility designs. Once a survey is accepted, it shall serve to meet this requirement for subsequent approvals for the tract.
- 10-2 Surveys and reports shall follow guidelines established by the State Historic Preservation Division. These guidelines may be obtained from the State. Referenced documents are "Regulations Pertaining to Issuance of Permits to Conduct Archeological Investigations" (1980) and "Guidelines for the Preparation of Archaeological Survey Reports" (1982). Reports will be reviewed by the State Historic Preservation Division as part of the review and comment process for development approval. At such time as a City archaeologist is hired or a City archaeological program is established, the review function may be assumed by the City.
- 10-3 Sites shall be treated according to the Advisory Council on Historic Preservation's Treatment of Archeological Properties: A Handbook (1980 or subsequent editions); treatments shall include preservation, avoidance, testing, or documentation of surface and/or subsurface remains. If significant archaeological sites are found that cannot be conserved or avoided, the City and State shall work with the property owner to determine the best mitigation solution.

CONSTRUCTION MITIGATION

Maintenance of the slope's pattern and color of the basalt in its natural, undisturbed state, and vegetation are crucial to protection of the geology, ecology, and aesthetics of the escarpment. It is desirable that no slopes, basalt, or vegetation be disturbed. Damage to the escarpment has occurred. Some types of damage, such as scars on petroglyphs caused by shooting, are impossible to correct. However, other types of damage - overturned boulders or off-road vehicle tracks, for example - can be repaired. The intent of the mitigation requirements is to minimize the impact of construction within the Conservation Area and Impact Area. Therefore:

POLICY #11. ANY DAMAGE TO THE VEGETATION, SLOPE, OR PLACEMENT OF BOULDERS DUE TO OR RELATED TO CONSTRUCTION SHALL BE MITIGATED.

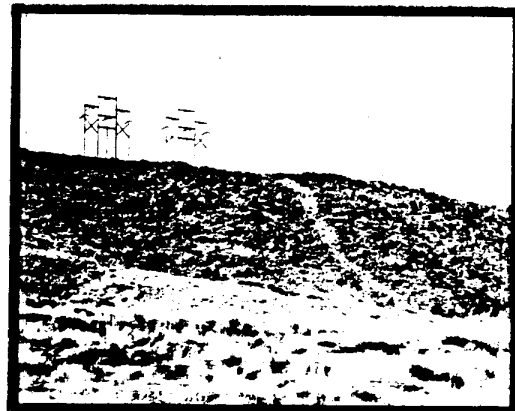
- 11-1 No grade change is allowed within the Escarpment Face other than that which is required for roads, trails and other utilities specifically permitted and regulated by this Plan (see Policies 15-19). No grading which could cause erosion or caving within the Escarpment Face, thereby threatening the public safety and welfare, is allowed adjacent to the 9% slope boundary. Retaining walls greater than four feet in height shall not be allowed adjacent to the Escarpment Face except as required for roadway design in order to minimize the width of the disturbed corridor, in which case the maximum height shall be eight feet. Retaining walls shall be of approved colors from the Approved Color List, Appendix E.
- 11-2 Prior to beginning construction, the property owner shall construct a temporary barricade at the site boundary adjacent to the Escarpment Face to protect it from heavy equipment. Alternatively, the property owner or contractor may elect to keep construction activities to a minimum of 20 feet from the Escarpment Face or survey boundary. Photographs of the site in its original condition shall be submitted with the application for building permit, subdivision and/or site development plan.
- 11-3 If damage due to construction occurs on the escarpment side of the property line, it shall be mitigated as required in this Plan at the expense of the property owner.
- 11-4 Public- and private-sector projects must include geotechnical data and analysis that demonstrates to the satisfaction of the City Engineer that proposed trenching or blasting will not affect the face of the escarpment, potentially causing erosion or caving of the slopes and boulders and thereby threatening the public safety or welfare.
- 11-5 Private open space shall be left in its natural undeveloped condition, or developed in accordance with an approved site plan if recreational facilities are located within it.
- 11-6 The location and design of private open space shall be consistent with conservation of the escarpment's multiple resources and with the design of the entire escarpment open space system, to the satisfaction of the City Parks and Recreation Department.
- 11-7 For any construction within the Conservation and Impact Areas, the following applies in the selection of alignment and in site design:
- a. Grading plans shall demonstrate that cut and fill has been kept to a minimum, unless the excavation reduces the profile of construction in a way that materially improves the site plan. Generally, the overall topography of the site is not to be substantially altered.

- b. Placement of projects in corridors which are located to avoid impacts and destruction of petroglyphs or other archaeological sites and the environmentally sensitive areas identified previously. (See also Policy #17.)
- c. Minimum width of disturbance to slopes and vegetation and minimum cut and fill, balanced against the need to provide for bikeways or other amenities within the right-of-way.
- d. Use of materials which blend with the adjacent landscape in color and texture. Natural materials are generally preferable to man-made materials.

11-8 Areas which are damaged or altered shall be restored through replacement of boulders to approximate the original location, angle and surface exposure. Revegetation to approximate original cover with appropriate native or naturalized plants as identified in Appendix D is required within 90 days of project completion. A variance may be granted if the type of vegetation or time of year make revegetation within 90 days impossible. A warranty bond shall be required for three years after final planting to insure successful revegetation.



White deposit on basalt is highly visible.



Highly visible scar

11-9 The City shall be responsible for restoring existing damaged areas which lie within public open space. The property owner shall be responsible for restoring damaged areas on lands accepted by the City to meet open space requirements; this shall occur prior to title transfer if the land is to be deeded to the City, and shall be an ongoing responsibility of the property owner if the land remains private open space. If land within the Conservation Area is donated to the City, the City will be responsible for restoring damaged areas.

- 11-10 Existing cuts which are used as trail locations shall be stabilized and revegetated at the time of trail construction.
- 11-11 As public open space is acquired by the City, damaged areas shall be protected from further abuse and reseeded.

VIEW PRESERVATION AND VISUAL CONTINUITY

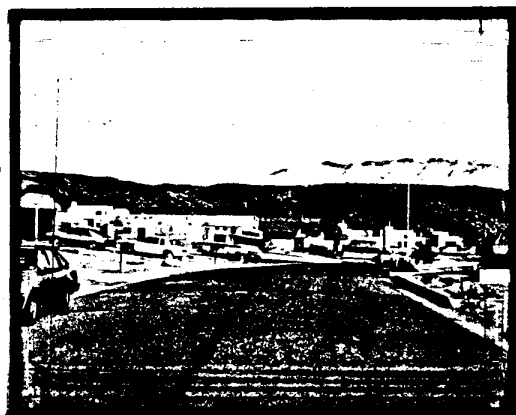
From a distance the mesa above and the area at the base of the escarpment are very important as the visual setting for the dark line of the escarpment. Regulation of color and reflectivity on buildings above and below is intended to minimize contrast with this background. Regulation of building height is intended to maintain views to the escarpment. Regulation of setback is intended to maintain the line of the escarpment and to protect the basaltic caprock and slopes. Therefore:

POLICY #12. STRUCTURES SHALL NOT BLOCK VIEWS OF THE ESCARPMENT OR VISUALLY CONTRAST WITH THE NATURAL ENVIRONMENT.

- 12-1 Structure height (as defined in Section 5.B.40 of the Comprehensive City Zoning Code, as amended through September 1987) shall not exceed 15'0". Up to four feet additional height for non-residential structures may be allowed by seeking a variance, in order to screen rooftop equipment. Residential structures further than 200'0" from the Escarpment Face on sites with gross residential densities less than one dwelling unit per acre may have a height of 26'0". See Regulation 22-8, page 84, for possible exceptions.
- 12-2 Application to allow exceptions to the 15' height limit will be reviewed as site plan submittals on a case-by-case basis by the Environmental Planning Commission. No exception will be allowed unless the applicant demonstrates that the impact of the proposed development on views to and from the escarpment as described in the plan (see Appendices C and N) will be the same as, or less than, the impact if the 15 foot height limit were met. Heights shall in no case exceed 19' from natural grade.* Submittals shall at a minimum include:
- a. site plans, site elevations and site sections showing the location of the major public views (generally taken from the site perimeter or nearest public road to the east, south and north, and the escarpment to the west)
 - b. the relationship between slopes, building heights, setbacks, the height of the escarpment, and views as noted in "a" above

* "natural grade" means the grade (as defined in the Zoning Code) based on the original site contours, prior to any excavation.

- c. use of a combination of the techniques suggested in Appendix N -- including A. Height/slope, B. View corridors, and C. Height/slope/setback -- to minimize the impact on views to and from the escarpment.
- 12-3 The exterior surfaces of structures must be Approved Colors (Appendix E). Mechanical devices and vents on roofs are subject to this regulation. Trim material on facades constituting less than 20% of the facade's opaque surface may be any color.
 - 12-4 Glass on any facade shall not be reflective or mirror glass, that is, glass having greater than 15% average daylight exterior reflectance as published by the manufacturer.
 - 12-5 No exposed roof-mounted heating or air-conditioning equipment shall be permitted. Roof-mounted heating and air conditioning equipment shall be fully screened from views, both from the ground and from the escarpment. Screening materials shall be of Approved Colors (Appendix E.)



One-story structures preserve the view. Note contrast of light colors with the escarpment.

SITE DESIGN

Parking lots, landscaping, and signs will be required for public and private facilities. These facilities should be designed to compliment their natural setting. Therefore:

POLICY # 13. SITES WHICH CANNOT BE SET ASIDE AS OPEN SPACE, INCLUDING RECREATIONAL FACILITIES, AND SITES ADJACENT TO OPEN SPACE, SHALL HAVE MINIMUM VISUAL IMPACT.

13-1 Off-street parking lots

- a. There shall be no parking of any kind within the Escarpment Face.

- b. A minimum of 20% of the parking lot area as defined by the outermost parking space edges shall be landscaped. The landscaping shall be native or naturalized species intended to minimize maintenance and harmonize with the existing vegetation, and shall be from the Plant Species List in Appendix D. The minimum 20% landscaped area must include:
 - No more than 10 contiguous parking spaces without a landscaped separation at least 6' wide. Landscaped areas shall be placed randomly to produce an informal visual interruption of the parking areas.
 - A landscaped strip between the parking lot and the escarpment with a minimum width of 6' which varies in width to avoid the appearance of a hard, straight line. Plant selections shall include sufficient shrubs or trees to provide a visual barrier.
- c. There shall be wheel stops or curbs around all landscaped areas in order to protect landscaping from vehicles.
- d. Shrubs and trees shall be nursery grown. Nursery grown stock is required in order to prevent illegal removal of naturally occurring vegetation from its existing location.
- e. Seed application for grasses is appropriate.

13-2 Landscaping

- a. Plants selected for landscaping on privately or publicly owned land shall be selected from the Plant Species List (Appendix D). Landscaping plans shall indicate a pattern that does not obscure major public views of the escarpment as defined in this document.
- b. Shrubs and trees shall be nursery grown. Nursery grown stock is required to prevent illegal removal of naturally occurring vegetation from its existing location.

13-3 Signs

- a. Free-standing signs other than street signs, traffic signs or informational signs shall be limited to 6 square feet of sign area -- except in areas zoned C-2, where free-standing signs shall be limited to monument signs 75 square feet in sign area -- and be of a uniform material, style and color to be determined by the Planning Department.
- b. There shall be no signs on the Escarpment Face with the exception of interpretive or educational signs in public open space which shall be limited to 4 square feet, and shall consist of colors chosen from the Approved Colors List (Appendix E).
- c. There shall be no building mounted signs (such as "Visitor's Center") with a sign area of greater than 24 square feet.
- d. There shall be no portable signs.

13-4 Site Lighting

- a. Height of luminaires shall not exceed 20'0".
- b. Light fixtures shall be of a type that throws light downward and have baffles, hoods or diffusers so that any light point source is not directly visible from a distance greater than 1000 feet.

SETBACKS

The view of the escarpment's top edge in silhouette against the sky is unique to Albuquerque and contributes immeasurably to the City's "sense of place". The Northwest Mesa Area Plan recommended the identification of "... areas near the edge of the escarpment where no structures may be located ..."

Maintenance of pattern and color of the basalt in its natural, undisturbed state is crucial to protection of the geology and aesthetics of the escarpment. Lots platted on the rim and Escarpment Face must not alter existing patterns and colors, nor be developed in a manner which causes public safety concerns. Maintenance of an undisturbed area adjacent to the Escarpment Face is critical for preventing erosion and/or caving of slopes, which could pose a threat to the public safety and welfare. Preservation of the distant view of the horizontal aspect of the escarpment requires that development be placed away, and therefore slightly downhill, from the base to allow for an unobstructed view of the full height of the escarpment whenever possible. In addition, maintaining clear spatial separation between the historic resources of the escarpment and adjacent, private development is important. Therefore:



Highly visible escarpment through Volcano Cliffs. In this area, residential lots are platted over the Escarpment Face.

POLICY #14. NO STRUCTURE SHALL BE PLACED WITHIN 50 FEET OF THE TOP OR THE BASE OF THE ESCARPMENT FACE. NO IRRIGATION SYSTEMS OR CONSTRUCTION OR ALTERATION OF THE NATURAL TERRAIN SHALL OCCUR WITHIN 30 FEET OF THE TOP OR BASE OF THE ESCARPMENT FACE. FENCES WILL BE ALLOWED NO CLOSER TO THE ESCARPMENT FACE THAN 30 FEET. ANY CONSTRUCTION WITHIN THE CONSERVATION AREA MUST BE CERTIFIED GEOTECHNICALLY SOUND BY THE CITY ENGINEER, SO AS NOT TO CAUSE A THREAT TO THE PUBLIC SAFETY. (See Regulation 22-8, page 84, for possible exceptions.)

14-1 Variances to setback requirements of the underlying zone of lots platted as of the date of adoption of this Plan may be granted when such variance will allow reasonable use of a lot which would be unuseable due to the requirements of this regulation, and when it is demonstrated that such variance meets the requirements for variance stated in the Comprehensive City Zoning Code.

SECTION 3 - REGULATIONS FOR ROAD, UTILITY AND DRAINAGE CORRIDORS
WITHIN THE IMPACT AND CONSERVATION AREAS

It is recognized that some utilities, roads and other public infrastructure will need to cross the Escarpment Face. The design of these facilities should respect the natural and cultural resources of the escarpment. Damage to or alteration of the escarpment resulting from development or construction activities within or adjacent to the landforms should be minimized. Siting and construction of public works - roads, drainage improvements, and public and private utilities - require practices which minimize damage to the escarpment and associated resources as the Northwest Mesa develops, and minimize downstream flooding and downslope erosion impacts on existing development. Street and site lighting should be scaled so as not to compete with views of the escarpment at sunset. Fixture, height, direction and quantity of light should be controlled to minimize visual impact while still providing for safe circulation at night. Therefore:

POLICY #15. PUBLIC ACCESS AND PUBLIC FACILITIES SHALL BE COMPATIBLE WITH THE SENSITIVE NATURE OF THE ESCARPMENT. PUBLIC ACCESS SHALL BE AT POINTS WHICH ARE LEAST SENSITIVE TO USE, WHENEVER POSSIBLE. UTILITIES AND ROADS SHALL BE LIMITED TO AREAS WHICH ARE LEAST SENSITIVE TO DISTURBANCE. AREAS TO BE AVOIDED, IF AT ALL POSSIBLE, ARE PIEDRAS MARCADAS CANYON, THE POINT WHERE THE MIDDLE BRANCH OF THE SAN ANTONIO CROSSES THE ESCARPMENT, THE MARSH PENINSULA, RINCONADA CANYON, THE ESCARPMENT SOUTH OF RINCONADA CANYON AND PETROGLYPH PARK.

15-1 Roads and utilities which must cross the escarpment shall be aligned to reduce damage to the escarpment's natural and archaeological/historical resources. Planning and development of these facilities shall respect the quality of the area. Utilities and roads other than those which presently cross or are approved by the Urban Transportation Planning Policy Board to cross the escarpment in the Long Range Major Street Plan in effect at the time this Plan is adopted, shall be routed around the escarpment. Protective fencing, as approved by the Parks and Recreation Department, is required as part of roadway construction projects which are immediately adjacent to the Conservation Area in order to control vehicular access (during and after construction of the facility) into this environmentally sensitive area. Costs for fencing will be equally shared by the Parks and Recreation Department and the Public Works Department. Public agencies and utility providers desiring to place facilities within open space must demonstrate that there is no feasible alternative. Criteria to be evaluated are the impact on the environmental and historical resources, including a geotechnical assessment of soils in order to avoid caving during or after construction, cost, and ability to provide adequate service.

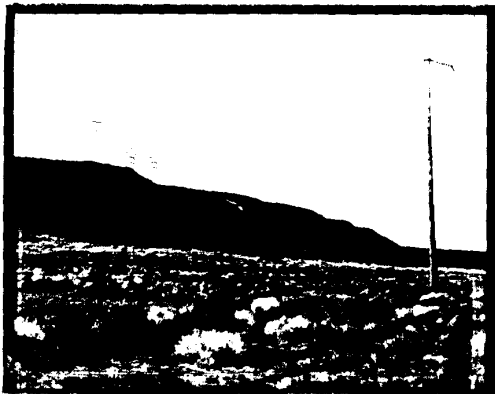
15-2 Streetscape improvements for the right-of-way of Unser Boulevard, 98th Street, Calle Nortena, and Paseo del Norte shall be required. These improvements shall include landscaping of roadway edges and medians planted according to the Plant Species List in Appendix D. Landscaping within the road rights-of-way will be the responsibility of the City, except where specified as a responsibility of the property owner by ordinance. Additional acquisition of right-of-way will be considered along these roadway edges in order to provide for an occasional 'pocket' or 'nodal' open space where appropriate; preservation of existing vegetation; berms where appropriate to mitigate noise; and selection of informational signs and street furniture compatible with the built and natural environment. Colors of street furniture and paving materials shall be consistent with the Approved Colors in Appendix E.

15-3 Street lighting.

- a. Height of luminaires shall not exceed 28'0".
- b. Light fixtures shall be of a type that projects light downward and have baffles, hoods or diffusers so that any light point source is not directly visible from a distance greater than 1000 feet.
- c. A single fixture and pole style shall be selected by the City and used throughout the Escarpment Area.

15-4 Construction of new overhead utilities shall be avoided. (This regulation applies only to the construction of new overhead utilities within the Conservation and Impact Areas, and does not prevent routine maintenance or the extension of service from existing lines.) City, State and Federal agencies shall work with Plains Electric and PNM to explore alternative routings for these lines, and how their ultimate removal might be financed.

15-5 Any scars caused by trenching or grading for underground utilities shall be mitigated per the requirements of this plan.



Existing utility easement

- 15-6 Above-ground facilities, such as reservoirs, must be designed in accordance with the design overlay regulations. As existing facilities are repainted in the course of normal maintenance, they shall be repainted with colors of appropriate hues and values identified in Appendix E.
- 15-7 Natural contours of the land shall be taken into account in determining the placement of roads and utilities. Grading and filling of existing contours shall be kept to a minimum. It is recognized that retaining walls will be necessary in some cases, but facility designs shall minimize their height and insure that they blend visually with their surroundings. The maximum height allowed for a retaining wall designed to limit the width of a road corridor is 8'. Retaining walls must meet all other requirements in the design overlay zone with regard to color and materials.
- 15-8 Where the road surface cannot be at grade with the prevailing adjacent contours, the exposed embankment must be stabilized. The covering of that stabilization shall be with a combination of basalt, earth and vegetation that is in similar proportion to the surrounding portions of the escarpment.
- 15-9 Where it is necessary to disturb basalt for construction outside of the land used for the actual facility, the area shall be restored to approximate its original character, to the greatest extent feasible and appropriate. Basalt containing petroglyphs shall be subject to mitigation per the policies of this plan.

UNSER BOULEVARD

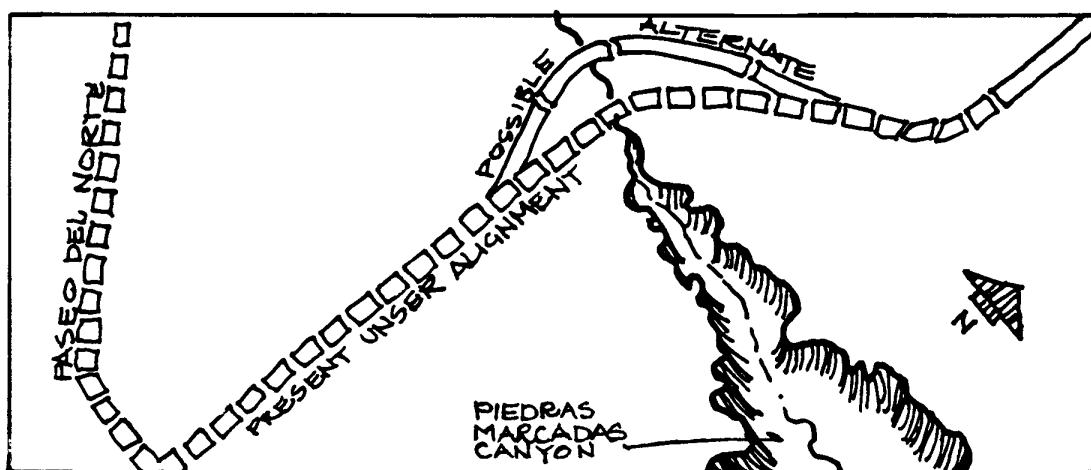
Unser Boulevard will provide a vehicular link between three major areas along the escarpment - Piedras Marcadas Canyon, Petroglyph Park, and Rinconada Canyon. Its alignment and design in critical locations will be a significant factor in the conservation effort. Therefore:

POLICY #16. UNSER BOULEVARD SHALL BE DESIGNED TO MINIMIZE ITS IMPACT ALONG THE LENGTH OF THE ESCARPMENT.

A. Piedras Marcadas Canyon

Unser/Lyon Boulevard was once planned to continue south from Paradise Hills Boulevard across the west end of Piedras Marcadas Canyon. That alignment has been changed. Unser Boulevard is now planned to continue north on the former Kimmick alignment until it passes west of the canyon, then curve back into the former Lyon alignment. The new alignment intrudes less on the western tip of the Piedras Marcadas Canyon and it appears to fall on the west side of the Conservation Area boundary, primarily within the Impact Area.

- 16-1 The City shall assess the feasibility of moving the Unser alignment further west of the Conservation Area at Piedras Marcadas Canyon and, if determined feasible, shall recommend amendment of the Long Range Major Street Plan, if appropriate.
- 16-2 Unser Boulevard may require a culvert or bridge over the Piedras Marcadas Arroyo. The design of the bridge or culvert shall acknowledge that visitors looking west, up the arroyo, will see the bridge as the "end" of their view. The aesthetics of the bridge or culvert design, however modest its span, shall receive special attention.
- 16-3 Siting and design of the roadway near Piedras Marcadas Canyon shall be coordinated with the Parks and Recreation Department. The roadway shall be designed so that passengers can take advantage of the view of the canyon. A place to pull out of traffic to appreciate the view shall be considered. Access to visitor parking shall be provided consistent with access policies for the roadway (no direct access, except at major intersections); and shall take into account access needs for adjacent development.

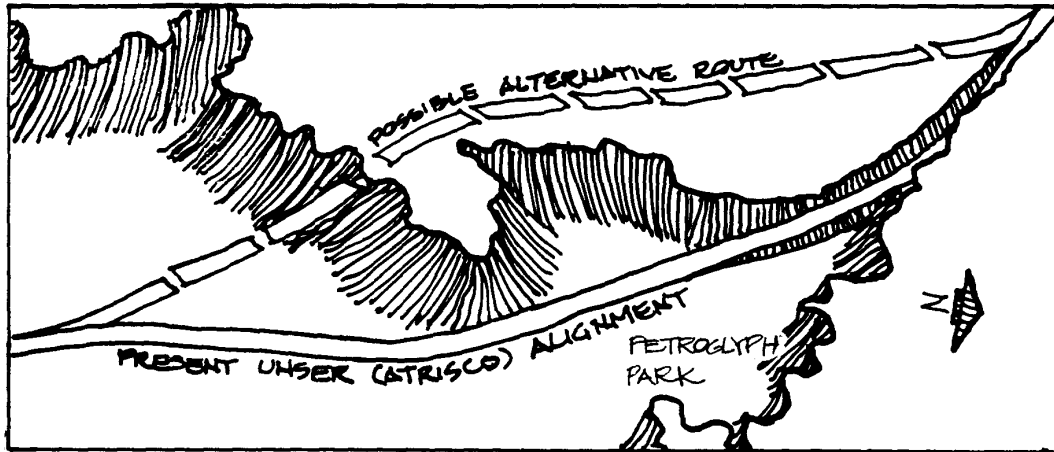


B. Petroglyph Park

At Petroglyph Park, the present profiles planned for Unser Boulevard as it crosses the escarpment require substantial expansion of the existing cut and fill areas due to the standard design requirements for arterial streets. The improvements along this alignment may change the existing configuration of the roadway as well as the park area and the Boca Negra Arroyo channel which crosses and parallels the roadway in this area.

- 16-4 The City shall evaluate alternatives to determine the feasibility of moving the Unser crossing of the escarpment at Petroglyph Park to the south and west. The study should at least include the comparative

impacts of the existing and proposed alignments on petroglyphs and other archaeological/historical sites, Boca Negra Arroyo, land use, access to Petroglyph Park and private property, required cut and fill, views of the escarpment, impacts of noise on the quality of the visitor experience, and costs. The present alignment will severely impact the park and its historic value by acting as a major physical barrier to pedestrian use, when widened to six or eight lanes. Therefore, this Plan strongly recommends that the alignment be moved out of Petroglyph Park in order to minimize impacts on proposed and existing open space and historical resources, and to minimize construction delays related to mitigation requirements.



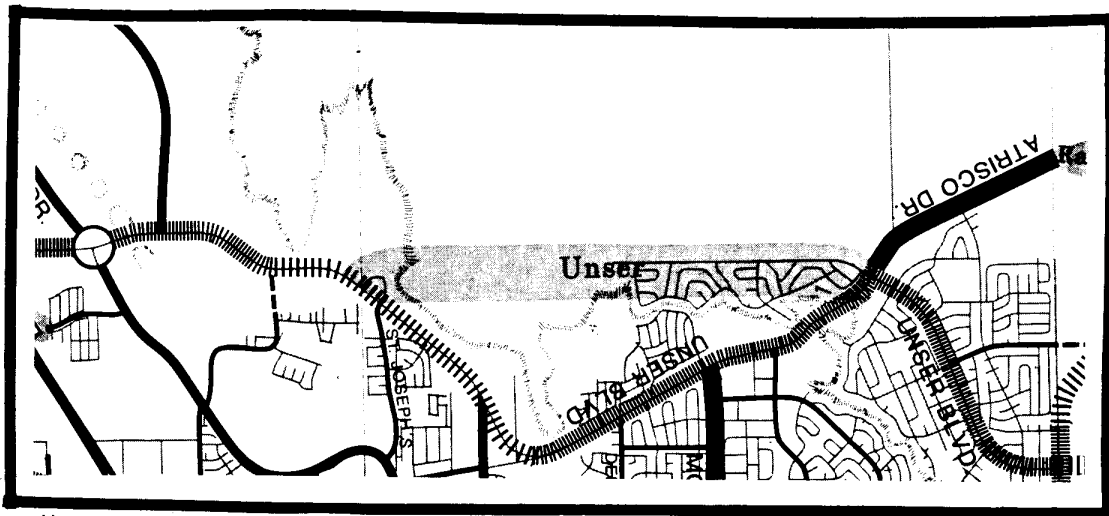
C. Unser/Kimmick/81st St.

The Long Range Major Street Plan presently proposes a section of Unser Boulevard west of Marsh Peninsula. A major roadway through this open space is undesirable for the following reasons:

- A roadway which bisects the existing open space will introduce high speed traffic (35-45 MPH) and noise into an area which is intended to conserve natural resources, provide recreational services, and fulfill a major function of open space -- to provide psychological relief from urban development.
- It is likely that the petroglyph concentrations and other archaeological/historical sites at the mouth of Rinconada Canyon would be damaged by a road crossing of the escarpment in the proposed corridor.

The proposed section of Unser west of the Marsh Peninsula (formerly Kimmick alignment) would severely damage the escarpment at the entrance to one of the area's most scenic features at Rinconada Canyon, and effectively separate the Marsh Peninsula from other public open space above the escarpment.

- 16-5 The City shall complete the Unser/Kimmick (81st St.) Corridor Study, assess the need for the facility and develop alternatives, including a no-build alternative. The assessment should at least include the following: determination of the traffic demands on this facility, identification of alternative routes, and their impacts. If it can be done consistently with sound transportation planning, this Plan strongly recommends that the Unser/Kimmick (81st Street) Corridor be removed from the Long Range Major Street Plan if adopted by the U.T.P.P.B., and that alternative transportation routes be utilized in order to avoid impacting the integrity of the open space preserve.



Unser/Kimmick/81st ST. Corridor

PASEO DEL NORTE

Paseo del Norte forms a major demarcation line between the highly significant and secluded Piedras Marcadas Canyon area and the more exposed escarpment through the Volcano Cliffs area. The City has recently conducted a study to determine the feasibility of moving the Paseo del Norte crossing of the escarpment. The study examined comparative impacts of the existing and proposed alignments on a petroglyph concentration to the north and proposed adjacent land uses. A Resolution (UTPPB R-87-12) was adopted by the Urban Transportation Planning Policy Board setting the alignment of the Paseo del Norte crossing and establishing design criteria for that alignment. Therefore:

POLICY # 17. THE FOLLOWING DESIGN REGULATIONS ARE ADOPTED FOR THE PASEO DEL NORTE CROSSING OF THE ESCARPMENT, PER UTPPB R-87-12:

- 17-1 "The center line of the alignment should be shifted 34 feet south of the center line of the platted alignment in the Shenandoah Subdivision to a location approximately 80 feet south of the Alameda Grantline.
- 17-2 The right-of-way through the Shenandoah Subdivision should be increased by 28 feet, as defined in the Paseo del Norte/Escarpment Crossing Special Advisory Committee report.
- 17-3 The roadway should be off-set 6 feet to the south of the right-of-way center line.
- 17-4 The side slopes of the facility should have a 1 to 1-1/2 slope with stabilization treatment of native grasses or other compatible materials, and a retaining wall of 8 feet or less on the south side only where needed.
- 17-5 The rear yards of lots abutting the facility in the Shenandoah Subdivision should be at least 40 feet in depth.
- 17-6 A concrete safety barrier, not less than 3 feet high and tinted to blend with the surrounding natural area, should be placed on either side of the road at such a height to provide for noise attenuation while allowing the viewing of the escarpment from the roadway and not creating a tunnel effect.
- 17-7 During construction, the north edge of the construction limits should be fenced to protect the escarpment area.
- 17-8 In addition, the following guidelines should be incorporated as appropriate:
- a. Berms should be placed as a buffer to the proposed open space area where topographically appropriate.
 - b. Street lighting for Paseo del Norte in the escarpment area should be compatible with that for the entire escarpment area.
 - c. A pedestrian/bicycle bridge location over Paseo del Norte is recommended on the mesa top with other crossings below the escarpment only at the nearest signalized intersection.
 - d. Transportation improvement guidelines in the Northwest Mesa Escarpment Plan should be respected."

BIKEWAYS

A recreational trail is proposed along the top of the escarpment beginning above the northeastern edge of Rinconada Canyon, extending west along the top edge of the escarpment to Paseo del Volcan and south of Double Eagle II Airport. This recreational bike trail could conflict with protection and management of the natural and cultural resource values of La Rinconada Canyon and La Mesa Prieta. Therefore:

POLICY #18. THE CITY SHALL RECOMMEND TO THE BIKEWAYS COMMITTEE AND THE URBAN TRANSPORTATION POLICY PLANNING BOARD THAT THE BIKE TRAIL ON TOP OF THE MESA FROM RINCONADA CANYON TO PASEO DEL VOLCAN BE DELETED FROM THE BIKEWAYS MASTER PLAN AS A PROPOSED BIKE TRAIL. COMPREHENSIVE RECREATIONAL TRAIL PLANNING WILL BE CONDUCTED FOR THE ENTIRE PLAN AREA, AT WHICH TIME ALTERNATIVE BIKE TRAILS WILL BE CONSIDERED.

DRAINAGE

Drainage facilities will be required through open space where there is a need. Sensitively designed drainage facilities will minimize visual impacts and the potential for erosion of the slope. It is important to note that naturalistic drainage treatments may require expensive and extensive public works. Therefore:

POLICY #19. DRAINAGE FACILITIES' DESIGN SHALL BE SENSITIVE TO THE CHARACTER OF THE EXISTING ESCARPMENT. ARROYO CORRIDOR AND DRAINAGE MANAGEMENT PLANS ARE THE APPROPRIATE PLANNING LEVEL FOR SPECIFIC CHANNEL TREATMENT RECOMMENDATIONS FOR ARROYOS IDENTIFIED IN THE "FACILITY PLAN FOR ARROYOS".

19-1 Channel treatments shall meet the following requirements:

- a. Limited stabilization of natural channels, according to policies contained in the "Facility Plan for Arroyos," unless such treatment is determined to be infeasible by the City Engineer.
- b. Use of many small, unobtrusive structures, such as check dams or small drop structures, rather than larger, more obtrusive structures, when structural solutions are required.
- c. Use of materials in treated channels which blend visually with the escarpment and adjacent open space. Naturalistic treatments, such as rip-rap, gabions, or tinted concrete, are the preferred treatment types.
- d. Protection of canyons from erosion through control of developed flows above the escarpment and through stabilization techniques which are consistent with the visual character of the open space.

- 19-2 Developed flows above the escarpment shall be managed to minimize their impact on the open space above the escarpment and the Escarpment Face. The potential impacts of water retention above the escarpment should be thoroughly studied prior to use of detention areas to control flows.
- 19-3 Within the large areas of open space above the escarpment, developed flows shall be modified through check dams or other means to approximate undeveloped flows to minimize impacts on the escarpment and to minimize the intensity of channel treatment required. However, the impact of check dams as a method of controlling flows should be thoroughly studied prior to their use.

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SECTION 4 - VIEW AREA REGULATIONS

The large area designated as the View Area comprises the view from a distance. Those factors which affect views from a distance and the general character of the area are controlled by the overlay zone. Therefore:

POLICY #20. THE PREDOMINANT COLORS USED ON STRUCTURES WITHIN THE VIEW AREA SHALL BLEND WITH THE NATURAL COLORS OF THE MESA.

- 20-1 Predominant exterior surfaces of commercial and multi-family buildings shall be Approved Colors (Appendix E). Metal items such as vents, cooling units and other mechanical devices on roofs are subject to this regulation, as are fences. Dish antennae shall not be placed on roofs. Up to 20% of the opaque materials on any facade may be colors other than Approved Colors.
- 20-2 Single family residential structures built in the View Area must be built with roofs that are Approved Colors.

POLICY #21. STRUCTURES ABOVE AND BELOW THE ESCARPMENT SHALL NOT DOMINATE THE VIEWS OF THE ESCARPMENT FROM THE EAST SIDE.

- 21-1 The height of structures within the View Area shall comply with the requirements of the Comprehensive City Zoning Code, except that no structure shall exceed 40'0" in height.

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TABLE VI - SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(1)

1. GENERAL REGULATIONS:
APPLY THROUGHOUT THE DESIGN OVERLAY ZONE,
INCLUDING THE CONSERVATION, IMPACT AND VIEW AREAS

<u>POLICY #7</u>	p. 50	Establishes Design Overlay Zone and states that variances, other than those specifically allowed in this chapter, constitute plan amendments. See Appendix J. "Plan Amendment Procedure."
<u>POLICY #8</u>	p. 51	Establishes plan submittal requirements.
8-1	p. 51	Plan submittal requirements are outlined, see Table V, p. 52.
8-2	p. 51	a. Site development plan review per standard Zoning Code procedure for SU-1 sites, i.e., reviewed by EPC.
	p. 51	b. Site plans on all other parcels, including single family detached housing, will be reviewed by the City Planner review prior to final sign-off.
<u>POLICY #9</u>	p. 54	Development adjacent to open space shall:
9-1	p. 54	Integrate on-site open space with public open space via trail connections, proximity. Locate lower densities, less intense uses adjacent to public open space in mixed-use developments.
9-2	p. 54	Lots adjacent to public open space shall be platted to provide a staggered line. Unfinished concrete block walls are not allowed adjacent to public open space.
9-3	p. 54	6' maximum height for fences and walls adjacent to public open space, colors per Approved Color List (Appendix E).
9-4	p. 54	Access shall be provided based upon Conceptual Trail Map (#11), and per review by City Planner.
9-5	p. 54	Native and/or naturalized vegetation required adjacent to public open space.

TABLE VI - SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(2)

2. CONSERVATION AREA AND IMPACT AREA REGULATIONS

Archaeology

POLICY #10: Archaeological site mitigation:

- | | | |
|------|-------|---|
| 10-1 | p. 55 | Survey required for development approval (sector development plan, subdivision, site plan, building permit). |
| 10-2 | p. 55 | Survey reviewed by state Historic Preservation Division for compliance with guidelines. |
| 10-3 | p. 55 | Treatment shall be determined by the City Planner in consultation with the property owner and the State Historic Preservation Division, per guidelines in "Advisory Council on Historic Preservation's Treatment of Archaeological Properties: A Handbook". |

Construction

POLICY #11: p. 56 Construction impact prevention, mitigation:

- | | | |
|------|-------|--|
| 11-1 | p. 56 | No grading within Escarpment Face (9% or greater slopes) except as required for roads, trails and utilities. |
| 11-2 | p. 56 | Temporary construction barricades, or 20' construction setback, required from the Escarpment Face (9% or greater slopes).

Photographs of original site condition required as part of submittal package for building permit, subdivision or site plan. |
| 11-3 | p. 56 | Property owner responsible for mitigation. |
| 11-4 | p. 56 | Geotechnical study required prior to trenching or blasting through basalt. |

TABLE VI - SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(3)

11-5	p. 56	Private open space to remain in undisturbed condition unless a site plan is approved for recreational facilities.
11-6	p. 56	Private open space location must be consistent with over-all conservation plan.
11-7	p. 56	Combine utility projects (roads, water/sewer, electric) in corridors located in least sensitive areas. Minimize width of disturbance and minimize cut and fill. Use natural materials or materials which blend visually with open space for slope stabilization, facilities.
11-8	p. 57	Replace boulders where appropriate and revegetate to approximate original conditions, within 90 days of project completion; warranty bond required.
11-9	p. 57	City shall restore existing public open space.
11-10	p. 58	City shall restore existing cuts at time of trail construction.
11-11	p. 58	City shall reseed and protect newly acquired open space. View Preservation: Buildings
<u>POLICY #12</u>	p. 58	Structures shall not block views of the escarpment:
12-1	p. 58	Structure heights limited to 15', or 19' with a variance if needed to screen rooftop equipment on non-residential structures. Exception granted for very low density residential developments (1 du/net acre or less) which reserve a minimum 200' setback from the Escarpment Face (9% or greater slopes) - maximum height is then 26'.
12-2	p. 58	Provides for exceptions to the 15' height limit on a case-by-case basis per site plan review by the EPC. See Policy 12-2 and Appendix N for specifics. Heights shall not exceed 19' from natural grade.
12-3	p. 59	Exterior surfaces (including roofs) must use approved colors (Appendix E). Trim (up to 20% of the surface area) is excepted.

TABLE VI – SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(4)

12-4	p. 59	No mirror or reflective glass allowed.
12-5	p. 59	Roof mounted heating and air-conditioning equipment shall be fully screened from view.
Site Design		
<u>POLICY #13</u>	p. 59	Site development plans designed to minimize visual impact:
13-1	p. 59	a. No parking allowed within the Escarpment Face (9% or greater slopes). b. Off-site parking landscaping requirements: <ul style="list-style-type: none">· Minimum 20% parking area landscaped.· No more than 10 contiguous spaces with a 6' wide landscaped separation.· 6' landscaped strip between parking and Escarpment Face.· Wheel stops or curbs required.· Landscaping – native or naturalized plants-nursery grown stock except for grasses.
13-2	p. 60	Landscaping <ul style="list-style-type: none">a. Plants, native and/or naturalized from plant species list.b. Nursery grown.
13-3	p. 61	Signage <ul style="list-style-type: none">a. Free-standing signs shall be limited to 6 square feet.b. Building mounted signs limited to 24 square feet (sign area).c. No portable signs.d. Colors per approved color chart (Appendix E).
13-4	p. 61	Lighting <ul style="list-style-type: none">a. Maximum height 20' 0".b. Downlighting fixtures required.

TABLE VI – SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(5)

Setbacks

<u>POLICY #14</u>	p. 62	If the City is unable to acquire or otherwise conserve property within the Conservation Area within a reasonable time, structures must be setback a minimum of 50' from Escarpment Face (9% or greater slopes); fences and walls a minimum 30'. No irrigated landscaping or other constructions allowed on Escarpment Face, and must be approved by City Engineer prior to constructing any alteration within 30 feet of the Escarpment Face.
14-1	p. 62	Variances possible if lot unuseable due to the above requirements.

3. ROADS, UTILITY AND DRAINAGE CORRIDORS IN CONSERVATION AND IMPACT AREAS

<u>POLICY #15</u>	p. 63	Corridors shall be compatible with escarpment environment and located at least sensitive crossing points to minimize impacts on escarpment:
15-1	p. 63	Align utilities in corridors to minimize number of disturbed areas. New corridors, in addition to those presently shown on Long Range Major Street Plan, shall be routed around the escarpment.
15-2	p. 64	Streetscape improvements include landscaping of medians and roadway edges according to plant species list. (Appendix D) Signs shall blend visually with open space. Colors per approved color list (Appendix E).
15-3	p. 64	Street lighting – height maximum 28' 0" down lighting fixtures required, and a single fixture style – to be determined.
15-4	p. 64	Avoid construction of new overhead utilities. Government agencies shall study feasibility of moving existing lines.
15-5	p. 64	Scars caused by trenching and grading for underground utilities shall be mitigated.
15-6	p. 65	Above-ground facilities designed per regulations in design overlay zone.
15-7	p. 65	Road and utility locations must take natural contours into account and minimize cut-and-fill. Retaining walls limited to 8' and shall comply with regulations concerning color and material.

- 15-8 p. 65 Exposed road embankments shall be stabilized with combination of basalt, earth and vegetation in similar proportions to the surroundings.
- 15-9 p. 65 Disturbed basalt shall be replaced to approximate original character where appropriate.
- POLICY #16 p. 65 Unser Boulevard:
16-1 through 16-3
- p. 66 Piedras Marcadas Canyon - Plan recommends assessing the feasibility of moving alignment further to the west, and coordinating design of roadway, drainage and open space facilities.
- 16-4 p. 66 Petroglyph Park - plan recommends moving alignment to the south and west to avoid impacting Petroglyph Park, subject to a feasibility assessment.
- 16-5 p. 68 Kimmick /81st Street Corridor - Plan recommends alternative routing to avoid impacting open space preserve, subject to findings of a needs assessment and alternative routing study.
- POLICY #17 p. 68 Paseo del Norte crossing of the escarpment.
17-1 through 17-8
- p. 69 Incorporates the recently approved UTPPB Resolution regarding the alignment. Design requirements include native landscaping, tinted concrete barricades and maximum 8' retaining walls.
- Bikeways
- POLICY #18 p. 70 City shall recommend deleting from Bikeways Master Plan proposed bike trail along southern rim of escarpment, to the UTPPB and Bikeways Committee.

TABLE VI - SUMMARY OF DESIGN OVERLAY ZONE REGULATIONS

(6)

Drainage

<u>POLICY #19</u>	p. 70	Drainage facilities should blend visually with surrounding open space and follow design regulations in the <u>Facility Plan for Arroyos</u> .
19-1	p. 70	Use of numerous, small structures recommended over single, large facilities, including checkdams, use of naturalistic materials.
19-2	p. 71	Developed flows above escarpment shall be managed to minimize impact on Escarpment Face.
19-3	p. 71	Within open space areas, flows shall be modified through check dams or other means to approximate underdeveloped flows.

4. VIEW AREA REGULATIONS

<u>POLICY #20</u>	p. 73	Structures within View Area shall blend in with color of area:
20-1	p. 73	Color of exterior surfaces (including roofs) of commercial and multi-family structures shall be from Approved Color List (Appendix E) trim (up to 25% of surface area) excluded.
20-2	p. 73	Single family residential structures - roof color shall be from Approved Color List.
<u>POLICY #21</u>	p. 73	Structures shall not dominate views of the escarpment:
21-1	p. 73	Structure height maximum 40'-0".

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Petroglyph State Park.

Steven Donahue, photographer.

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CHAPTER 5: LAND USE AND ZONING

Zoning establishes the uses permitted along the escarpment. In general, average densities along the escarpment should be low to transition into open space and allow for resource protection. A low overall density allows for conservation of open space by shifting development rights away from the area to be conserved as higher densities, townhouses or patio homes, for example, can be located away from the escarpment. Much of the escarpment has been annexed to the City of Albuquerque and zoned for uses which are more intense than is preferable in such a highly valuable and sensitive area. Therefore:

POLICY #22. THE FOLLOWING ZONING AND LAND USE REGULATIONS SHALL APPLY WHENEVER PROPERTY WITHIN THE CONSERVATION AREA IS PROPOSED FOR REZONING OR DEVELOPMENT PLAN APPROVAL.

It is preferred that all land within the Conservation Area be acquired or set aside as open space. Those zoning recommendations outlined below which anticipate development are applicable if property cannot be set aside as open space, or to allow for clustered development with structures set back from the Conservation Area. Within the Conservation Area, appropriate land uses, if the area cannot be set aside as open space, are either very low densities and large lots, which have little visual impact, or moderate densities, townhouses or patio homes, which can be designed to compliment public or private open space.

22-1 The preferred zones for property totally or partially within the Conservation Area are:

- A-1(County)
- RO-1, RO-2 and RO-20 (City)
- SU-1 for Public Open Space
- SU-1 for Private Open Space

SU-1 for Planned Residential Development (Density not to exceed 1 du/net acre) Appropriate compatible uses adjacent to low density residential include private recreation and related facilities and public or institutional facilities.

22-2 For sites of three acres or more in the City of Albuquerque located totally or partially within the Conservation Area, special use zoning is required because of the flexibility it provides in lot size, lot width, and setbacks.

22-3 Total allowable units for a site zoned SU-1 for Planned Residential Development shall be established. The units allowed on the portion of the site which is within the Conservation Area shall be placed on the portion of the site outside the Conservation Area boundary, to the greatest extent feasible. If the site is located entirely within the Conservation Area, development shall be set back away from the escarpment to the greatest extent possible.

- 22-4 Requests for density increases shall be considered as zone change requests and considered in conjunction with site development plan approval, subject to the recommendations and regulations contained in this Plan.
- 22-5 As public open space is acquired by the City, or if the City acquires control through lease, easement, or other legal agreement, land within the open space boundary shall be zoned SU-1 for Public Open Space. Site development plans for development and facility designs within land zoned SU-1 for Public Open Space shall be approved by the Environmental Planning Commission. The Open Space Advisory Board shall review and comment on all plans, including facilities such as roads.
- 22-6 Private open space is the appropriate designation for land within the Conservation Area which will remain open and undeveloped as a result of the land use planning provisions of this plan, but which will not be publicly owned or accessible to the public. Such open space shall be designated in sector development plans, or in site plans if a sector development plan is not required. Appropriate zoning is SU-1 for Private Open Space.
- 22-7 In reviewing site development plans, sector plans, subdivision plats and other development plans presented by a property owner, the City shall require that development be set back in a manner which is reasonably related to protection of the Conservation Area, and which allows the property owner a reasonable use of the property.
- 22-8 The criteria for exclusion from the Design Overlay Zone building height and setback regulations (Policies #14-1 and #16) are:
- Site Plans (including subdivisions with site plans) approved by the Environmental Planning Commission within the last four years prior to adoption of the Escarpment Plan.*
 - If the City and a property owner initiate negotiations as to public purchase or dedication of conservation easements to preserve views on properties within the Impact Area, the time-line on the approved site plan may be extended (by the City Planner) for one additional year to allow negotiations to proceed.

* See Zoning Code, Section 30.A.5 (as amended through September 1987) concerning SU-1: "5. The Planning Commission shall review the application, plan, and progress of development at least every four years until it is fully implemented to determine if it should be amended."

CHAPTER 6: RECREATIONAL AND CULTURAL RESOURCES

The escarpment and adjacent open space land are rich with opportunities for recreation and viewing and for interpreting our cultural and geological past. This section includes recommendations for recreational and educational use of the escarpment and proposes a conceptual trail network, locations for parking, handicapped access, and interpretive facilities.

Recommendations should be considered in decisions about development of recreational and cultural facilities to ensure that a cohesive system is established which is compatible with protection of the resources within public open space.

Interagency coordination will be an important factor in providing the extent of open space and facilities proposed in this plan. Successful implementation will require the cooperative efforts of the City, County, State, and Federal governments in acquisition, development, and implementation of design regulations.

RECREATIONAL OPPORTUNITIES

The volcanic escarpment and adjacent open space lands, the Rio Grande Valley State Park, and proposed pedestrian trails, equestrian trails, and bikeways provide the opportunity for an exceptional recreational system in the northwest area. Much of the system, including Boca Negra Park, Volcano Park, Rio Grande Valley State Park, Petroglyph Park, neighborhood parks, arroyo trails, and bikeways, exists or is planned. The escarpment's recreational facilities can be designed to integrate with this system as a north/south connector and as a series of destinations for recreational use.

The escarpment, adjacent open space, the Zuris-Mann site, the Rio Grande Valley State Park, arroyos, and other easements, rights-of-way, and points of interest, present an extraordinary opportunity for a recreational/educational system on the Northwest Mesa. These features have tremendous potential for recreation, education, and tourism, in creating a unified system. Therefore:

POLICY #23 A SYSTEM OF RECREATIONAL PEDESTRIAN, BICYCLE, AND EQUESTRIAN TRAILS RELATED TO THE ESCARPMENT SHALL BE PROVIDED ON THE NORTHWEST MESA, INCLUDING LINKAGES TO OTHER NORTHWEST MESA FEATURES.

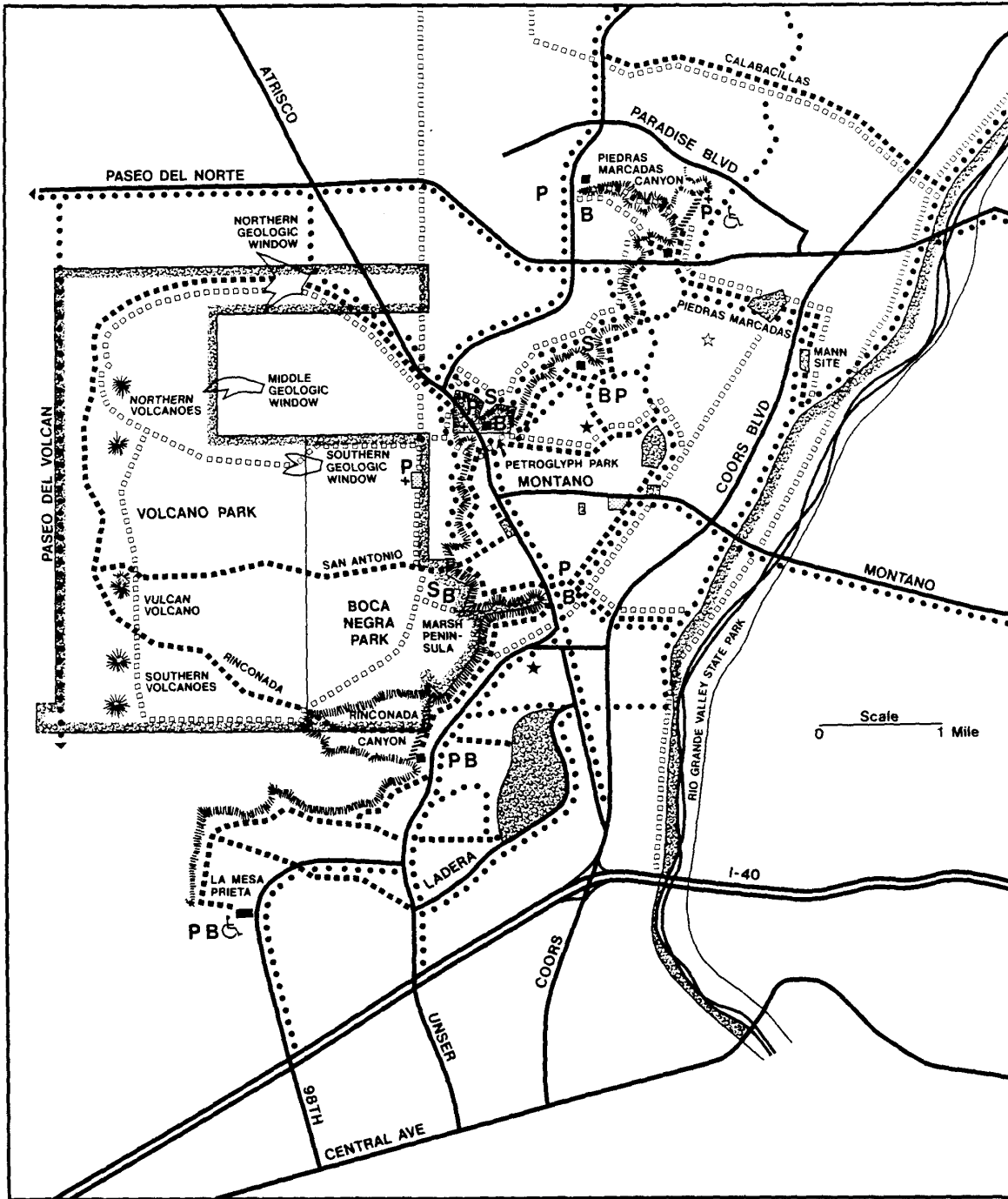
23-1 Sector development plans, all other Rank 3 plans, site plans and subdivisions within the Design Overlay Zone shall provide for dedication of trail easements as indicated on Map 11. Some of these areas have been field checked by hikers and horsemen; however, a detailed location study for trails will be required prior to their construction.

- 23-2 Design and construction of all major roads and drainageways shall provide for safe, easily accessible pedestrian, equestrian, and bikeway crossings. The design of such crossings shall be subject to the approval of the Parks and Recreation Director. Grade separations (culverts sized to accommodate trails, pedestrian bridges) are preferred. Pedestrian-activated traffic signals shall be placed at at-grade crossings of major streets.
- 23-3 In order to better protect American Indian religious uses and sites within the conservation Area, the All Indian Pueblo Council Chairman shall be the designated City contact. All City proposed plans and actions for recreational facility development on public lands shall be provided to the Chairman for comment with time for review and response, consistent with the standard review period of 30 days.

POLICY #24. THE FOLLOWING RECOMMENDATIONS WILL APPLY TO THE LOCATION OF RECREATIONAL FACILITIES IN PUBLIC OPEN SPACE. FUNDING SHALL BE IDENTIFIED THROUGH ROAD AND DRAINAGE CORRIDOR STUDIES. IDEALLY, FUNDING SHOULD BE SHARED BY ALL INVOLVED AGENCIES.

Recommendations:

- Recreational uses within or adjacent to public open space should be limited to activities which do not conflict with maintenance of environmental quality and protection of cultural resources.
- Active recreation areas, such as picnic areas, should be located away from the escarpment but linked to it by trails.
- Trail placement should enhance the nature experience for the hiker, while allowing for varied experiences and views. A continuous trail is desired from the Piedras Marcadas area to the southern tip of the escarpment, but its design criteria must place escarpment preservation as a priority over providing a continuous trail.
- Recreational trails should be located in areas which are least sensitive to human use. The protection of unique environmental, archaeological, and visual resources shall be a prime concern in determining trail locations. In general, bike trails should not be located within the area proposed to be managed by the National Park Service, until a comprehensive facility plan is completed. The proposed bike trail shown following the top of the escarpment from La Rinconada south should be deleted from the Bikeways Master Plan pending development of a recreational plan for the escarpment.



CONCEPTUAL TRAIL AND FACILITY LOCATIONS * MAP 11

- | | | |
|---------------------------|----------------------|------------------------------------|
| Pedestrian Trails | —— Escarpment | ★ School |
| Bikeways | —— Major Roads | ■ Visitor Center (Staffed) |
| Equestrian Trails | —— Restricted Access | ● Interpretive Exhibit (Unstaffed) |
| ■ Equestrian Center | ■ Park | P Parking |
| + Equestrian Staging Area | ☆ Proposed Park | B Bicycle Rack |
| | ♿ Handicapped Access | S Scenic Overlook |

*Trails shown are conceptual--based on existing City plans--and subject to change. Designation of a Petroglyph National Monument would result in comprehensive facility planning for the area, including inter-agency coordination and extensive public input.

- Trails should not be placed on the escarpment if their construction will cause erosion of the slope. In such areas, the trail should divert to the base or top beyond the nine percent slope, or if necessary, to sidewalks of nearby streets.
- Trail design and location should minimize the potential for conflicts between trail users and area residents and property owners.
- Trail placement should allow for a variety of views. In some areas where there is existing or planned development below the escarpment, trails on top should be far enough from the edge so that views of immediately adjacent development are blocked and one sees the bosque and beyond. In other areas when the trail is on top, it should move to the edge so the Escarpment Face and base can be seen. Where distance from the edge permits, the trail may fork to provide the hiker with view options from the trail.
- To the extent possible, trails should be continuous. Because of limited space outside of steep slopes, bikeways below the escarpment should be located on streets, for the most part, with bike racks provided at pedestrian access points. Above the escarpment, bike trails may be provided, preferably along local streets. Pedestrian and equestrian trails should be located off street.
- Where practical, sidewalks on local streets against the toe of the escarpment should be used to open up portions of the escarpment to the public while avoiding construction of a paved trail outside of the road right-of-way. Fences with walk-through openings should be installed along open space adjacent to local streets to control random access.
- Existing cuts should be considered as preferred locations for pedestrian and equestrian trail links between the top and bottom of the escarpment.
- Bikeway crossings of the escarpment should be aligned with road crossings because of their need for paving and relatively flat grades. Bikeway crossing needs must be balanced against the desire to minimize road crossings cut-and-fill.
- Horse trails should be located where they will do the least damage to the escarpment and in locations which do not conflict with other activities. Preferred horse trail locations are in areas where zoning allows livestock and near the other equestrian facilities (i.e. the Horse Complex and the West Side Equestrian Center). Arroyos and utility corridors are generally good horse trail locations.

- Arroyo trails should be used as connections between the escarpment and points of interest in Boca Negra and Volcano Parks. These trails will also provide links to neighborhoods, schools, parks, archaeological sites, and other points of interest, such as the Zuris-Mann site.
- Some petroglyph concentrations should be designated as easy viewing areas with trails for easy walking, handicapped access, and convenient parking. Such easily accessible areas will require a relatively greater degree of management to prevent vandalism or overuse. These areas will require larger setbacks, parking, and on-site management.
- Access should be carefully controlled and located to minimize vandalism.

AREA SPECIFIC RECOMMENDATIONS

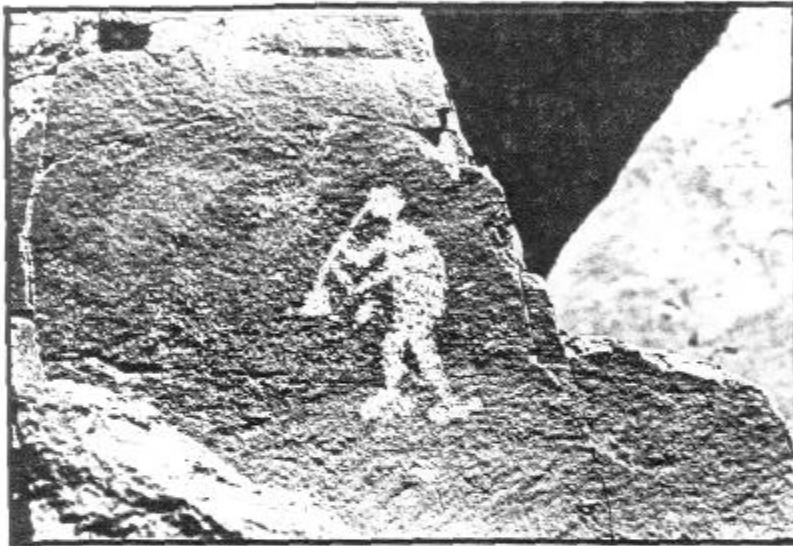
The escarpment top has numerous trail placement opportunities. However, the presence of Native American shrine sites and the current status of certain areas renders the development of recommendations for precise trail locations at the top and base beyond the scope of this plan. Precise location decisions will be made as land is set aside as open space or concurrently with subdivision and site planning approvals. Therefore:

POLICY #25. THE FOLLOWING RECOMMENDATIONS FOR SPECIFIC AREAS SHALL BE CONSIDERED IN PLANNING FOR A CONTINUOUS TRAIL AT THE BASE AND/OR TOP OF THE ESCARPMENT AND ASSOCIATED FACILITIES.

Recommendations:

- A pedestrian trail should be designed along the Piedras Marcadas Arroyo to connect the canyon with the Zuris-Mann site. Interpretive exhibits should be developed along the trail to educate the visitor regarding archaeological and geological features; ancient Anasazi water harvesting techniques to enhance agriculture; and contemporary methods of flood control, irrigation and transportation. Los Metates (LA #52099) is an archaeological site located in the Piedras Marcadas Arroyo Corridor Plan area which includes petroglyphs and more than 25 boulder metates. Although this site is protected through conditions imposed in the Riverview Sector Development Plan, it is privately owned. A branch of the Piedras Marcadas trail may be located between the escarpment, Los Metates and the Bosque, if the property owner is amenable to allowing access to the rock outcrop.

The base trail through Riverview and Shenandoah should cross the Mariposa Arroyo at Tesuque and proceed along the sidewalk of Painted Pony to Staghorn Drive. Repairs to the basalt behind the residences in Shenandoah and High Range at Taylor Ranch should be made by the City Open Space Division.



John R. Holbrook, photographer

- The park planned in Unit 22 of Volcano Cliffs along the Mariposa Arroyo is an ideal northern terminus for an expansion of Petroglyph Park that would incorporate over 650 additional petroglyphs. It has the potential of being linked with the pedestrian trail along the escarpment base and therefore with other open space and recreational areas. As a minimum, the City should seek to acquire an easement along the Mariposa Arroyo from the park site to the east to connect to the pedestrian trail proposed at the escarpment base.
- In the Santa Fe Village and Marsh Peninsula areas, there are areas where the lots are platted close enough to the slope that trail construction might be damaging to the slope.
- The base trail should be located along Montano and south along local streets rather than behind the lots north of Cienega Road West. The trail should be connected from Foxford through a maintenance vehicle easement to the North Branch of the San Antonio Arroyo, crossing the arroyo and continuing west along the south edge of the arroyo, then south behind the lots on Rockcress Court and Rockcress Road to the South Branch. A trail is indicated on the plans for Santa Fe Village to the north of Marsh Peninsula; however, there has been damage to the escarpment there and the trail may have to move to the sidewalk of Volcan Parkway to avoid further damage.
- The Rinconada Canyon and La Mesa Prieta comprise one of the most attractive open space areas of the escarpment. The immediate access from I-40 from 98th Street and Unser will make it the staging area for most visitors. Trails will have to be designed to accommodate visitors without damaging the environment.
- Specific pedestrian trail location in the area between Taylor Ranch and Petroglyph park depends in part on what land the City is able to acquire in the Volcano Cliffs area. Whenever possible, the trail should be located adjacent to the escarpment base. When right-of-way for a base trail cannot be obtained, the trail should make use of the sidewalk alignment in the Staghorn Drive right-of-way.
- The southern tip should provide parking, a Visitors' Center, interpretive trails, and handicapped accessible trails. Visitors with only a small amount of time should be able to take a short trail that will expose them to many of the experiences that the rest of the escarpment offers.
- Due to its pristine state, and its uniqueness in that regard, access to Rinconada Canyon should be limited. Any facilities which would detract from the natural experience, i.e., an amphitheatre or other intense development, should be located elsewhere.

- Roads should be designed to accommodate trail crossings. Pedestrian bridges or underpasses are examples of solutions. The use of culverts which are a minimum of 13 feet high, for example, allows horse or bicycle riders to cross under a roadway. Such culverts could be included in drainage facilities design where trails are planned to parallel an arroyo.
- Pedestrian, equestrian, and bicycle gates should be placed at trail entrances to open space to prevent motorized vehicles from using the trails.
- Interpretive exhibits, parking areas, scenic overlooks, and other facilities should be located near points of interest but should not negatively impact fragile areas. In Piedras Marcadas Canyon and Rinconada Canyon, for example, developed facilities other than trails should be located near street access at the canyon edge. No developed facilities should be placed on the Marsh Peninsula.
- A staffed visitors' center should be placed near the escarpment's southern end with access from 98th Street and at the Mann Site, with access from Coors Boulevard.
- Vehicular access to Volcano Park should be provided from Paseo del Volcan as recommended in the Volcano Park Master Plan.
- A public information center should be located north of Paseo del Norte in the vicinity of the small canyon just south of Piedras Marcadas Canyon.

PUBLIC SAFETY

POLICY #26. THE FOLLOWING RECOMMENDATIONS SHALL BE CONSIDERED IN THE DESIGN AND MAINTENANCE OF FACILITIES.

Recommendations:

- Recreational trails and other public facilities which are developed within public open space should be designed with public safety as a major objective. Trails should avoid steep slopes and use natural access routes or existing roads and cuts wherever possible.
- Crossings of arroyos and major streets should be designed so that trail users can safely cross these barriers. All weather crossings of arroyos and pedestrian bridges across major street are preferred. Culverts designed to

accommodate equestrians and bicyclists, as appropriate to the specific trail, are logical for arroyo trails that cross major streets. Other options include steps down steep arroyo banks, culverts, and pedestrian activated traffic lights.

CULTURAL RESOURCES

The petroglyphs and other archaeological sites along the escarpment have achieved national significance through inclusion of the "Las Imagines" Archaeological District on the National Register of Historic Places. The presence of such a large concentration of rock art and other archaeological/historical sites within the urban area provides a unique opportunity for understanding our cultural past.

A series of interpretive exhibits which are linked by the recreational trail system is recommended as shown on Map 11.

POLICY #27. THE FOLLOWING RECOMMENDATIONS SHALL BE INCORPORATED INTO THE WORK PROGRAMS OF APPROPRIATE DEPARTMENTS AS SCHEDULES AND BUDGETS PERMIT.

Recommendations:

- Archaeological surveys on the Northwest Mesa in the vicinity of the escarpment will be continued and expanded to insure that as many sites as possible are identified. Expansion of the national historic district may be appropriate if new significant sites are found. Surveys should be done as part of all Rank 3 plans affecting the design overlay zone. If surveys have not been done as part of existing Rank 3 plans, they should be completed prior to subdivision or site plan approval. Surveys are the responsibility of the landowner(s) or, in the case of public plans, the applicable public agency. Surveys must be prepared by a qualified archaeologist, as defined in Appendix H. If the survey identifies a site which requires extensive mitigation, the City Planner, in consultation with the State Historic Preservation Officer and the property owner, will determine the appropriate treatment for the site, and how it will be financed.
- Public access along the escarpment should be designed so that access to the most sensitive archaeological sites is limited or carefully controlled. Trail widths and materials should be appropriate to the environmental character and intended uses through the different segments of the escarpment.
- Handicapped access should be provided to specific sites along the escarpment.

- Appropriate archaeological sites along the escarpment should be incorporated into a linear interpretive exhibit.
- Connections from the escarpment to distant archaeological sites, such as the Zuris-Mann Site east of Coors, the geologic windows and certain volcanoes to the west, should be provided. Arroyo trails may serve this purpose.
- A maintenance level adequate to protect archaeological sites and petroglyphs from vandalism and overuse should be provided. At areas with easy access, parking, and exhibits, continuous patrols, frequent trash pickup, and repairs will be required. In areas of heavy use, full time staffing may be required .

A public archaeology program has been proposed for the City of Albuquerque and Bernalillo County. As an important and integral part of the County's heritage, the sites along the escarpment should be incorporated into such a program when it is established. Until a City/County archaeological program is in place, archaeological sites will be protected through this plan's regulations.

To the extent that decisions must be made about the escarpment open space without the benefit of such a program being in place, these decisions should be consistent with proposed goals and objectives of the public archaeology program as expressed in the ARPAC report and with the governing concepts of this plan.

PUBLIC EDUCATION

The cultural, geological, and biological resources of the escarpment and adjacent open space contribute to an understanding of Albuquerque's prehistoric and historic past and to its natural systems. As a significant feature in the local landscape, it is a potential public education focal point. Therefore:

POLICY #28. THE FOLLOWING RECOMMENDATIONS FOR A PUBLIC INFORMATION PROGRAM SHALL BE CONSIDERED.

Recommendations:

- The City should work with the public schools and other public and private agencies and institutions to develop a comprehensive public education program which conveys the geological, biological, and cultural significance of the escarpment.
- Public information pamphlets and brochures should be available through the Albuquerque Convention and Visitors' Bureau, the Chamber of Commerce, the Mayor's Office, the Parks and Recreation Department and other agencies which

would logically make such information available to residents and tourists.

- Video programs and/or volunteer speakers should be available for interested groups, classes, and cable TV.
- Local museum exhibits which describe the escarpment, its natural surroundings, and/or native rock art should be accomplished.
- On-site exhibits at La Mesa Prieta and Piedras Marcadas Canyon, the Mann site, and points of interest along the escarpment should be developed to explain the context of the area, its history, and its significance.
- A coordinated marketing and promotional program should be established through the City of Albuquerque, the Albuquerque Convention and Visitors' Bureau, the Chamber of Commerce and the National Park Service.

RESOURCE MANAGEMENT

The escarpment is already suffering from vandalism -- shooting, damage to slopes and vegetation by off-road vehicles, spray painting, dumping, and removal of petroglyphs. Resource management will be required to prevent further degradation.

As the open space and associated recreational and interpretive facilities are developed and used, management efforts will be required to maintain trails, exhibits, signs, fencing, landscaping, and other amenities.

POLICY #29. THE FOLLOWING RECOMMENDATIONS FOR PUBLIC MANAGEMENT OF THE RESOURCE SHALL BE CONSIDERED.

Recommendations:

- As land is acquired for public open space, it should be protected from damage, cleaned up, and posted with open space signs. A 100% photographic inventory of the petroglyphs has been done for the State Historic Preservation Division. Other archaeological sites should be documented and steps taken to protect them from vandalism. Funds for fencing, signs, clean-up, and protection of cultural resources should be included in acquisition appropriations.
- Access should be controlled where public open space abuts a local street. Fences with walk-through openings should be installed at the property line. Equestrian and bicycle gates should be provided where equestrian trails and bikeways are located.

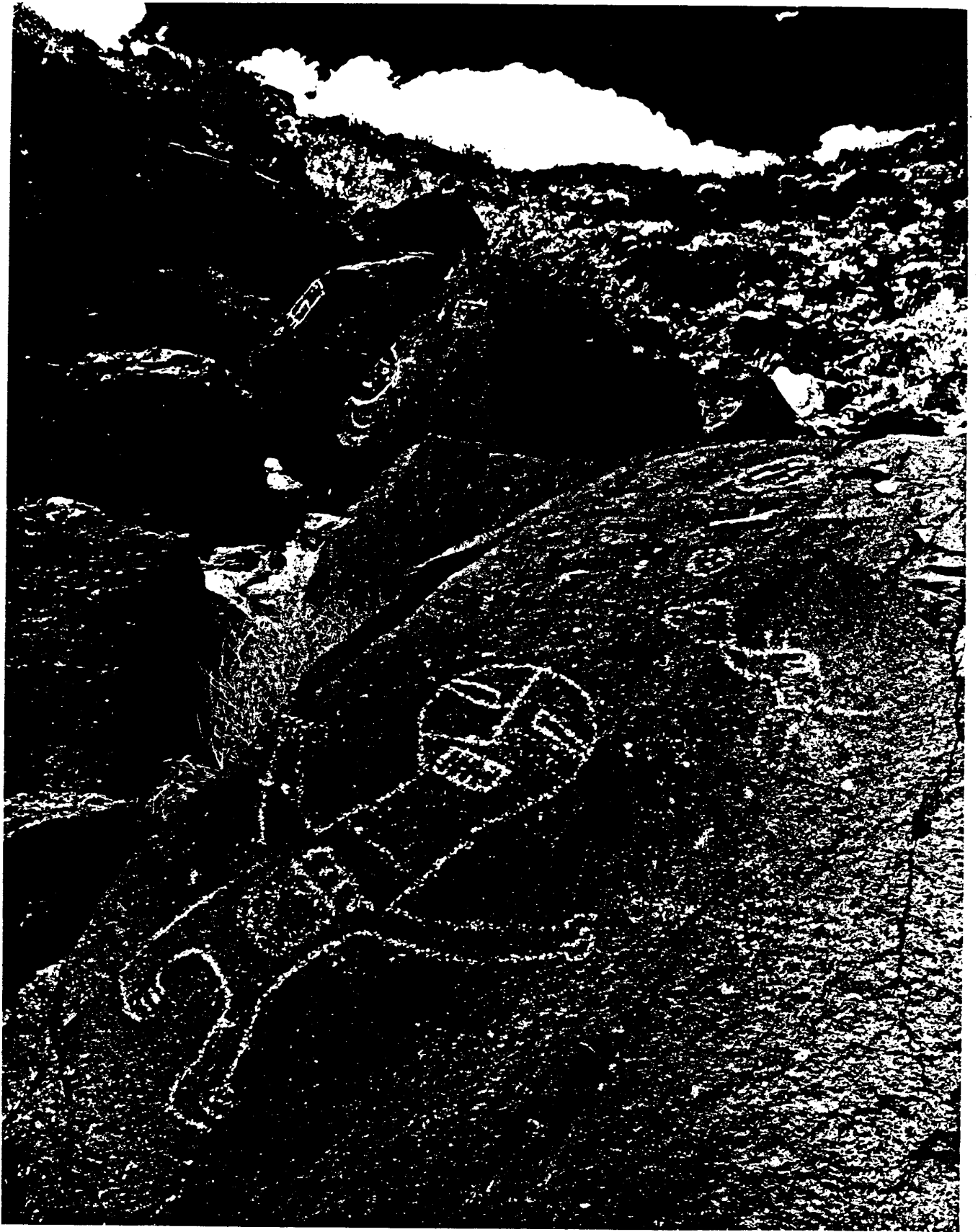
- Routine patrolling of public open space should begin immediately to provide a watchful presence. The presence of conservation officers can deter vandalism. A volunteer patrol program may be created by the Open Space Division of Parks and Recreation working with local groups and neighborhood associations concerned with open space protection and interpretation.
- Upon adoption of this plan, The City should begin immediately to assist private property owners with information to secure their property from vandals. Areas of particular concern are Piedras Marcadas Canyon, Volcano Cliffs, Rinconada Canyon and the escarpment south of Rinconada Canyon.
- Once the City has acquired a workable system of public open space, and the area is open to public use, the following management practices should be followed:
 - a. Access for maintenance crews and patrols should be provided where heavy maintenance is required. Foot patrols are the appropriate level of management in other areas.
 - b. Two full time conservation officers and one full time maintenance worker should be added to the Open Space Division for adequate management of public use area. This additional staff would be responsible for patrolling during hours the area is open to the public, on-site management of the canyons during periods of heavy use, daily trash pickup, and repairing/replacing fences, signs, trails and exhibits.
 - c. Phasing of public open space development should be coordinated with hiring of management staff. A plan for phasing development to match acquisition of the resource to manage it will insure that the resource will not be damaged by increased public use.
 - d. Use of the open space, trails, and other recreational facilities should be monitored for signs of overuse, vandalism, or other damage. To minimize long term damage, a number of techniques may be used, including:
 - Controlling the number of users at one time through a permit system or guided tours only in areas to be protected. Rinconada Canyon and Piedras Marcadas Canyons are areas where such an approach could be applied successfully.

- Rotating areas open to the public or closing areas of heavy use to allow vegetation to recover.
 - Hardening of trails or installation of barricades to expedite recovery.
- e. Development of a detailed management plan for the escarpment is recommended once the level of public agency commitment to the acquisition and management of open space is determined.



Steven Donahue, photographer.

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Piedras Marcadas Canyon.

Isaac Eastvold, photographer.

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CHAPTER 7: IMPLEMENTATION

The uniqueness and importance of the West Mesa Escarpment is as limitless as the expansive vistas it creates on Albuquerque's western horizon. This uniqueness lies in the statuesque black cliffs and the rolling hills of the mesa edge which give our community a character all its own.

Although preservation of the escarpment benefits the Albuquerque area, the tourism, education, recreation and research potential goes far beyond our city limits benefiting both State and National Park Systems.

"The rock art and other archaeological remains of the West Mesa escarpment are an irreplaceable part of New Mexico's cultural history, a document of the Southwest's distinctive prehistoric, historic and artistic past. On a national level, such a major concentration of rock art is of special significance. In the eastern half of the United States there is probably not a single site of this magnitude...of the large rock art sites in the West, many are in remote locations, or in private hands. The situation of the West Mesa petroglyphs near a major interstate, make it a prime candidate for acquisition by the National Park Service for preservation and public interpretation." (Polly Schaafsma, Rock Art and Associated Archaeological sites of the Las Imagines Archaeological District, West Mesa, Albuquerque: Statement of Significance. Submitted in fulfillment of professional services for the National Park Service, February 1987).

The success of preserving and managing this expansive yet sensitive resource hinges upon an effective cooperative effort between all agencies involved. Therefore, the implementation strategy outlined below is contingent upon significant participation by the City, State and Federal governments. This section identifies recommendations for land acquisition and protection, management, and in a more limited sense, development of facilities.

Citizen groups, property owners, public agencies and policy makers have focused much attention on the Northwest Mesa Escarpment and petroglyphs. While this attention often mobilizes support for protection, it also causes pressure to find immediate, clear-cut implementation methods. Any implementation plans are subject to change depending on a number of factors including development pressure, commitments of other agencies such as the United States Congress and the State of New Mexico, other priorities for open space acquisition, the condition of the economy, and the economic health of governments. Resources for implementation will take time to develop and put in place.

Implementation of the Plan recommendations will require a mix of acquisition and preservation strategies involving all of the parties interested in the escarpment including public agencies and policy makers, landowners, conservation advocates and organizations, and voters. Besides resources for actual acquisition, additional staff and/or consultants will be required to deal with the complex problems of acquisition, management and facilities development if implementation is to succeed.

The division of responsibility among governmental agencies is a result of conversations with agencies and a history of their prior participation in such projects. The Conservation Area recommended for acquisition or preservation in the Plan totals approximately 7,360 acres (this includes existing Volcano and La Boca Negra Parks). Approximately 2,906 acres within the Conservation Area have not yet been publically acquired. Therefore:

POLICY #30. THE CITY SHALL COORDINATE CONSERVATION, AQUISITION AND MANAGEMENT RESPONSIBILITIES AS BEST AS POSSIBLE TO ATTAIN THE FOLLOWING MIX (Map 13):

	<u>ACQUISITION OR PRESERVATION*</u>		<u>MANAGEMENT</u>
	<u>Total Acres</u>	<u>Individual Lots</u>	<u>Total Acres</u>
City	720	300	3,320
State	40	60	0
Federal	<u>3,210</u>	<u>250</u>	<u>5,110</u>
Total	3,970	610	8,430

* Figures are approximate. Acreage assumptions differ slightly in National Park Service report.

CITY PARTICIPATION

The City has acquired over 20,000 acres of open space and over 9,000 of these acres are on the West Mesa. These open space lands include such major acquisitions as Shooting Range Park, Volcano Park, and La Boca Negra Park. To date, approximately 25% of the Escarpment Face is in public ownership or reserved as private open space through the R-D zone. The City and the State Historic Preservation Office have co-sponsored an archaeological survey of the escarpment. In addition, Indian Petroglyph State Park was constructed on City park land with State funding.

Approximately 13,600* acres of proposed open space, including the Volcanic Escarpment, remain to be acquired or conserved throughout the metropolitan area under the Comprehensive Plan. The Open Space Advisory Board issues a recommended priority list for acquisition of these lands. The list is divided into three priority groupings. Most of the lands within the Conservation Area are currently listed in the first priority grouping as "Volcanic Escarpment" (the Priority 1 designation conveys an urgency for acquisition or protection). The State-owned section in Volcano Park and the Westland property above the escarpment are listed in the Priority 2 grouping. The City is currently negotiating purchases in Volcano Park and in the Piedras Marcadas area of the escarpment and is working on other acquisitions as resources permit.

*All acreage figures are approximate.

Lands within the Conservation Area proposed for potential City acquisition or conservation total approximately 700 acres. It should be recognized that the City does not intend to acquire all of this land. To the extent that land can be protected from development through the development process as described in the land use planning section of this plan and the City does not feel public access or management is necessary, acquisition is not anticipated. In addition, another 2,300 acres within the Conservation Area which the City presently owns would also be managed by the City. The City would also manage 40 acres acquired by the State and 180 acres acquired by the Federal Government in Volcano Cliffs subdivision for a total of approximately 3,300 acres under City management within the Conservation Area.

Proposed City responsibilities for acquisition or preservation include lands in and around Piedras Marcadas canyon; rim lots in Volcano Cliffs Subdivision north and south of Petroglyph Park; lots and dedicated open space in Shenandoah, High Range, Santa Fe Village, Lava Shadows, and Katherine Nicole Subdivisions; and the north portions of Volcano and La Boca Negra Parks. Approximately 2,000 acres in and adjacent to the south portions of La Boca Negra and Volcano Parks which the City now owns and manages would be leased to the National Park Services under the provisions outlined below.

FEDERAL PARTICIPATION

The National Park Service is currently working on a feasibility study for a Petroglyph National Monument on the West Mesa. Federal participation strategy is based upon several alternatives which have been discussed with Park Service staff.

The National Park Service study includes options for assembling lands within the Conservation Area belonging to Westland Development Corporation (approximately 2,370 acres), the State Land Office (640 acres), and the City (approximately 2,100 acres), in order to establish a National Monument. The advantage to these lands would be their proximity to I-40, sweeping views from the escarpment to the volcanos, and the presence of large petroglyph concentrations in Rinconada Canyon and at the south end of the escarpment. Because it has access to public lands desired by the State Land Office to consolidate state holdings elsewhere, the Federal Government would be in a better position than the City to acquire the State land in Volcano Park.

The City would retain management of lands in northern Volcano and La Boca Negra Parks. The National Park Service may propose that City-managed lands in the Conservation Area be affiliated with the National Monument. Therefore:

POLICY # 31. THE CITY SHALL COORDINATE CONSERVATION, ACQUISITION AND MANAGEMENT OF THE CONSERVATION AREA WITH THE STATE OF NEW MEXICO, THE UNITED STATES CONGRESS AND THE NATIONAL PARK SERVICE.

Recommendations:

- If the Petroglyph National Monument Feasibility Study is acted upon by Congress, the City should lease the above mentioned open space lands to the National Park Service on the condition that the federal government first acquire the Westland and state properties.
- The National Park Service should be encouraged to acquire 184 acres in Volcano Cliffs subdivision east of La Boca Negra Park. The City will consider trading title to its 2,100 acres in the south portion of the Conservation Area for these lands.
- The City will pursue strategies to unify escarpment management goals, including possible affiliation of its lands with the National Park Service. Staff will advise City Council on the legal, fiscal and administrative implications of such arrangements.

STATE PARTICIPATION

In 1973 the State of New Mexico Department of Natural Resources, State Parks Division partially funded the construction of Indian Petroglyph State Park on a City park site. Federal Land and Water Conservation Fund monies were also used in this project. Facilities were then turned over to City management. Petroglyph State Park is a 74 acre park which is managed to preserve the cultural resources within this small canyon. Additional petroglyph concentrations, which are located just outside of the park boundaries, are also in need of protection.

The serenity and natural beauty of Petroglyph Park are a vital part of the visitors' experience. These qualities would be severely diminished if currently platted lots surrounding the park were developed. (An additional, and perhaps greater impact to the park would result from the widening and improvement of Unser Blvd. in its planned alignment through the park.)

The New Mexico State Parks Division and the State Historic Preservation Officer should be approached for technical assistance and possible grants for escarpment, archaeological site and petroglyph conservation.

The State Land Office is constrained by Federal legislation requiring sale or lease of State lands to benefit State Universities. The State Land Office may be interested in three-way trades involving the Federal Government which "block up" their "checkerboard" lands and at the same time conserve escarpment land. The New Mexico State Legislature has expressed interest in the fate of the escarpment and petroglyphs through Senate Memorial #116 in the 1987 legislative session (see Appendix M). Timely acquisition of right-of-way will prevent delay in the extension of Unser Boulevard which is needed as a north-south reliever to Coors Boulevard. Therefore:

POLICY #32. THE CITY SHALL ASK THE STATE LEGISLATURE TO EXPAND AND PROTECT PETROGLYPH PARK THROUGH PURCHASE OF LOTS TO THE NORTH AND SURROUNDING THE PARK, AND AQUISITION OF RIGHT-OF-WAY FOR RE-ROUTING UNSER BOULEVARD SOUTH OF THE PARK. THIS REQUEST SHOULD BE MADE A PART OF THE CITY'S LEGISLATIVE PRIORITIES IN 1988 AND AGAIN IN 1989 IF NECESSARY.

Recommendations:

- The State Historic Preservation officer should be encouraged to provide technical and possible acquisition assistance for escarpment preservation.
- The National Park Service should be encouraged to discuss mutually advantageous trades with the State Land Office in an effort to acquire escarpment land.

FINANCIAL IMPACTS OF ACQUISITION

A variety of funding sources and acquisition or protection methods (outlined below) can be used to accomplish preservation. Approximately one fourth of the rock face of the escarpment is currently in public ownership or reserved as private open space, and most of this land was conserved at little or no public cost through the development process or the Recreation and Public Purposes Act. Conservation, acquisition and management will require cooperative efforts on the part of the City, State and Federal governments and private corporations.

More will be known after Congress takes action on the National Monument Study (expected in the Fall of 1987) and the City begins to implement some of the measures listed below under funding sources. If the National Monument Study is adopted by Congress, it is probable that a substantial share of the acquisition responsibility will be borne by the National Park Service.

Since speculation and development pressure are driving land values up in the Plan area, it is to the public's advantage to move as rapidly as possible to acquire recommended lands on a priority basis. Another reason for urgency in public acquisition is the need to protect these resources from deterioration due to vandalism, shooting, dumping, and off-road vehicles.

PHASES OF PRESERVATION

Diversity, flexibility and creativity are three very important ingredients in a successful land acquisition program. The primary goal of the escarpment acquisition program is protection of the escarpment and its resources. Therefore:

POLICY #33. PROTECTION OF THE ESCARPMENT AND THE ASSOCIATED HISTORICAL AND NATURAL RESOURCES WILL BE UNDERTAKEN IN THREE PHASES.

Recommendations:

- Phase I: The City, State and Federal Government should employ all legal conservation, acquisition and management methods and strategies established by law, ordinance, or policy to protect the escarpment through the zoning and development process and cooperative agreements as recommended below and in previous chapters of this plan. Through Rank II and III plans, much of the escarpment can be protected, and in some cases, acquired through dedication. The City should explore mandatory conservation easements to protect Escarpment Face property in private hands. Less-than-fee interests such as leases, conservation easements and management agreements will extend further protection on an interim basis.
- Phase II: Fee-simple title to lands within the Conservation Area which are desired for public ownership should be acquired expeditiously by appropriate governmental agencies, according to priority. Proposed funding sources for City acquisition are identified in this chapter as summarized in Table VII. If identified short-term funding sources (two years or less) are not adequate to accomplish major acquisitions, then available funds should be used to purchase options and make payments in anticipation of medium and long term funding.
- Phase III: The City Council will monitor progress of the acquisition by the three levels of government and take appropriate action to protect the escarpment consistent with this Plan. Within 24 months after adoption of the Escarpment Plan, the Mayor will present to Council a report and analysis of the progress made by the City, State and Federal Governments toward the Plan's implementation. At that time, the City's open space priorities and the boundaries of the Conservation Area will be re-assessed, taking into consideration progress made toward protection and acquisition of the escarpment and projected resources available.

* * *

The City should work toward an effective acquisition procedure as soon as acquisition resources are approved by policy makers.

A tentative forecast of potential funding sources for acquisition by purchase appears in Table VII. It should be stressed that providing support for an effective acquisition program and management and protection of lands which are acquired are as important as acquisition itself.

Priorities will be established for the parcels within the Conservation Area designated for City preservation. These priorities will be based on development pressures, importance of resources to be protected and negotiations with land owners.

CONSERVATION, ACQUISITION AND MANAGEMENT METHODS AND STRATEGIES

The conservation and acquisition methods, strategies, and funding sources below appear in order of suggested implementation. The first group includes methods and strategies which generally require little public funding, and which can be implemented quickly. The second group identifies funding sources to be used in acquisition.

Protection of Sensitive Land by Requirements of the Development Process:

The Northwest Mesa Area Plan and this Plan prohibit development within the nine percent or greater slope of the escarpment. This plan further restricts development within the Conservation Area. As long as these regulations do not deprive landowners of reasonable use of their property, they are sustainable and should withstand legal challenge. In the case of some lots in Volcano Cliffs subdivision, however, no viable building pad exists outside the nine percent slope. In such cases the lot would probably be acquired. Therefore:

POLICY #34. DEVELOPMENT REQUIREMENTS OF THIS PLAN SHALL BE USED AS MEASURES TO PROTECT THE ESCARPMENT.

Open Space Dedication Requirements and Land Banking:

Open space dedication is currently required in Developing Urban areas of the metropolitan area. It is not certain if these requirements will be retained in the future. Planning Department staff estimates that approximately 395 acres of off-site open space will be required to be dedicated under the current dedication requirements on the Northwest Mesa (PIAS 10 & 11). A recent amendment of the Comprehensive City Zoning Code allows off-site open space to be dedicated outside the sector plan in which the development occurs. A subdivision on the West Mesa could purchase inexpensive land on the Escarpment Face for open space dedication instead of dedicating expensive developable land in the subdivision or paying cash-in-lieu at the developable land rate. The City can encourage dedication of escarpment land by rejecting often marginal off-site open space lands offered elsewhere. Therefore:

POLICY #35. THE CITY SHALL INFORM PROSPECTIVE DEVELOPERS THAT PURCHASE OR DEDICATION OF THE ESCARPMENT IS A TOP PRIORITY IN ACCEPTANCE OF OFF-SITE OPEN SPACE AND REFER THEM TO ESCARPMENT LANDOWNERS FOR ACQUISITION AND DEDICATION OF ESCARPMENT LANDS.

POLICY #36. IF OPEN SPACE DEDICATION REQUIREMENTS ARE DISCONTINUED BY THE CITY, A CITY-WIDE OPEN SPACE FEE OR SOME OTHER ASSESSMENT SHALL BE INVESTIGATED.

Less-Than-Fee Acquisition of Escarpment Lands:

Leases, options and cooperative management agreements have been used to protect open space lands. These methods often provide only temporary protection. They can be used to buy valuable time and the small payments involved are often a help to the landowner in paying property taxes and other carrying costs. This often reduces pressure on landowners to sell or develop the property. State legislation allowing reduced tax rates for property under a conservation easement is needed. Other states have enacted similar successful tax incentives.

The City has recently negotiated a cooperative management agreement with an escarpment landowner to protect petroglyphs on proposed open space property. Other such agreements are expected soon. Since these management agreements are cancellable by either party upon 30 days notice, they are viewed as interim measures for protecting the escarpment when cooperative landowners are involved. Success in implementation of these agreements depends on adequate patrol and maintenance personnel to manage the land. Therefore:

POLICY #37. WHERE APPROPRIATE, THE CITY SHALL UTILIZE LEASES, OPTIONS, OR MANAGEMENT AGREEMENTS TO REDUCE COST OF PROTECTING ESCARPMENT OPEN SPACE AND TO PROTECT LAND IN ANTICIPATION OF MEDIUM TO LONG RANGE FUNDING.

37-1 The City shall research tax incentives to landowners for providing donations and conservation easements and shall prepare sample donation and easement agreement forms.

37-2 Where management personnel and resources allow, the City shall continue to negotiate management agreements with landowners to provide interim protection of the escarpment prior to acquisition.

ACQUISITION FUNDING SOURCES: EXISTING

The Open Space Trust Fund and Trust Lands:

In 1982 the City purchased part of the Elena Gallegos Grant on the west face of the Sandia Mountains using a 1/4 cent gross receipts tax. Approximately 7,200 acres of this land was traded to the Federal Government for 17,000 acres of Federal surplus lands located throughout the State (the Trust Lands). Pursuant to City ordinances, these Trust Lands are being sold to provide funding for the open space program. The principle from these sales is deposited in a permanent Open Space Trust Fund, the corpus of which has reached \$9.5 million (the Permanent Fund).

Interest from the fund as well as interest income from land sales is used for management, maintenance, acquisition, and development of open space lands and for repayment of obligations of the open space program. Although interest from the Permanent Fund currently supports open space management, repayment of program obligations and the Trust Land marketing program, it is not expected to produce significant income to fund open space acquisition for at least the next five years.

Income from land sales, however, is expected to increase. It is the current practice of the City to seek long-term contract sales of these lands while maximizing up-front interest payments. Interest income from these lands can be used directly to purchase proposed open space lands including, but not limited to the escarpment. Staff has projected annual trust land sales income goals through 1998 (See Table VII). Market conditions will be the primary factor in meeting these goals. City officials realize that Trust Lands are not appreciating in value as quickly as lands proposed for acquisition as open space. It is, therefore, in the City's best interest to market Trust Lands as quickly as possible and in a prudent manner.

Increased General Obligation Bond Funding for Open Space:

This funding source takes into account recent increases for open space acquisition programmed in the six year bond cycle as well as the availability of funding currently programmed for West Mesa Open Space near the Double Eagle Airport (see explanation below). Since some revenue is expected to be available as early as July, 1988, this can be considered a short as well as a medium term funding source.

Because of pressing needs for high priority open space acquisition in other parts of the metropolitan area, it is recommended that the "added funding" for open space acquisition (total of \$3.2 Million) be programmed for acquisition of open space other than the Conservation Area described in this plan. Funding from the 1987 and 1989 bond issues can best be used to purchase options and make payments on several parcels in anticipation of medium term funding sources.

Added Funding:

As a response to reduce Federal funding and less than expected income from the Open Space Fund, increases in the FY '87, '89, and '91 bond cycles have been approved by City Council for open space acquisition. Approximately \$600,000 has been added to both the 1987 and 1986 bond issues, and \$2,000,000 for open space and \$3,000,000 for "Petroglyphs" has been added to the 1991 bond issue (NOTE: None of these figures reflect a 5% DFM overhead). As indicated in Table VII, if the bond issue passes, these monies will not be available until July 1 of the year following the bond election. Addition of more funding in these bond issues would have the undesirable effects of either impacting other capital needs, or causing an increase in property taxes.

West Mesa Open Space Funding:

In addition, funds currently programmed for West Mesa Open Space acquisition near the Double Eagle Airport include \$775,000 in FY 1987, \$687,000 in 1989 and \$267,000 in 1991. Under the proposal for disposal of this land outlined below, these funds could not be used for further purchase of this land, but could be made available for other open space purchases on the Volcanic Escarpment.

1/4¢ Tax for Acquisition:

Passage of the 1/4 cent gross receipts tax* with a portion reserved for open space acquisition constitutes the most positive and significant step taken at this time to solve current open space acquisition problems. (See Table VII) The major advantage of this funding source is that it provides the amount of funding required in the short term to solve critical open space needs.

The 1/4 cent gross receipts tax assigns approximately \$13.8 million for the purchase of Escarpment land in fiscal years 1988 and 1989. In order to make this funding available during the first year of the tax, the City Council provided additional funding for interest payments on revenue bonds as well as additional funding for real estate acquisition overhead. This revenue will allow the City to move quickly on open space acquisitions, particularly as new development pressures increase on the west side. The tax assigns an additional \$27 million to open space acquisition during fiscal years 1990-1993.

The City can use long-term rolling options and sell revenue anticipation bonds to either acquire the land fee-simple or to acquire an interest in the property. A similar acquisition program was successfully accomplished in 1982 when revenue anticipation bonds were used on a 3 year 1/4 cent tax to raise over \$24 million for purchase of the Elena Gallegos Grant. Although interest must be paid on these bonds, it would probably not be as much as the appreciation of proposed open space over the same period.

ADDITIONAL FUNDING SOURCES AND OTHER RESOURCES: PROPOSED

Direct Trade of Trust Lands for Proposed Open Space Lands:

Current ordinances require that Trust Lands be sold and that proceeds derived from sales be deposited in the Permanent Fund. Income from land sales and certain income from the Permanent Fund can be used directly for open space acquisition of proposed open space. Two unforeseen circumstances have caused City staff and Administration to question this policy:

1. Trust land sales have not occurred as rapidly as originally anticipated. The real estate market and economies in the communities close to these lands are factors which have influenced this trend.
2. Proposed open space lands in the Albuquerque area are accelerating in value far more rapidly than Trust Lands near smaller, often economically depressed communities.

As a result of these factors, there is an increasing gap forming between the cost of proposed open space lands such as the escarpment, and the value of Permanent Fund and Trust Land resources. Since this gap promises to get wider in the future, it makes sense to dispose of the trust lands in a prudent way as soon as possible.

* O-141, Passed by the City Council on October 9, 1987.

The possibility of trading Trust Lands for proposed open space has generated some interest among owners of the proposed open space lands. Since one of the original purposes of the Permanent Fund was to assist in acquiring proposed open space, trading Trust Lands directly for open space appears to be consistent with the intent of the original ordinance. Some lands will be sold as originally intended to provide proceeds to build up the Trust Fund. A limit could be placed on the amount of trust lands allowed to be traded to insure that Trust Fund income goals could be reached.

By the terms of the Elena Gallegos purchase agreement, the Albuquerque Academy is entitled to 20% of the difference between the 1982 basis value of the trust lands and the appraised value at the time of the sale or trade. This would require the City to pay the Academy in cash as arranged between the parties. Therefore:

POLICY #38. THE CITY SHALL PREPARE A DRAFT AMENDMENT TO EXISTING LEGISLATION WHICH WILL ALLOW FOR DIRECT TRADE OF TRUST LANDS PROPOSED FOR OPEN SPACE. UPON PASSAGE, THE AD HOC LAND DISPOSAL COMMITTEE FOR THE TRUST LANDS AND THE ADMINISTRATION SHALL WORK TO ACCOMPLISH BENEFICIAL TRADES FOR ACQUISITION OF PROPOSED OPEN SPACE LANDS, INCLUDING THE ESCARPMENT, CONSISTENT WITH THE AMENDED ORDINANCE.

Sale of West Mesa Open Space Near the Double Eagle II Airport:

This land is being acquired using General Obligation bonds and listed as "West Mesa Open Space" in the Six year Capital Improvements Program Planning Guidelines, 1987-1991. An option purchase for the property was negotiated in 1980. Purchase will be complete after the 1991 bond issue. Only a small part of this land, occupied by a playa lake, was proposed for conservation as open space in the Comprehensive Plan. The rest of the land was acquired as a buffer to control undesirable development around the Double Eagle Airport. Land use controls can be accomplished by completing a City-sponsored sector plan and by zoning the land for airport-compatible uses prior to sale.

The Department of Finance and Management (DFM) has advised that the City may dispose of the lands it has already acquired in the West Mesa Open Space purchase. Further, the proceeds from this disposal need not be used exclusively for other open space on the west mesa. However, DFM advises against using more "Open Space" bond funds to purchase the remainder of the West Mesa Open Space land if the City intends to dispose of this land rather than keep it as open space. Alternative funding sources must, therefore, be found to complete purchase of this land.

Option payments for the West Mesa Open Space are approximately \$300,000 per year, and the last payment is due in July of 1990. Potential funding sources for option payments other than G.O. Bond funds include:

1. Interim sale of a tract in the south end of the property to Liquid Waste Division for a sludge composting site.

2. Sale of 10 acres to the Federal Aviation Agency for a radar site.
3. Negotiate a sale of all or part of the property after sector planning, and use income to complete option payments.
4. If necessary, use income from sales of Open Space Trust lands to make option payments.

It is expected that approximately 1,500 acres of this parcel will be developable after protection of the playa lake. It is estimated that \$8 million may be generated from such a sale within 4 to 5 years. Another possibility is that some of these lands could be traded for priority escarpment lands. Income generated from this property is the largest single source of funding for City acquisition of the Conservation Area recommended in the plan. Since revenues are not likely to be generated immediately, this should be considered a medium term funding source.

Staff estimates that the sector plan for the airport can be concluded within nine months, and that the first sales or trades could occur within a year after the plan is completed. Either a cash sale or terms would be possible. Both the Open Space Task Force and the Open Space Advisory Board have gone on record favoring disposal of this land and use of the income to acquire other open space on the west mesa. Disposal will require approval of the Administration, City Property Review Board, and City Council. City departments will have an opportunity to comment on the proposal before it is acted upon by the Property Review Board. The interest of City departments can also be addressed in the sector plan. Therefore:

POLICY #39. STAFF SHALL INITIATE THE PROCESS OF DECLARING THE WEST MESA OPEN SPACE NEAR DOUBLE EAGLE II AIRPORT SURPLUS TO THE NEEDS OF THE CITY FOR OPEN SPACE PURPOSES.

- 39-1 Planning, Public Works, Aviation and Parks and Recreation departments will pursue development of a Sector Plan and sale or trade of this property.
- 39-2 After completion of the Sector Plan, staff will develop a marketing strategy and a plan to complete payments on the remainder of the land.

Federal Assistance From the National Park Service:

The National Park Service is currently developing study options for escarpment acquisition for a proposed National monument. In recent planning meetings, Parks Service officials indicated that they are interested primarily in land of Westland Development Corporation at the south end of the escarpment, City open space at the south end of Volcano and La Boca Negra Parks, and State lands between these two parks. The Westland property, in which the Park Service is interested, comprises over one-half of the land proposed for conservation or acquisition in this plan.

In addition, the Park Service is exploring means of compensating the City for acquisition of City open space lands. Since the Federal regulations prevent the Park Service from paying a local government for land, they are investigating the possibility of acquiring other priority escarpment proposed for acquisition to trade for the City's Volcano Park and La Boca Negra Park lands. Other options include three-way trades in which the City would receive escarpment land and the landowner would receive Federal lands.

The feasibility study for the proposed National Monument is due in the Fall of 1987. Establishment of the Monument, and acquisition funding must be approved by Congress. If the Monument is established, it is likely that any funding would take at least two years. Therefore:

POLICY #40. THE CITY SHALL ASSIST THE NATIONAL PARK SERVICE IN ITS EFFORTS TO ESTABLISH A NATIONAL MONUMENT IN ANTICIPATION OF SUFFICIENT FEDERAL INVOLVEMENT IN ACQUISITION OF PRIORITY ESCARPMENT LAND AND THE STATE SECTION OF LAND BETWEEN VOLCANO AND LA BOCA NEGRA PARKS.

POLICY #41. CITY STAFF SHALL WORK WITH THE NATIONAL PARK SERVICE TO IDENTIFY PRIORITY ESCARPMENT LANDS WHICH WOULD BE DESIRABLE FOR FEDERAL ACQUISITION AND SUBSEQUENT TRADE TO THE CITY FOR OPEN SPACE LANDS WHICH THE PARK SERVICE WISHES TO ACQUIRE IN VOLCANO AND LA BOCA NEGRA PARKS.

United States Congress:

Congress will be asked by citizens and local governments to increase the state share of the Land and Water Conservation Fund and Acquisition and Development funding for historic preservation including acquisition of archaeological sites. Such funds would greatly assist efforts to acquire escarpment lands. There may also be times when Senators and Congressmen could assist in contacting landowners to further the purposes of protection of escarpment and petroglyphs. Therefore:

POLICY #42. THE CITY SHALL EXPRESS SUPPORT FOR FEDERAL FUNDS TO THE LEGISLATIVE DELEGATION. THE DELEGATION WILL BE MADE AWARE OF SPECIFIC ACQUISITION NEEDS AND BE ENLISTED TO HELP WITH ACQUISITION FUNDING AND IN CONTACTING LANDOWNERS WHERE APPROPRIATE.

Private Conservation Land Trusts:

Such trusts focus on acquiring land for eventual transfer to public agencies for management. Members of the Open Space Task Force recently announced the formation of a local land trust to acquire open space. The trust is currently in the organizing stage, and should be ready to pursue its goals by the time the Escarpment Plan is approved.

National land trusts such as the Nature Conservancy, Trust for Public Lands and the Archaeological Conservancy, have offices in the state and have indicated interest in helping with preservation of the escarpment. Private land trusts have a great deal more flexibility than governmental agencies.

They often obtain low interest loans from financial institutions to aid in purchase of lands and organize fund raising activities. Some landowners prefer dealing with a neutral private party such as a land trust rather than a government agency. Trusts can sometimes arrange a donation or bargain sale for desirable land. Reversion clauses and deed restrictions can be employed to insure that lands are managed as open space in perpetuity. Therefore:

POLICY #43. THE CITY SHALL SUPPORT EFFORTS TO ESTABLISH A LOCAL LAND TRUST FOR OPEN SPACE ACQUISITION.

POLICY #44. THE CITY SHALL WORK WITH LOCAL AND NATIONAL LAND TRUSTS TO SEEK COOPERATIVE STRATEGIES FOR PRESERVING THE ESCARPMENT.

Corporate and Foundation Support and Grants:

Local corporations hold title to some priority escarpment lands. Such corporations should be approached to make donations of land or money to preserve the escarpment. National and international foundations could well be interested in assisting preservation efforts for such an important resource as the escarpment and petroglyphs.

It is possible that elected officials or officers of private land trusts could be enlisted to approach officers of corporations to request assistance in preserving the escarpment with a gift of land or money where appropriate. Letters of inquiry could also be sent to appropriate foundations to request assistance in preserving the escarpment.

ACQUISITION PROGRAM AND PROCEDURE

It is imperative that adequate staffing and support be provided to manage an effective acquisition program. Large open space programs throughout the nation have recognized the importance of specialized land acquisition programs and procedures. Such programs provide the constant attention required to minimize or avoid legal challenges and assure landowners and the courts that progress is being made toward acquisition. There are over 1,000 individual landowners in the Conservation Area. Acquisition planning and negotiations should begin immediately, and continue with adequate staffing and resources until completed. This will take several years. No City programs are adequately staffed or organized to perform this function at this time, and existing acquisition procedures are inadequate to address anticipated needs. Therefore:

POLICY #45. A PERMANENT OPEN SPACE ACQUISITION PROGRAM AND PROCEDURE SHALL BE ESTABLISHED AS A PART OF PROPERTY MANAGEMENT WITH LIAISON TO THE PLANNING AND PARKS AND RECREATION DEPARTMENTS AND PRIMARY CONTACT WITH THE OPEN SPACE ADVISORY BOARD. ADEQUATE FUNDING WILL BE IDENTIFIED FOR STAFF, APPRAISALS AND OTHER PROFESSIONAL SERVICES AND CLERICAL SUPPORT.

POLICY #46. THE PLANNING DEPARTMENT, CAPITAL IMPLEMENTATION PROGRAM, PUBLIC WORKS, AND PARKS AND RECREATION DEPARTMENTS SHALL CONTINUE TO PURSUE IMPLEMENTATION AND ACQUISITION IN THE INTERIM AND SHALL COORDINATE WITH ACQUISITION PROGRAMS' STAFF AS APPROPRIATE WHEN THE PROGRAM AND PROCEDURE IS ESTABLISHED.

MANAGEMENT AND FACILITIES DEVELOPMENT

Without a commitment to adequate management, public acquisition of escarpment lands and resources should not be undertaken. Lands need to be identified with signs and fenced to protect them from motorized vehicle encroachment and dumping. Patrol and maintenance schedules must also be maintained, and this will require additional personnel. Areas of outstanding resource value will require more intense management and protection. Funding for fencing, signage and other permanent protection, as well as parking and appropriate public access should be programmed at the time of acquisition to avoid destruction of the resource. Although the first priority is protection of the escarpment, interpretive and educational programs and appropriate facilities will also be needed to promote responsible public use of this resource.

Although the escarpment presents its own unique set of management challenges as noted below, many of these same problems and more have been solved in other open space areas such as the Sandia Foothills and Bosque where support has been provided. Active Federal and State involvement should be sought in maintaining and protecting the escarpment.

Several circumstances add to the difficulty of protecting the escarpment:

- Delicate, easily damaged terrain and non-renewable cultural resources.
- Linear pattern with accessibility along a large perimeter.
- Rural nature of much of the area without the presence of nearby residents to provide eyes and ears.
- Well established patterns of abuse from dumping, shooting, resource removal, off-road vehicles, and vandalism.
- A 17.5 mile length requiring mobility of management personnel.

POLICY #47. THE CITY SHALL MANAGE THE CONSERVATION AREA FOR THE PURPOSE OF PROTECTION OF THE NATURAL AND CULTURAL RESOURCES AND FOR THE PROVISION OF EDUCATIONAL AND RECREATIONAL SERVICES.

Recommendations:

- On lands and facilities which the City manages, additional open space personnel should be provided as required for maintenance and patrol. Innovative use of motorcycle patrols, ultra-light aircraft, remote intrusion sensors, volunteer eyes-and-ears programs and resident personnel at facilities and critical areas will be investigated in order to improve mobility and extend surveillance capability of limited personnel.
- The National Park Service and the State will be requested to assist with management, protection and establishment of interpretive and educational programs and materials through grants, assistance and/or direct management.
- If the federal government is involved, a joint management plan should be developed by federal, state and city representatives with public involvement to determine the extent and location of facilities for visitors and for administration and maintenance.
- Facility planning will follow policies of this Plan and be subjected to public review.
- Management and facility development on the City's area of responsibility will take place in phases as summarized below and detailed in Appendix I.

POLICY #48. THE CITY AND PROPERTY OWNERS MAY NEGOTIATE PURCHASE OR DEDICATION OF CONSERVATION EASEMENTS TO PRESERVE VIEWS ON PROPERTIES WITHIN THE IMPACT AREA IF ZONING REGULATIONS SEEM INADEQUATE TO SECURE VITAL PUBLIC INTERESTS.

DEVELOPMENT AND MANAGEMENT BY PHASES
CITY RESPONSIBILITY

ESTIMATED COSTS

	Phase I (1987-91)	Phase II (1991-93)	Phase III (1993---
<u>CAPITAL COSTS:</u>			
Fencing & Signs	151,500		
Parking & Access	18,000		
Vehicles & Equipment	36,200	8,000	28,500
Trail Construction		159,000	
Petroglyph Museum			940,736
TOTAL CAPITAL COSTS:	205,700	167,000	969,236
 <u>ANNUAL OPERATING COSTS:</u> (Additive)			
Personnel	62,047	83,725	172,173
Operating	29,500	36,500	70,300
TOTAL OPERATING COSTS:	91,547	120,225	242,473

CONTENT SUMMARY OF PHASES

- PHASE I: Fencing, signage, controlled access parking and staffing and support for patrol and maintenance.
- PHASE II: Phase I plus an escarpment trail, maintenance personnel and equipment.
- PHASE III: Phase I, & II plus a Petroglyph Museum, equipment and support staff.

TABLE VII

RECOMMENDED REVENUE SOURCES FOR PROPOSED OPEN SPACE ACQUISITION AND MANAGEMENT
 PROJECTED REVENUE POTENTIAL 1988-1998 Prepared 9/18/87 (See Attached Assumptions)

REVENUE SOURCE	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	TOTAL
Gross Receipts Tax	3,335,700	3,335,700	3,335,700	3,335,700	3,335,700							16,678,500
Escarpment/Petroglyphs	4,250,000											4,250,000
Rounds Estate	525,000											525,000
Zurris/Mann	569,055	597,508	627,383	4,213,755								6,007,701
Open Space/Other												
Total Gross Receipts Tax	8,679,755	3,933,208	3,963,083	7,549,455	3,335,700							27,461,201
General Obligation Bonds												
West Mesa Open Space	775,000		887,000		267,000							1,729,000
Petroglyphs					3,000,000							3,000,000
Open Space (general)	600,000		600,000		2,000,000							3,200,000
Sales of WM Open Space (Double Eagle Aripport)	250,000	1,250,000	1,500,000	1,500,000	1,500,000	1,500,000						7,500,000
OTHER (AMOUNTS UNKNOWN)												
Federal Assistance												
State Assistance												
Private Land Trust												
Corporations & Grants												
TOTAL REVENUES	10,304,755	5,183,208	6,750,083	9,049,455	10,102,700	1,500,000	0	0	0	0	0	42,890,201
CUMULATIVE TOTAL	10,304,755	15,487,963	22,238,046	31,287,501	41,390,201	42,890,201	42,890,201	42,890,201	42,890,201	42,890,201	42,890,201	42,890,201
TIME FRAME TOTAL	SHORT RUN: 15,487,963	MEDIUM RUN: 27,402,238	LONG RUN: 0	TOTAL REVENUES 42,890,201								

TABLE VIII

ASSUMPTIONS FOR RECOMMENDED REVENUE SOURCES FOR ESCARPMENT ACQUISITION REVENUE POTENTIAL (Table VII.1)

GENERAL OBLIGATION BONDS: *

1. City Council approved line items for open space and petroglyphs in the 1987, 1989, and 1991 bond issues will remain unchanged and will be approved by voters (previous open space bond issues have typically passed by 60% margins and none have failed.)
2. Added open space bond funding of \$600,000 in FY 1987, \$600,000 in 1989 and \$2,000,000 in 1991 (total \$3,200,000) will be programed for purchase of open space other than on the west mesa. These amounts are not listed in Table 3.
3. Funds programed for "West Mesa Open Space" in the 6 year CIP Plan will no longer be used for that purchase. These funds will be available for purchase of priority escarpment lands in the short to medium term.
4. The City will continue to fund open space bond issues after 1991 at the rate of between 2 and 3 million dollars per bond cycle.

TRUST LAND SALES: *

1. The City will continue to negotiate long term sales contracts with up-front interest payments. This income can be used directly for open space purchase.
2. Sales will proceed at the rate forecast by CIP staff.

SALES OF WEST MESA (DOUBLE EAGLE AIRPORT) OPEN SPACE

1. The City will approve sale of this land and use of the proceeds for other West Mesa open space purchases on the escarpment.
2. The City's option on this land will be completely paid off after the 1989 bond issue, or before if payments are accelerated in connection with a sale of the land.
3. The sector plan will find solutions to transportation, utilities, drainage, annexation, zoning and other development related issues which will add to the value of the land.
4. The land will return an average of \$5,000 per acre to the City with principle and interest payments included. The land will be sold by 1994.

* NOTE: Income from sales of open space trust lands are used for purchase of lands throughout the open space system depending on priority.

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North Geologic Window.

Isaac Eastvold, photographer.

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APPENDICES

APPENDIX A

PLANS AND STUDIES

ADOPTED PLANS AND COMPLETED STUDIES

Albuquerque/Bernalillo County Comprehensive Plan, 1975 (Rank 1 Plan)

The Comprehensive Plan establishes broad policy for the development of the entire urban area. The Northwest Mesa escarpment is shown as open space in the Comprehensive Plan (see Map 10). The Plan for Major Open Space proposes that a 500 to 1000-foot wide strip of the nearly flat land along the upper edge of the escarpment be acquired as Major Public Open Space. Public ownership of the strip would provide recreational opportunities, preserve the scenic value of the edge, and offer protection from further erosion. In addition, acquisition of a Public Easement or Other Rights is proposed to preserve the scenic value of the area below the edge. The steep, deeply dissected slopes erode easily and are difficult to develop. The lower slopes share some of these problems, but could sustain development. The plan suggests that the steep slopes be preserved through purchase or an exchange of development rights that would allow higher densities on the lower slopes.

The Plan for Major Open Space designates Piedras Marcadas Canyon as a Proposed Major Developed Park and Indian Petroglyph State Park as an Existing Developed Park. It designates the escarpment below the edge of the mesa between those two parks as a Proposed Public Easement or Rights. All of the escarpment between Indian Petroglyph State Park and the Marsh Peninsula above the edge of the mesa is designated as Proposed Major Public Open Space and the area below the edge of the peninsula is designated Proposed Public Easement or Rights. The northern half of Rinconada Canyon is part of Boca Negra Park. The Plan designates it as Existing Major Public Open Space and the southern half of the canyon as a Proposed Major Developed Park. The rest of the escarpment above the edge of the mesa and the area below the edge are Proposed Public Easement or Rights.

The properties adjacent to the escarpment north of the Marsh Peninsula are designated as Established Urban in the Metropolitan Area and Urban Centers element of the Comprehensive Plan. Properties above the edge of the mesa west and south of the Marsh Peninsula are shown as Proposed or Existing Major Public Open Space. Properties below the edge east and south of the peninsula are Developing Urban.

The Policies element of the Comprehensive Plan establishes policies related to the escarpment. These policies are listed in the introduction of the Northwest Mesa Escarpment Plan.

Northwest Mesa Area Plan, 1981 (Rank 2 Area Plan)

The Northwest Mesa Area Plan describes the escarpment as an ecologically important, well defined edge that stands out as one of the area's most characteristic landforms. It recommends that Piedras Marcadas and Rinconada Canyons be obtained and developed as Regional Parks. The plan states that

"the areas are of outstanding scenic value and should be accessible to the public, not just preserved as open space to be appreciated by the public from a distance." It adds that they might be acquired through the open space provisions of the R-D zone.

The Northwest Mesa Area Plan established the policy that the area at the base of the escarpment with slopes of nine percent or more be protected. The Bluepoint-Kokan soils predominant in that area is loosely consolidated and easily eroded by wind and water. Noting the need for additional data, including a slope analysis, the plan recognizes a nine percent slope on Bluepoint-Kokan soil to be the maximum that can support development. Most of the area at the base of the escarpment with slopes of nine percent or more had not been platted at the time of adoption, and protection by special setbacks, easements, acquisition of fee ownership, or the transfer of development rights was recommended as part of the subdivision process. The area was considered particularly appropriate for acquisition through the detached open space provisions of the R-D zone.

Consideration of a continuous pedestrian trail at the base of the escarpment was recommended. A trail extending from Piedras Marcadas Canyon through Indian Petroglyph State Park to Rinconada Canyon would connect future major developed open space in the southern portion of the plan area. Nearby, parallel streets were to be used as trail segments where there are no provisions for a pedestrian path on platted lots.

The Northwest Mesa Area Plan also states that all development along the upper edge of the escarpment will be subject to design controls. In order to protect the edge as a visual, psychological urban amenity, the requirements will identify areas near the edge where no structures may be located, provide design controls on adjacent buildable areas, and possibly establish a design review process to implement the setback and design control requirements.

Facility Plan for Arroyos, 1985 (Rank 2 Facility Plan)

The Facility Plan for Arroyos categorizes Piedras Marcadas Arroyo as a major Open Space Link. It drains a relatively small and largely undeveloped watershed on the mesa above the escarpment. As a Major Open Space Link, it will connect both Piedras Marcadas Canyon and the Rio Grande Valley State Park with residential, institutional, and commercial developments proposed both above and below the escarpment. It may also provide linkage to two significant archaeological sites in close proximity to the arroyo. The Piedras Marcadas Dam is located west of Coors Boulevard. Its outflow, east of the boulevard, empties into the Corrales Main Canal. Recognizing its significance as a Major Open Space Link, the Facility Plan for Arroyos called for the preparation of a corridor study and the acquisition of easements and/or rights of way along Piedras Marcadas Arroyo. The corridor study is presently in process.

Six arroyos and the Mariposa Diversion Channel are designated Urban Recreational Arroyos. The Mariposa, Boca Negra, and San Antonio Arroyos and the Mariposa Channel are considered a single system. Originating near the base of the volcanoes, the system traverses the mesa before descending the volcanic escarpment to the alluvial terraces. As an Urban Recreational

Arroyo, the system will connect Volcano and Boca Negra Parks, the Rio Grande Valley State Park, several neighborhood parks, and a school with residential developments. Some of the developments already exist, and other are proposed both above and below the escarpment. Channel treatment west of Coors Boulevard consist primarily of graded earth, riprap, and gabion weirs. San Antonio Arroyo remains unaltered east of Coors. The Mariposa, Boca Negra, and San Antonio Arroyo System was ranked second in City-wide assessment of priorities for planning and development as an urban recreational arroyos. The Facility Plan recommends that portions of the arroyo corridor required for recreational purposes be dedicated to meet park requirements.

Rinconada, Ladera, and Mirehaven Arroyos are also considered a single system. this system originates near the base of the volcanoes and terminates at the Ladera Golf Course west of Coors Boulevard. As an Urban Recreational Arroyo, the system will connect Volcano and Boca Negra Parks and the Ladera Golf Course with low to medium density residential developments proposed on the terraces below the escarpment. Existing channel improvements consist primarily of graded earth, riprap, and gabion drop structures. As a general policy the Facility Plan states that, within major public open space, channel treatments will be designed to blend with the natural surroundings.

Far Northwest Drainage Management Plan, 1986 (Rank 2 Facility Plan)

The Far Northwest Drainage Management Plan provides broad guidelines for drainage management in the watersheds of three arroyo systems on the west side. This plan assumes full development of all areas not publicly owned and free discharge from developed areas. Because previous drainage management plans assumed that AMAFCA Resolution 72-2 was to be enforced, and that runoff from development would not exceed rates generated in the existing conditions, existing facilities in some cases are inadequate to handle flows generated assuming free discharge.

The Far Northwest Drainage Management Plan recognizes that the erosive effect of developed runoff, particularly "nuisance" flows which increase the frequency of runoff events, is a concern. Treatment of development runoff will require particular attention.

The plan makes the following recommendations on channel design and watershed policy which are related to the escarpment:

- Special attention should be given to the management of storm and nuisance flows over the west mesa escarpment.
- Given that the volcanic escarpment represents a primary component of the Plan for Major Open Space, recommended channel treatments include riprap, gabions, tinted concrete, and soil cement. Decisions about specific treatment type will be made on a case-by-case basis, taking into account standard engineering criteria and cost.

- Transportation and drainage right-of-ways should be shared whenever practical.
- City controlled parcels and open space not designated for development potential should be considered for the construction of diversion berms, dikes, or desilting ponds for the purpose of mitigating the impact of runoff from these tracts on downstream development.
- If right-of-way along major arroyo systems is purchased or dedicated prior to development of individual tracts, a right-of-way width of at least 200 feet should be selected to provide maximum flexibility in channel design.
- Developed runoff in the Ladera basins which drain across the southern tip of the escarpment should be controlled to insure that the capacity of the drainage ponds into which they feed are not exceeded.
- Discharge rates from the basins just to the north should be controlled to match the capacity of the gabion/riprap channel into which they drain. Alternatively, the capacity of the channel into which the discharge drains may be increased where appropriate.

Long Range Major Street Plan for the Albuquerque Urban Area 1986 (Rank 2 Facility Plan)

The Long Range Major Street Plan is the overall plan for major streets in the Albuquerque urban area. The Plan identifies existing and proposed major streets as well as study corridors.

The 1986 Long Range Major Street Plan identifies several roadways and study corridors adjacent to and traversing the escarpment. Pertinent information is discussed under Existing Conditions in the Northwest Mesa Escarpment Plan.

Facility Plan: Electric Service Transmission and Subtransmission Facilities (1985-1995), 1985 (Rank 2 Facility Plan)

This facility plan establishes policy for the system of electric transmission and subtransmission facilities in Albuquerque and Bernalillo County. It sets out standards for selecting transmission and subtransmission line corridors and substation sites to minimize siting, visual, and environmental impacts of overhead facilities.

Proposed electric facilities to 1995 are identified. None of the proposed facilities are located near the escarpment. The facility plan is presently being revised.

Lava Shadows Sector Development Plan, 1984 (Rank 3 Sector Development Plan)

The Lava Shadows Sector Development Plan establishes land use for a 2014 acre area of 30 individual property owners. The Lava Shadows area abuts Boca Negra Park. Land above the nine percent slope, encompassing 23.45 acres, is reserved as R-D open space.

Within the Sector Plan area several guidelines apply regarding development adjacent to the escarpment:

- "The buildings silhouetted against the escarpment should not extend above the escarpment.
- "The buildings silhouetted against the escarpment should enhance rather than deface the natural resources.
- "The building heights should be limited to 26 feet from grade to top of parapet on the high side unless sufficient information to justify variation is produced.
- "The buildings should be sited away from the escarpment zone (generally defined as the area from the top of the escarpment to the base) sufficiently to provide solar access to all levels of the building adjacent to the escarpment."
- Siting of buildings should "Minimize disruption of existing site topography (Show existing topography as well as proposed grading).
- "No new building/buildings west of Unser may be white or of a very light color. Natural earth tones of area should govern so that the demarcation of natural to constructed will be more gradual than harsh."

Planned land use within Lava Shadows is shown on Map 8.

Riverview Sector Development Plan (Rank 3 Sector Development Plan)

The Riverview area encompasses about 804 acres north and east of Taylor Ranch. Within Riverview are several areas considered desirable as open space: a portion of the escarpment; a basalt outcrop east of the escarpment near the Piedras Marcadas Arroyo; and the Piedras Marcadas Arroyo, as an open space link to the Zuris-Mann tract east of Coors which contains a major archaeological site.

The sector plan identified up to nine acres to be reserved near the lower escarpment slopes. This area is being further defined as part of Shenandoah Subdivision. The plan also identifies a future trail system which will link the escarpment to the bosque and proposes residential development adjacent to the escarpment.

Master Plan for Volcano Park

The Master Plan for Volcano Park was developed by the City's Open Space Task Force as a conceptual plan for facilities within Volcano Park, which encompasses 3,450 acres surrounding the volcanoes.

The intent of this plan is to keep Volcano Park natural in appearance, while providing a range of recreational and educational uses within the park.

The plan identifies several user needs, including recreation with a variety of unstructured activities, psychological relief, and education. The educational component of the park is intended to provide insights into the processes by which the physical environment was formed and the ways in which man has interacted with that environment over the course of time.

Five intensive use areas are proposed which can be linked by pedestrian trails to the escarpment:

- Volcan Volcano
- Southern volcanoes
- Southern geologic window
- Northern geologic window
- Northern volcanoes

Reports of the Albuquerque/Bernalillo County Archaeological Resource Planning Advisory Committee (ARPAC)(1986)

The ARPAC report identifies major issues, suggests goals and policies, and offers recommendations for the development of a program for planning and managing the wealth of archaeological resources in the Albuquerque/Bernalillo County area. The overall goal of the program is "to preserve, during growth and change, the unique archaeological record of more than 12,000 years of human presence in the Albuquerque/Bernalillo County area for the economic, cultural, and educational benefit of its inhabitants."

Recommendations for the establishment of a public archaeology program are included in the report. During the first two years of the program, the following are to be developed:

- A centralized data base.
- A comprehensive evaluation framework for determining site significance.
- Guidelines and procedures for conducting archaeological compliance survey and reporting requirements.
- A ranked list of outstanding sites suitable for permanent preservation and public interpretation.
- Beginning a Rank 2 facility plan for archaeological resources.

- Archaeological compliance requirements.
- Initial implementation of the public program.
- Non-project survey priorities (i.e. program of surveying areas that are not threatened with immediate disturbance) and survey program implementation.

PLANS IN PROGRESS

In addition to adopted plans and completed studies, there are a number of plans and studies currently being developed. These documents, when complete, should be integrated with plans for the volcanic escarpment.

Comprehensive Plan Revisions - will include changes and additions to goals, policy statements, and map classifications. Changes pertinent to the Escarpment Plan will include redefinition of the open space network and the addition of goals and policies related to archaeology and historic resources.

Northwest Area Plan, Update and Expansion - when completed, will establish general land uses patterns and parameters for development in the entire area north of Central Avenue to the Sandoval County line on west of the Rio Grande to the Rio Puerco.

Piedras Marcadas Arroyo Corridor Plan - will establish land use guidelines, recommended channel treatment, and recreational facilities along Piedras Marcadas Arroyo.

Northwest Mesa Drainage Management Plan - will quantify drainage improvements needed over the escarpment and upstream of the Ladera system if development above the mesa reaches Comprehensive Plan densities with standard development patterns.

National Park Service Study for Escarpment National Monument - will determine the feasibility of a national monument encompassing all or a portion of the escarpment, volcanoes, and adjacent open space.

Unser Boulevard Alignment Study Dellyne to the Sandoval County Line - will establish an alignment and design criteria for Unser Boulevard from Dellyne north across the escarpment to the Bernalillo County Line.

El Rancho Atrisco Phase V Sector Development Plan - will establish zoning for Phase V of the El Rancho Atrisco development which lies immediately south and east of La Mesa Prieta. At this location 98th Street is within about one-half mile of the escarpment. Land uses and densities, road locations, drainage improvements, open space, and recreational facilities will be determined by the plan and will impact the future use of the southern tip of the escarpment.

Volcano Cliffs Sector Development Plan - will establish zoning and identify public and private improvements in the Volcano Cliffs subdivision. The portion of Volcano Cliffs located below the escarpment was annexed in 1964. In 1980, the City annexed the remaining area of Volcano Cliffs (above the escarpment) and zoned it R-1 for single family residential.

Archaeological Planning for the City of Albuquerque and County of Bernalillo - as a follow-up to the ARPAC report, is intended to outline procedures for evaluating the significance of archaeological sites based on their scientific importance and their interpretive and educational importance. It will establish guidelines and procedures for archaeological assessment and research, and outline a public education program.

APPENDIX B

AD HOC COMMITTEE GOALS AND OBJECTIVES

Objectives for conservation of the escarpment were developed in conjunction with the plan Technical Team and Ad Hoc Citizens Committee. Through the process of determining objectives the committees, staff and consultants discussed the aspects of the escarpment which are of most value to the community. Objectives are directed towards preserving the aspects of the escarpment and adjacent open space which make them special.

The overall purpose of conservation of the escarpment is:

TO PRESERVE THE UNIQUE ENVIRONMENTAL, VISUAL, ARCHAEOLOGICAL, AND RECREATIONAL QUALITIES AND OPPORTUNITIES OF THE NORTHWEST MESA VOLCANIC ESCARPMENT FOR THE ECONOMIC, CULTURAL, AND EDUCATIONAL BENEFIT OF RESIDENTS OF THE ALBUQUERQUE/BERNALILLO COUNTY AREA.

Specific areas of concern which were identified are environmental resources, urban form, archaeological resources, views, recreational opportunities, park management, and public education. Objectives for each of these areas are as follows:

ENVIRONMENTAL RESOURCES

- Identify and protect the plant and wildlife communities which presently exist on or in close proximity to the volcanic escarpment.
- Preserve physical resources of the escarpment, especially its unique geologic features.

URBAN FORM

- Conserve the escarpment as an entire unit, including the rock face itself, its relationship to the volcanoes, the mesa top, and the arroyos which bisect it, in a way which preserves the integrity of the land feature. To maintain a sense of place at a metropolitan scale.
- Plan for a pattern of development and open space which respects the escarpment and volcanoes and to encourage a built environment on the northwest mesa which relates to and compliments the natural features.
- Regulate adjacent private development and development of public facilities with regard to
 - Impact on the resource
 - Appearance/visual relationship to the escarpment
 - Access to public open areas and facilities
 - Public safety and welfare

- Acquire land as necessary to preserve the land form, provide for recreational facilities, and to preserve views.
- Maintain a visual separation between developed areas to the east of the escarpment and future development to the west.
- Preserve natural contours of the land.
- Develop design regulations for public projects (e.g. utility extensions, roads, and recreational facilities).

VIEWS

- Establish an appropriate visual context for the escarpment from the following points using a combination of open space and development guidelines.
 - Views of the escarpment observed from east of the Rio Grande where the objective is to preserve the distant view of the horizontal aspect of the land form and allow for an unobstructed view of the full height of the escarpment thereby preserving the integrity of the land feature as a cohesive unit.
 - Views of the escarpment from the west side where the objectives are to preserve vistas from public areas and to preserve to the degree possible the sense of procession from the river to the escarpment.
 - Views from the base of the escarpment, where the objectives are for pedestrians to be able to step away from the edge enough to see the context of the escarpment, to avoid an alley-way effect for pedestrians, and to maintain a sense of openness at the top of the escarpment as viewed from below.
 - Views from above, looking down, where the objective is to maintain a sense of harmony and clear spatial separation between the escarpment and the more urban landscape at its base.
 - Views from the volcanoes, where the objective is to maintain a sense of the open space and views to the east.
- Preserve in perpetuity those nodes and open areas which contribute to the escarpment's sense of place, including:

- the southern tip (La Mesa Prieta)
 - Rinconada Canyon
 - Marsh Peninsula
 - San Antonio Arroyo
 - the area between the escarpment and the volcanoes (La Boca Negra and Volcano Parks)
 - Petroglyph Park
 - Piedras Marcadas Canyon
- Avoid destroying the appearance of the Escarpment Face.
 - Restore areas which have been disturbed in the past through replacing boulders, stabilizing slopes, preventing erosion.

ARCHAEOLOGICAL RESOURCES

- Convey to those who presently use or view the escarpment a sense of identity with those who used the escarpment in the past through conservation, management, and acquisition of petroglyphs, significant archaeological sites; trail connections; interpretive and educational materials, and conservation of views.
- Design recreational facilities along the escarpment in a manner that does not damage archaeological resources.
- Evaluate and require appropriate treatment of archaeological sites which are located on private lands.
- Coordinate public and private development activities with a defined Albuquerque/Bernalillo County public archaeology program or the State Historic Preservation office.
- Develop a public education program in conjunction with the escarpment recreational facilities to convey appreciation for the cultural resource.
- Coordinate with other public agencies which have a specific interest in the escarpment and its archaeological resources.

RECREATIONAL OPPORTUNITIES

- Develop the escarpment open space as a linear recreational facility with nodes along it for significant features or related recreational facilities.
- Encourage more intense uses at the least sensitive areas, and limit the uses at more sensitive areas.
- Provide accessibility for the handicapped and mobility impaired at appropriate points along the escarpment. Provide a range of trail types which are graded for level of difficulty.

-
- Provide trail links between the escarpment and other recreational or cultural sites to the east and west, forming a network of recreational trails on the northwest mesa. The trail system will ultimately connect to the volcanoes and beyond and to the bosque and east of the river.
 - Develop recreational facilities which are compatible with other goals for the escarpment, including protection of environmental and cultural resources, public education, and protection of views.
 - Explore the potential of private open space and recreational facilities to meet overall objectives for protecting the escarpment.
 - Work with other governmental entities in developing a system of trails and facilities, including interpretive trails, recreational trails, a visitors' center, and links to complementary recreational facilities on the northwest mesa.

RESOURCE MANAGEMENT

- Provide adequate access for protective management of the resource.
- Provide management and maintenance which are responsive to the use levels at various locations along the escarpment.
- Establish an open space buffer which will ensure the escarpment's long term protection as a physical entity and the recreational and cultural resources associated with it.

PUBLIC EDUCATION

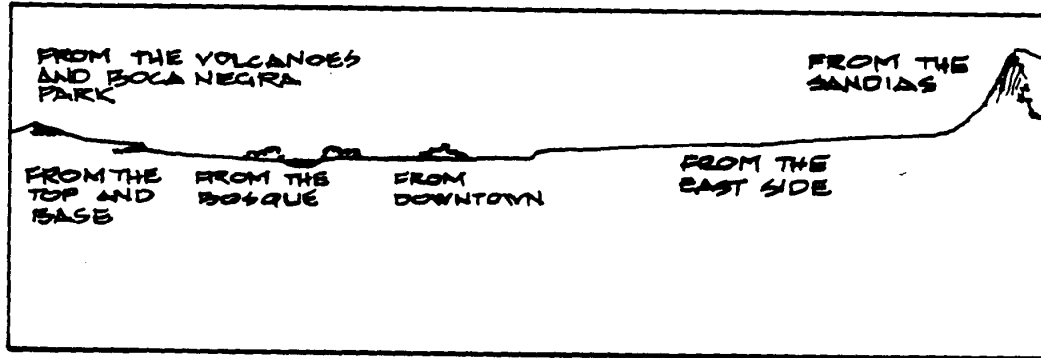
- Develop a public education program which conveys the escarpment's significance, highlighting its geology, biology, and cultural attributes.
- Establish interpretive facilities at varying scales and levels of accessibility for the enjoyment of the public.

APPENDIX C

VIEWING THE ESCARPMENT AND MESA TOP

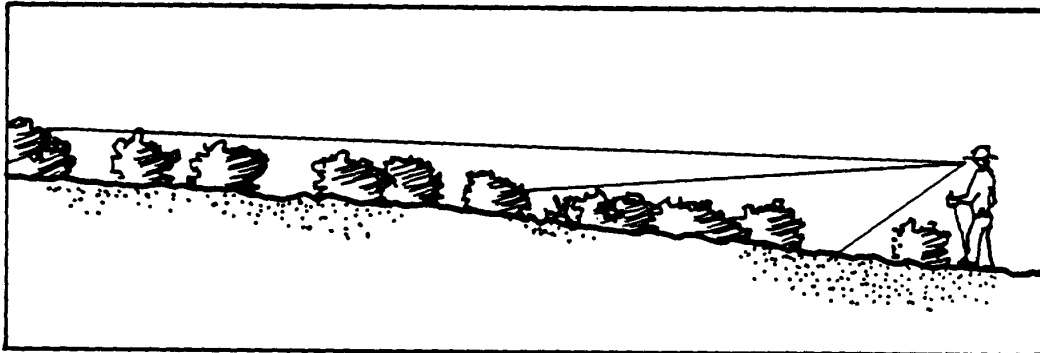
In order to understand the rationales for the regulations related to the visual qualities of the escarpment, the mesa top and the base, it is necessary to understand how we view these areas. An analysis of the views of the escarpment and from the escarpment provides the basis for regulations dealing with color, height, building and plant materials.

From the volcanoes looking east, the escarpment is seen as the edge of the mesa and is clearly a part of the geological base of the volcanoes. The visual crispness of this edge can be eroded by development at the top of the rim.



THE MESA

The open space of the mesa provides a place for a visitor to get away from views of the City. The views are bounded on the west by the volcanoes and on the east by the Sandias. The treatment of the edges of this open space will serve as foreground for the views north, east, and south from the mesa.



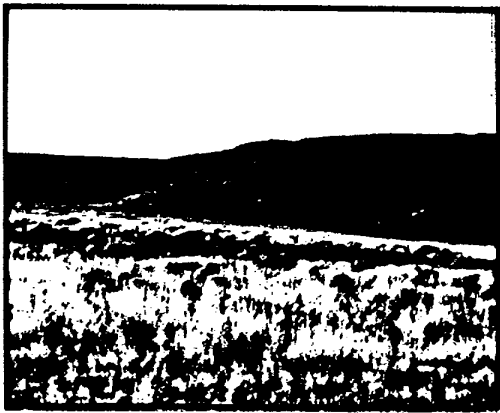
Close up on the mesa the color of the ground can be seen, lighter in color than the surrounding vegetation. As one looks across the mesa, the color of the vegetation predominates. While the vegetation offers a variety of hues, from grey-greens to yellows, the tones on the mesa blend with a minimum of contrast. There are few very light or very dark colored plant species.

THE TOP EDGE

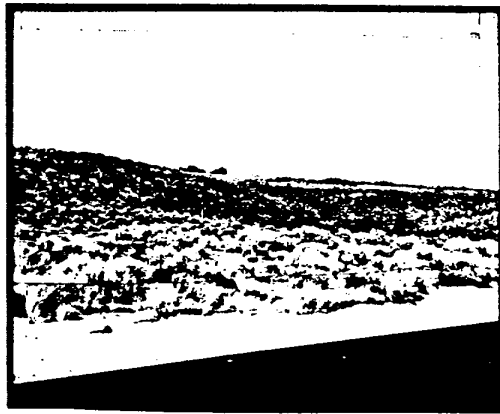
At the top edge of the escarpment, the recent development on the west side is seen along with the bosque and the more established development to the east. From here one can see roof tops, building facades, and landscaped sites in detail.

THE BASE

From the base we are most aware of the geologic story the escarpment tells. Here is where we can do our most effective imagining of what its origin was like. Toward the southern end we see the dramatic contrast of the consolidated edge. In the northern third, we see illustrated the process of how sand and vegetation reclaim a volcano's devastation.



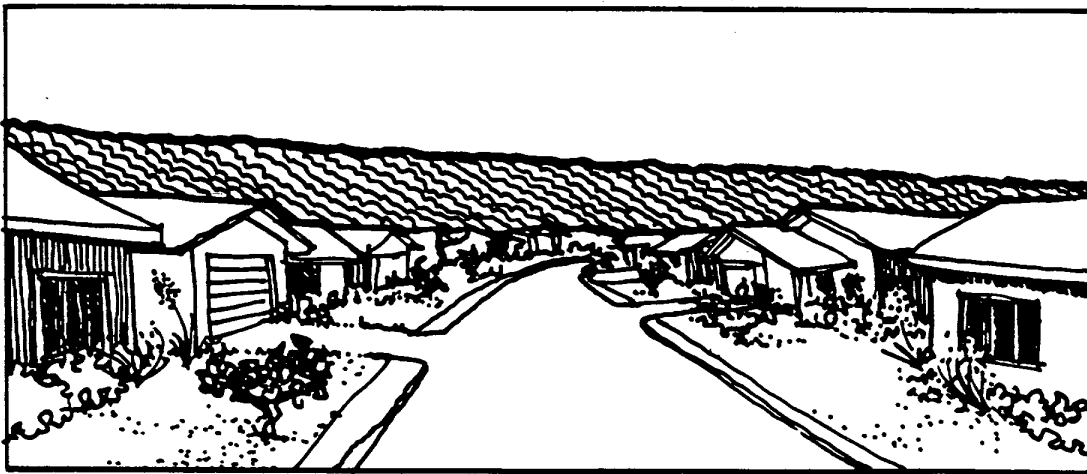
South end escarpment



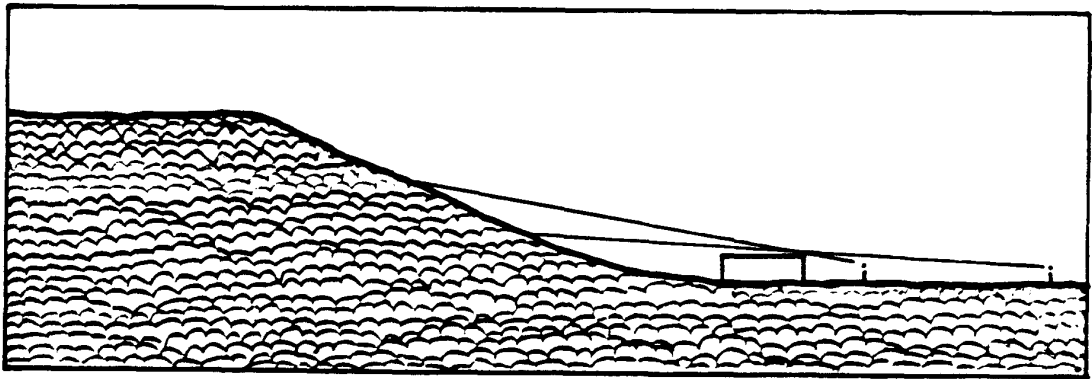
North end escarpment

THE WEST SIDE

On the west side, one glimpses the Escarpment Face occasionally from Coors. Atrisco/Unser provides views of the face from numerous angles. For many of the newly developing neighborhoods on the west side, the escarpment provides a backdrop.

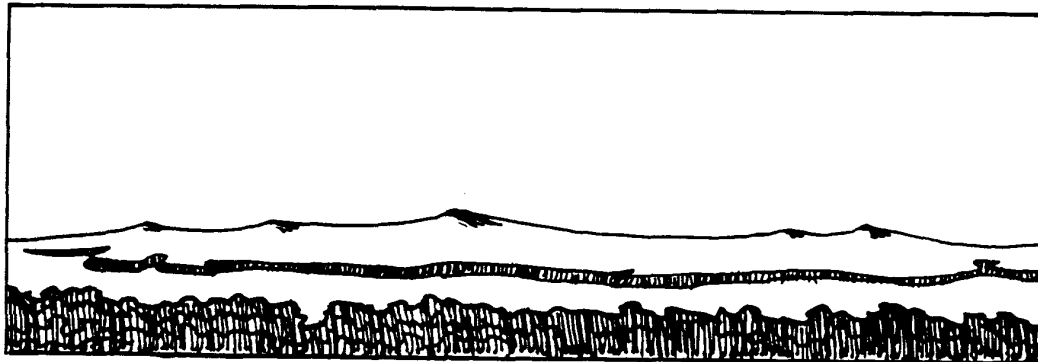


The closer one comes toward the base, the more one's view of the face is blocked by even a low building.



THE EAST SIDE

From many older parts of the City there are excellent views of the escarpment and volcanoes. Tall buildings in Downtown and Uptown offer panoramic views of the full length of the volcanic flow. Major east-west streets such as Menaul and Rio Bravo offer excellent views as one descends west-bound.



From the east escarpment (approximately I-25), the Northeast and Southeast Heights, the foothills and to Sandia Crest, the full escarpment is seen in its wonderful continuous strip. As the present majority of the population of Albuquerque lives and drives its streets, they are able to view the continuous escarpment. This strip which outlines the "place" that is now Albuquerque defines the place that people decided many hundreds of years ago was a good place to live ... and there they left their messages.

Ruth Eisenberg expressed the visual significance of the escarpment many years ago: "... when people say 'volcanoes', they do not mean the cones and nubbins alone. They are referring to the whole eastern part of Ceja Mesa: the walls of black basalt rocks curving in and out, forming promontories and canyons. They are referring to the desert sloping up gradually, the expanse ending in the row of cones which seem to accentuate our sky, especially at sunset." (Eisenberg, 1980: Personal Communication with Members of Save the Volcanoes Associations, Inc.)

APPENDIX D

PLANT SPECIES LIST

Grasses

Up to 25% of the landscaped area of a residential site may consist of turf.

Agropyron smithii - Western Wheatgrass
Andropogon gerardii - Big Bluestem
Bouteloua curtipendula - Sideoats Grama
Bouteloua eriopoda - Black Grama
Bouteloua gracilis - Blue Grama
Buchloe dactyloides - Buffalo Grass
Hilaria jamesii - Galleta
Oryzopsis hymenoides - Indian Rice Grass
Schizachyrium scoparium - Little Bluestem
Sporobolus airoides - Alkali Sacaton
Sporobolus cryptandrus - Sand Dropseed
Sporobolus flexuosus - Mesa Dropseed
Tall Fescue Sod - Olympic, Falcon

(Note: All of the grasses listed are available commercially except for Mesa Dropseed.)

Flowers

Ratibida columnifera - Prairie Coneflower
Gaillardia aristata - Firewheel
Gaillardia pulchella - Blanket Flower
Gilia leptantha - Showy Blue Gilia
Castilleja intergra - Indian Paintbrush
Bush Penstemon - Beardtongue
Penstemon strictus - Rocky Mountain Penstemon
Rudbeckia hirta - Blackeyed Susan
Achillea millefolium - Yarrow
Zinnia grandiflora - Rock Mountain Zinnia
Oenothera albicaulis - Desert Evening Primrose
Heliotropium convolvulaceum - Heliotrope
Aster tanacetifolius - Tansy Aster
A. pauciflorus - Purple Aster
Melampodium leucanthum - Blackfoot Daisy

Any other annuals with water and soil requirements compatible with the above.

Shrubs

Artemisia filifolia - Sand Sagebrush
Artemisia frigida - Fringed Sagebrush
Artemisia tridentata - Big Sagebrush
Atriplex canescens - Fourwing Saltbush (potential allergen)
Baccharis pularis - Coyote Bush
Santolina chamaecyparissus - Gray Santolina
Santolina virens - Green Santolina
Ceratoidees lanata - Winterfat (potential allergen)
Cercocarpus montanus - Mountain Mahogany
Ephedra trifurca - Mormon Tea
Chrysothamnus nauseosus - Rubber Rabbitbrush/Chamisa (potential allergen)
Fallugia paradoxa - Apache Plume
Opuntia - Prickly Pear
Opuntia imbricata - Cholla
Quercus grisea - Gray oak (can become small tree)
Rhus trilobata - Skunkbrush Sumac/Three Leaf Sumac
Yucca elata - Soaptree Yucca
Yucca glauca - Small Soapweed
Potentillo fruticosa - Shrubby Cinquefoil
Dalea scoparia - Broom Dalea

Trees

Fruit and ornamental trees which do not typically exceed 30 feet at maturity, are also permitted.

*Elaeagnus angustifolia - Russian Olive
Juniperus monosperma - One Seed Juniper
Juniperus deppeana - Alligator Juniper
Chilopsis linearis - Desert Willow
*Populus fremontii - Rio Grande Cottonwood
Celtis occidentalis - Hackberry
Celtis reticulata - Net Leaf Hackberry
Robina neomexicana - New Mexico Locust
*Forestiera neomexicana - New Mexico Olive
Prosopis glandulosa - Mesquite
*Fraxinus velutina - Velvet ash
*Salix amygdaloides - Peachleaf willow
Cowania stansburiana - Cliff rose (also considered a shrub)
Fraxinus cuspidata - Fragrant Ash
*Salix gooddingi - Goodding Willow

(Note: *Indicates potential shade trees.)

APPENDIX E

APPROVED COLORS

Generally speaking, the Approved Colors include the yellow ochres, browns, dull reds, and grey-greens existing on the mesa and escarpment, exclusive of the basalt. The reflectance of the Approved Colors ranges between 14 percent and 63 percent of the light which falls on them. This middle range of reflectance is intended to avoid very light and very dark colors.

A chart of Approved Colors is available for review at the City Planning Department.

For the purposes of this study, "Approved Colors" include the following colors as identified by the "Color Cue" or "Colortrend Cue" system. Samples are available in Albuquerque through Wellborn Paint Co., Chemres Coatings Corporation, and others. Other paint companies and building material suppliers can match these colors. Prefinished building materials, such as roofing and stucco, have standard colored materials which fall within these color ranges.

<u>Color Number</u>	<u>Reflectance</u>	<u>Color Number</u>	<u>Reflectance</u>
Q1-18T to 20D	45,32,23	Q6-13T to 15D	63,53,46
38T to 40D	43,31,26	17T to 20D	63,51,35,27
53T to 55D	36,22,16	29D to 30D	53,45
58T to 60D	31,21,14	33T to 35D	50,38,30
		38T to 40D	51,41,32
Q2-18T to 20D	40,24,18	53T to 55D	56,44,36
38T to 40D	43,34,17	58T to 60D	52,38,31
59D to 60D	38,21		
		Q7- 9P to 10D	53,44
Q3- 9D to 10D	35,28	13T to 15D	58,40,29
13T to 15D	32,24,18	18T to 20D	46,33,26
18T to 20D	45,32,23	29T to 30D	51,41
33T to 35D	35,24,19	33T to 35D	59,45,36
38T to 40D	38,27,19	38T to 40D	48,35,27
52T to 55D	47,38,28,21	53T to 55D	55,39,30
58T to 60D	42,28,22	58T to 60D	36,36,26
Q4-13T to 15D	48,36,31	Q8- 8T to 10D	55,43,36
18T to 20D	42,31,21	13D to 15D	52,46,32
38T to 40D	43,30,23	18D to 20D	43,31,22
58T to 60D	53,35,29	32T to 35D	59,50,40,30
		38T to 40D	46,34,26
Q5-13T to 15D	55,45,38	53T to 55D	49,34,26
17T to 20D	54,45,33,24	58T to 60D	41,29,20
33T to 35D	57,46,42		
38T to 40D	44,31,24		
58T to 60D	45,30,24		

<u>Color Number</u>	<u>Reflectance</u>
Q9-17T to 20D	56,46,33,24
33T to 35D	49,35,27
38T to 40D	54,39,20
53T to 55D	50,33,26
58T to 60D	46,32,24

The Approved Colors for building materials used within the nine percent slope are not included above. In the event that public facilities are built within the nine percent slope, it can be any color as long as that color has a light reflectance of less than 14%; that is, a very dark shade of any color, in order to avoid contrasting with the basalt.

APPENDIX F

DESIGN OVERLAY ZONE COMPREHENSIVE ZONING CODE

The following regulations are excerpted from the City of Albuquerque Zoning Code, Section 39.F:

"F. DO Design Overlay Zone:

1. General. This overlay zone may be used for areas which deserve special design guidance but do not require complete design control of development; area so zoned must be at least 320 acres and meet at least two of the following three conditions:
 - a. Contain highly scenic natural features or physical setting, or have highly significant views.
 - b. Have development potential which is likely to require unusually complex coordination of flood control, transportation, open space, and urban land uses.
 - c. Have a strong role in the development of the form of the metropolitan area, arterial street corridors or critical areas near urban centers or historic zones.
2. Control. Design regulations, which control specified critical design aspects of the area, shall be adopted by the City Council in the resolution applying the Design Overlay Zone to any given area. Such regulations shall be as specific as possible so that developers and designers will have a clear indication as to what development designs are acceptable. These regulations will address specified design criteria; total design control of development is not intended. Any construction or alteration of buildings or sites which would affect the exterior appearance of any lot within the overlay zone shall be consistent with the adopted regulations. However, building demolition shall not be controlled by the regulations.
3. Advisory Design Guidelines. The City Council, the Planning Commission, or the Planning Director may promulgate advisory design guidelines to supplement the design regulations. Such guidelines need not necessarily be followed by developers, but their observance is suggested in order that development might fully achieve the design potential of the area.
4. Procedure for Individual Premises. Required design review and approval shall be by the Planning Director. Approval as to compliance with the adopted design regulations shall be certified by signature."

APPENDIX G

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APPENDIX H

DEFINITIONS

Archaeological Site. Any location that contains evidence of past human behavior (usually older than 75 years).

Conservation Area. The area within the escarpment design overlay zone which is appropriate for conservation as open space and subject to the requirements of the design overlay zone.

Escarpment. Long, precipitous, cliff-like ridge of land, rock, or the like.

Escarpment Face. Area within the nine percent slope.

Impact Area. That area within 350 feet of the Conservation Area which by its proximity has significant impact upon the escarpment and is subject to the requirements of the design overlay zone.

Nine Percent Slope. The line surveyed by the City based on field verification and staking of the nine percent slope as mapped on Map 3 of this report.

Naturalized Vegetation. Plant species which have been introduced into the Southwest region and require little or no irrigation to establish and require minimal maintenance.

Petroglyph. Any depiction made by scratching, pecking, grooving or abrading the surface of a rock.

Private Open Space. Land within the Conservation Area which will remain open and undeveloped as a result of the land use planning provision of this Plan, but which will not be publicly owned, nor accessible to the public.

Qualified Archaeologist. An individual who meets the following minimum professional standards:

1. a graduate degree in archaeology, anthropology, or closely related field, or equivalent training acceptable for accreditation purposes by the Society of Professional Archaeologists; and
2. demonstrated ability to carry research to completion, evidenced by timely completion of theses, research reports or similar documents; and
3. at least 16 months of professional experience and/or specialized training in archaeological field research, laboratory research, administration or management, including at least 1 year of experience or specialized training in the kind of activity the individual proposes to practice, and at least 6 months of field experience within the region where the project will be undertaken, or demonstrable competence based on analogous experience. Persons engaged to do archival or documentary research, as

part of the permitted activity, should have either a graduate degree in history or ethnohistory or at least two years of graduate education in either of these fields, or equivalent professional experience including publications

View Area. The area outside the conservation and impact areas which can be easily seen from the base or top of the escarpment or is within a broader area which, seen from a distance, contributes to the perception of the escarpment and volcanoes as a unified feature.

APPENDIX I

PROJECTED COSTS FOR PROTECTION, MANAGEMENT
AND FACILITIES DEVELOPMENT

PHASE I: Protection, Parking & Access, Patrol & Maintenance
Total Implementation Time Frame: 3-4 years

Capital Costs:	
Fencing: Materials & Labor for 15 miles	141,000
Signs & materials	10,500
6 ea. Parking & Access Points	18,000
1 Motorcycle w/emergency equipment	3,200
4x4 Utility Vehicle w/emergency equipment	15,000
Radio Equipment	7,000
4x4 pickup for maintenance worker	11,000
Total Phase I Capital Costs:	205,700
	=====
Annual Operating Costs:	
Personnel:	
1 ea. B-05 Open Space Maintenance worker	20,904
2 ea. JAP series Patrol Officers	41,143
Total Personnel:	62,047
Operating:	
Training	1,500
Repairs & Maintenance	9,500
Supplies	7,000
Vehicle Fuel & Maintenance	11,500
Total Operating:	29,500

Total Annual Operating Costs: Phase I	91,547
	=====

PHASE II: Phase I plus Additional Parking & 10 mile trail,
Interpretive program (seasonal interp. specialist)
Implementation Time Frame: 2-3 years after Phase
I ends

Capital Costs:	
10 mile hiking trail w/signs	159,000
4x4 All Terrain Vehicle w/trailer	6,000
Radio Equipment	2,000

Total Phase II Capital Costs	167,000
	=====
Annual Operating Costs:	
Personnel:	
Phase I Personnel Total	62,047
Temporary Wages (Phase II)	21,678

APPENDIX J

PLAN AMENDMENT PROCESS
SECTION 44, "COMPREHENSIVE ZONING CODE"

NOTE: The Escarpment Plan is a Rank 3 Plan, therefore, the Sector Development Plan amendment procedure applies.

Section 44. Sector Development Plan Procedures

"A. Application for New or Amended Sector Development Plans:

1. Prospective applicants should discuss their ideas with the Planning Director before making application so as to familiarize themselves with City plans and policies.
2. New or amended plans are initiated by application to the City on prescribed forms. Each application shall be accompanied by sufficient copies of the proposed plan, evidence of interest in property, and other related information as required by the City. Submission of inaccurate information with an application is grounds for denial.
3. Applications may be made only by a representative of the City or by a person with direct financial, contractual, or proprietary interest in the affected property. The Planning Commission may not be an applicant.
4. Applications for amendment of the land use plan map of a previously approved Sector Development Plan shall be subject to the same fee and other procedures as changes to the zone map in areas not zoned SU-2, SU-3 or R-D, except that the notification procedure shall be the same as for zone changes for an area of one block or less, and except that the application fee for amendments of an R-D plan shall be \$100, and except that amendments of one block or more in areas zoned SU-2 or SU-3 must be approved by the City Council.
5. Applications for amendment of the text of a previously adopted Sector Development Plan shall be subject to the same fee, and notification and other procedures as changes to the text of this ordinance.

B. Fee. An application fee shall be charged as follows except to representatives of the City:

1. Plan approval, fifty dollars (\$50) if approval is requested at the same time rezoning of the plan's area is requested.

-
2. Plan approval, one hundred sixty dollars (\$160) if approval is requested at a time other than when rezoning of the plan's area is requested.
 3. The application fee is non-refundable.

C. Hearing and Decision:

1. Public notice of the Planning Commission shall be as specified in Section 41.C. of this ordinance for zone changes of over one block.
2. The Planning Commission is hereby authorized to approve Sector Development Plans for R-D areas, subject to appeal as in a zone change.
3. Only the City Council shall approve Sector Development Plans for SU-2 and SU-3 areas, and Sector Development Plans containing other zone changes, except R-D, or no zone changes, consistent with the procedure specified in Sections 31.B and 32.B of this ordinance respectively. The same procedures as are used for SU-2 Plans, shall be used for Sector Development Plans which contain zone changes other than R-D, SU-2 and SU-3 or no zone changes. Notice of the time and place of the public hearing conducted by the Council Committee on the Sector Development Plan shall be contained in a public notice in a daily newspaper of general circulation in the City of Albuquerque at least 15 days before the date of the hearing. The notice shall give the location of the property, the present zoning, and the requested zoning, and the place where copies of the application may be examined. Mailed notice of the City Council hearing may be provided to people who indicated interest at the Planning Commission hearing.
4. An advertised hearing may be continued to a time and place announced at the hearing without readvertising or reposting of signs.
5. The Planning Commission may prescribe regulations pertaining to the submission of documentary evidence into the record of any application prior to the advertised hearing date for said application.
6. In approving the plan, the Planning Commission or City Council may make changes as it sees fit in order to implement the purpose of this ordinance and the master plan. Content of the approved plan is subject to appeal just as is any zone change.
7. The Planning Commission shall make a decision on a Sector Development Plan proposed for the R-D zone within 90 days after

filing of a complete application for approval of such plan. If the Planning Commission action is appealed, no plan shall be considered in effect until the appeal is decided, and the provisions of Section 18.G.2. of this ordinance shall control during the interim.

D. Review and Administration:

1. The Planning Commission shall review a Sector Development Plan at least every four years until it is fully implemented to determine if it should be amended. Such review and amendment shall be undertaken only after notifying the public in the same way required for an adoption of the plan. Adoption of a revision shall be by the City Council in the case of SU-2 and SU-3 plans.
2. The Planning Director may approve minor changes to an approved Sector Development Plan or Landscaping Plan if it is consistent with the use and other written requirements approved by the Planning Commission or City Council, if the buildings are of the same general size, the vehicular circulation is similar in its effect on adjacent property and streets, and the approving official finds that neither the City nor any person will be substantially aggrieved by the altered plan."

APPENDIX K

COMPARISON OF ALBUQUERQUE VOLCANOES
TO OTHER VOLCANIC AREAS
(NATIONAL PARK SERVICE REPORT)

COMPARISON OF ALBUQUERQUE VOLCANOES TO OTHER VOLCANIC AREAS*

The following sections are an inventory of the most important volcanic features in (1) the National Park System, (2) a large region in the Southwest, and (3) Albuquerque Basin. The emphasis is on basaltic volcanoes and the analysis focuses on eruptions that produce cones and related features such as dikes, domes, and lava ponds. Comparisons are made at the end of each section to determine if the Albuquerque Volcanoes are unusual or unique in the larger picture of basaltic volcanism.

A. National Park System.

1. Lava Beds NM (CA) and Craters of the Moon NM (ID). Areas with large, recent flows and many unweathered flow surfaces. Spatter cones and lava tubes are common. There are many classic cinder cones, some with flows emergent at the base. Most remarkable at Craters of the Moon are the massive basalt flows which rafted and destroyed parts of cinder cones. In one case, a lava pond in a crater breached the rim and the resulting flow shows dip reversal.
2. Capulin Mountain NM (NM), Sunset Crater NM (AZ), and Lassen Volcanic NP (CA). Each area contains a single young and classic cinder cone with flows emergent at the base.
3. Haleakala NP (HI), Aniakchak NM (AK), and Crater Lake NP (OR). Following collapse of large calderas, cinder cones and small flows erupted inside. All these later flows are basalt except at Aniakchak where a dacite cinder cone was intruded by a viscous dome that exploded and destroyed part of the cone.
4. Katmai NP (AK). Cinder cones have recently been discovered outside the main caldera. These cones have been largely removed by glaciers; and encounters between lava and ice are known.
5. Devils Postpile NM (CA). A remnant of basalt with well developed columnar jointing in the flow and glacial polish on its surface.
6. John Day Fossil Beds NM (OR) and Lake Mead NRA (AZ/NV). Older flows that cap ridge tops. The basalt at John Day is underlain by fossiliferous tuff.
7. Zion NP (UT) and Grand Canyon NP (AZ). Cinder cones and basalt flows (Spendlove Knoll, Vulcans Throne) on extensional fractures related to the Hurricane Fault zone. These spectacular intercanyon flows on eroded strata and stream gravels are distinctive features in the System.

* The basalt flows section of Table I, "Geologic Resource Inventory", should be read first to gain a preliminary understanding of the Albuquerque Volcanoes.

8. Yellowstone NP (WY). Many basalt flows, both Eocene and also associated with all three caldera cycles of the past 2 million years. Dikes are common, some in radial systems converging on the vents of old volcanoes.
9. Big Bend NP (TX). Dikes, sills and other intrusions, and related basalt flows on sedimentary rock. The radial dike system on Dominguez Mountain is very well developed.
10. Death Valley NM (CA). Maar craters at Ubehebe formed when ascending magma encountered groundwater and exploded. These may be the only maars in the System.
11. Mount Rainier NP (WA). A large stratocone volcano modified by explosions and deeply eroded by glaciers. The rocks are andesite, not basalt. No cinder cones except those incorporated in the growing stratocone.
12. Other Volcanic Features in the System. Pinnacles NM (CA), Lassen Volcanic NP (CA), Yellowstone NP (WY), Katmai NP (AK), and Bandelier NM (NM) are famed for volcanic phenomena associated with lavas that are more silicic and explosive than basalt.

Comparison with Albuquerque Volcanoes. Volcanoes built up from mixed flows and pyroclastics are common and represented by Mount Rainier. However, Mt. Rainier is a large, complex andesite stratocone, in comparison to the small basalt cones west of Albuquerque. The mixed variety of lava and pyroclastics on the Albuquerque cones is not clearly represented among other small basalt volcanoes in the System. Small lava ponds in cone craters and collapse of craters with release of flows are documented at Albuquerque Volcanoes and at Craters of the Moon. Flows, spatter and cinder are all common products of basaltic volcanism in the System.

Older flows on alluvial surfaces and in streambeds, and reversed topography represented by lava caps, are common in the System and elsewhere.

The matter of whether basalt domes, radial dikes, and late explosions at Albuquerque Volcanoes have been correctly interpreted by Kelley and Kudo is discussed under Section C, Albuquerque Basin. Basalt domes are not represented in the System and are unusual elsewhere. However, dacite domes with associated explosions are documented at Aniakchak and Lassen Volcanic. Radial dikes intruded in the sides of small bulged cones are not known in the System, but dikes associated with large basaltic volcanoes are documented at Yellowstone and Big Bend.

- B. The Larger Region. An obvious "larger region" of volcanism lies along a southeast-northwest trending zone in Arizona and New Mexico called the Jemez lineament. Major centers of eruption along this zone contain late Tertiary to Recent basalt and flows of more silicic composition. The lineament is not well understood but it seems to be an ancient line of weakness in the earth's crust that exerts major control over the distribution of younger volcanic rocks. The major areas of eruption are described below. The large San Francisco field at Flagstaff, included

in this report, is north of the zone. The volcanoes in Albuquerque Basin of which the Albuquerque Volcanoes are part are close to the zone, but are regarded by some petrologists as a special subset of volcanics related specifically to rifting along the Albuquerque trough.

1. Springerville field (AZ). About 250 cones and basalt flows west of Springerville. Recent studies show interesting differentiation of magma -- basalt cinder cones and flows intruded by andesite domes. (Source: L. Crumpler, Brown University, Providence, RI.)
2. San Francisco field (AZ). About 300 small to large volcanoes. Much basalt, including classic cinder cones with flows from the base, for example, the eruptions at Sunset Crater. A few cones have late plug domes; in one case a basaltic andesite cone is intruded by a rhyodacite dome.
3. Zuni/Bandera field (NM). Basalt flows. The very young McCartys pahoehoe flow is remarkably unweathered and has well developed primary surface features such as pressure ridges, collapse depressions, spatter cones, squeeze-ups, grooved lava and tree molds. The Zuni group, with 74 vents, has aligned cinder cones, lava tubes, and both pahoehoe and blocky lavas. The Bandera Cone is composed mainly of pyroclastics but also has flows. A lava pond breached Bandera's crater and a late explosion deepened the crater. Bandera is the same age as Sunset Crater, AZ (about 1060 A.D.). West of Quemada and apart from the rest of the field is the maar of Zuni Salt Lake. (Source: W. Elston, University of New Mexico, Albuquerque.)
4. Mt. Taylor/Mesa Chivato field (NM). Mt. Taylor, a large eroded pile of andesite and latite, is much younger than once believed (only 2 million years). Basalt flows and cones of Mesa Chivato, which extend northeast from Mt. Taylor, have not been extensively studied. This field includes scores of eruptive centers including fissure flows with lava and cinder cones and central vents with volcanic necks.
5. Jemez region (NM). This major eruptive center, including the volcanic rocks exposed at Bandelier, Los Alamos, and in the caldera of Valle Grande, started with basalt flows about 14 million years ago. Its spectacular ash flows are rhyolite, but it is dominated by volcanic rocks of intermediate composition -- andesite to latite.
6. Servillita field (NM). A thick sequence of basalt flows in the Taos region. Flows, vents, and cones are prominent along the Rio Grande gorge. The flows are a key model in studying tholeiitic basalts of the Rio Grande rift.
7. Ocate field (NM). Volcanoes ranging from 8.3 to 0.8 million years on the high plains adjacent to the Sangre de Cristo Range. A few older flows are andesite and dacite, but many younger eruptions are basalt. About 25 well developed basalt cinder cones and flows have

recently been described in the Wagon Mound area. These include cinder cones with lava pools (one pool broke through its crater and others have radial dikes) and domes (apparently basalt) which intruded lava and cinder cones. The domes intruded and dilated the cones, and some domes show internal concentric structure. (Source: M. O'Neal, U.S. Geological Survey, Denver, CO.)

8. Raton field (NM). Age 7.5 million years to 4,000 years. Basalt cones and flows, some forming lava-capped mesas. The classic cinder cone at Capulin Mountain has flows at its base.
9. Other basalt flows scattered through New Mexico range widely in age. For example, in the Gila region, basalt flows are associated with massive rhyolite outpourings and domes; these are mid-Tertiary.

Comparison with Albuquerque Volcanoes. The McCartys flow is recent, and its fresh surface features are superior as educational examples compared to the weathered and eroded flow surfaces at the Albuquerque Volcanoes. Like Albuquerque Volcanoes, the Zuni/Bandera field has cones breached by lava ponds, both flows and pyroclastics in cones, and spatter features. Lava ponding and a variety of cone types are also present in the Ocate field.

Should Kelley and Kudo be correct that JA and Vulcan cones were intruded by basalt domes and radial dikes, certain features at Ocate field may be comparable. Ocate's combination of cones, domes, radial dikes and lava ponds could be a useful model for studying the volcanic processes described at Albuquerque Volcanoes.

C. Albuquerque Basin. Volcanism in this smaller region, which includes the Albuquerque Volcanoes, is described in Kelley and Kudos' 1978 publication, "Volcanoes and Related Basalts of Albuquerque Basin, New Mexico". The dozen or more fields and eruptive centers are all in or at the margin of the Albuquerque trough. Features shared by the larger fields in Albuquerque Basin are:

- Mostly basalt.
- Principal eruptions on a northerly trend paralleling the axis of the basin.
- At least 5 or 6 eruptive phases.
- The earliest flows are highly fluid, cover large areas, and issue from long fissures.
- Later lavas are more viscous and issue from central vents, with many ending in explosive activity that formed cinder cones.

Distinctive features of each group of volcanoes in Albuquerque Basin are described in the following sections (miles and direction indicate the location of the site relative to Albuquerque's city center).

1. San Felipe Volcanoes (22 miles north).
 - Largest and most complex field in the basin.
 - In the middle of the flow sequence, ascending magma encountered groundwater and exploded, producing a large maar; some of the maar tuff is exposed as an inlier (window) in later flows.
 - Approximately 66 cinder cones are unusual low mounds and patches, possibly degraded by alluviation. In one place, an eruption bulged up an earlier flow. One cone was very explosive and is composed of two concentric sheets of tuff.
 - The last eruptions were small basalt plugs and dikes, some within cinder cones.
 - In some areas, the flows have been faulted into "stair step" topography.
2. Canjilon Hill (20 miles north).
 - The first volcano was a large, spectacular maar which exploded outward, throwing out concentric beds of breccia.
 - Diatremes formed at four separate centers inside the original maar. One has a basalt plug and radial dikes (Octopus Hill); another is a subsidence basin that filled with lava lakes.
 - Finally there were small explosions at Octopus plug and in the center of the lava lake area.
3. Isleta Volcano (13 miles south).
 - First a maar explosion threw out tuff, then the center collapsed inward, forming a large circular basin.
 - Six flows erupted in succession in the basin and partly filled it. The first two were lava lakes and the fourth produced a cinder cone covered by the last flow. These flows produced a broad cone superimposed on the maar basin.
4. Volcanoes Far South of Albuquerque. At Mohinas Mountain, Los Lunas Volcano, Tome Hill, and Black Butte are several vents and plugs, some andesitic in composition.
5. Wind Mesa (14 miles southwest).
 - A low dome consisting of several fairly uniform flows -- a small shield volcano.

- Cinder erupted onto the east flank was intruded by small dikes.

6. Cat Hills Volcanoes (18 miles southwest).

- Expansive flows (four groups) from a fissure zone. Cat Hills has the best preserved flow surfaces in the Basin; successive flow units exhibit different textures, reflecting increasing viscosity.
- The eruptions culminated in 23 well developed cinder cones, some with closed craters and most with spatter on the rims. There was no explosive activity other than the cones themselves; also, no late lava flows.
- High resource integrity. Only the northern cone has been mined for cinder.

7. Albuquerque Volcanoes (6 miles northwest).

- Six flow units, each younger one increasing in viscosity and decreasing in size.
- The late eruptions (flows 5 and 6) formed six prominent cones with varying internal structure. Considerable lava is present with the cinder and spatter accumulations in most of the cones.
- The last events at JA and Vulcan cones, as interpreted by Kelley and Kudo, seem unusual for basalt volcanoes: cones bulged by domes, intruded by small radial dikes, and finally breached or split by explosions.
- An alternative explanation for the late events at JA and Vulcan is instead: lava pools, dribblet flows, and collapse of the pools.

Comparison of Albuquerque Volcanoes with Other Volcanoes in the Basin: The six cones comprising the line of volcanoes show greater landform variety than any other group of cones in the Basin. These include a spatter/cinder/lava cone at JA; a lava cone and a cinder cone at Black, and three mixed lava/cinder cones at Vulcan, Bond and Butte. It is unfortunate that the only cinder cone in the group, at Black, has been destroyed by mining and has lost most of its value for public interpretation.

The Albuquerque Volcanoes do not have some of the volcanic landforms mapped elsewhere in the Basin: the spectacular diatremes and maar basins of San Felipe, Canjilon, and Isleta; the shield volcano at Wind Mesa; and the small plug intrusions exposed in several places.

Kelley and Kudos' late stage domes at JA and Vulcan are interpreted by them as intrusions that grew in place, bulged the cones, and emplaced radial dikes. Late intrusions at San Felipe and other sites in the Basin, as

described by Kelley and Kudo, are well exposed plugs rather than the somewhat obscure domes proposed at JA and Vulcan. The radial basalt dikes at Octopus Hill (Canjilon Hill) are at the same small scale as dikes believed to be present at JA and Vulcan, but the dikes are unmistakably connected to the Octopus Hill plug. The domes at JA and Vulcan, and the explosion of the latter, if interpreted correctly by Kelley and Kudo, would add an unusual touch to the "litany of landforms" at Albuquerque Volcanoes.

Conclusions: On the advice of others and based on my observations at Albuquerque Volcanoes, I propose a different explanation for the late events at JA and Vulcan. The Albuquerque cones were built in part by lava extruded high on the flanks and from the craters. At times, lava pools formed in craters. Low wall strength in some of the craters led to their rupture and the pools drained down the sides as small flows. In other cases, the crater pools simply overflowed the rims, producing small dribble flows.

My examination of the radial dikes described by Kelley and Kudo revealed dribble flows instead. However, considering the inhomogeneity of the material in the cones, there may have been some subterranean leakage of the lava ponds, and some of the dribble flows may lead into short dikes. Finally, I found no convincing evidence of late explosions at JA and Vulcan; lava pooling and collapse of craters and parts of cones probably explain the breaches.

Domes, radial dikes, and late explosions have all occurred in the Southwest. Lava pools, dribble flows, and collapse of pools and cone walls are also documented. These features are fairly common, and the processes involved often combine to make many interesting volcanic landforms. Albuquerque Volcanoes are small steep cones composed of mixed flows and pyroclastics with overspilling and collapse of lava pools a rather common event. This type of volcano is unusual in Albuquerque Basin and perhaps in the larger region as well. The combination of volcanic features at Albuquerque Volcanoes does not have new or special scientific significance, but the cones are an interesting variant not represented in the National Park System.

HAGOOD
NPS/DSC/TCE
2/12/87

APPENDIX L

FIELD REPORT - PETROGLYPH NATIONAL PARK
NEW AREA STUDY

February 5

We met Barbara Baca (Planner, City of Albuquerque Open Space Division) and drove to the Volcano Cliffs Subdivision.

We concentrated our investigation on the areas above the escarpment immediately north of Petroglyph Park. The area is platted, many lots are already in individual ownership, and some of the lots extend over and down the face of the escarpment and are coterminous with lots below.

A "sector plan" which is the next step in zoning for residential and commercial development and planning utility systems on West Mesa is to be considered by the city. In the interim, a Preservation Plan for the Northwest Mesa Volcanic Escarpment will soon be available. The preservation plan considers several subjects including open space needs.

Ms. Baca told us of her concern about potential development on top of the mesa. The soil is shallow or nonexistent along the edge and water and sewer lines might require the incision of trenches into the basalt bedrock.

We noted the joints in the basalt (columnar cooling crack) and remarked that trenching may collect percolating surface water and could channel some of it into vertical fractures in the basalt and finally into the soft sediments that support the margin of the cliff. Indiscriminate use of explosives to construct trenches could locally increase instability at the base of cliff blocks, and it is possible in some places the cliff would collapse. Property damage and human safety are the concerns; but there was no opportunity in this rapid examination to identify any areas of actual instability. A detailed geotechnical study is needed to identify the specific areas along the rim where tumbling of the cliff face is active or potentially active.

Examination of the areas north and west of the rim revealed that a fine alluvial silty sand as well as larger quantities of wind blown silt and fine sand make up the majority of in-place soil. Vegetation, consisting of grass and scattered shrubs, exerts at least some stabilizing influence on the soil. The soil generally deepens back from the cliff edge, but varies considerably in depth from site to site.

The principal engineering constraint is low soil density and therefore inferior bearing strength, requiring precompaction before construction of foundations. This appears to be a common requirement in soils of the Albuquerque area.

A second constraint is moderate to high susceptibility to wind erosion. Blowouts can develop, and during windy periods excessive dust would be an aggravation to residents.

Based on cursory observation, we found no other behavioral problems in the soil here. Frost heaving is probably not a large issue, but piping could be a problem if soils are locally saturated for extended periods.

Other than the constraints noted above, we concluded that the upper mesa sites probably are assuitable for constructing buildings and burying utilities as the many sites now being developed below the escarpment. A few mesa top sites might even be more stable if building supports are set on bedrock.

An interesting issue on West Mesa is what happens to water from precipitation. How is it dissipated?

We examined the bed of Boca Negra arroyo in this area and could not find a clearly defined channel. There is little evidence of any recent deposition or scouring. Furthermore, where Boca Negra passes over the cliff there are numerous boulders below, but not much evidence of a streambed. Naturally, wind action might soon obscure the signs of stream action, but still it appears that channelized runoff is below average. Seepage at the base of the basalt has probably softened the foundation material and allowed the cliff blocks to tumble onto the boulder talus.

Most atmospheric water enters the soil directly. Some water is retained but most dissipates gradually through evaporation and transpiration; possibly in this arid climate these processes account for removal of 60 percent or more.

Water retained by the soil percolates and follows the top of the basalt until it either passes into the bedrock through joints or emerges at low spots along the rim and pours over. Heavy rain may result occasionally in floods that pour over the rim. Whether the flow is on the surface or through joints, wherever water encounters permeable silt either under the basalt or in the arroyo below, it probably passes to depth very soon and joins the regional water table approximately 400-500 feet below the top of the mesa. Other than at Boca Negra we did not see much evidence of springs, seeps, or well defined soil creep at the base of the rimrock or in the underlying steep slope. This suggests relatively little lateral migration of water under the basalt toward the cliff edge.

In a February 18 meeting with developers and city planners in Albuquerque, Allen Hagood asked if the arroyos on top of and on the face of the escarpment are ever flooded. The developers offered the opinion that this is rare or nonexistent, and that the few diversion ditches present are not really needed. City people checked on this question and on February 19 stated their opinion that increased runoff from impervious surfaces in a development would result in flooding that is either a nuisance or damaging. Furthermore, the city constructs drainage and diversion structures based on 100-year events, meaning that random observations about surface flow can be misleading.

We are concerned that any heavy discharge into the arroyos or elsewhere along the rim, if not effectively diverted, could accelerate the natural rate of undermining and collapse of the rimrock. Water following utility ditches incised in the bedrock could infiltrate joints near the edge and eventually weaken some blocks to the point of collapse.

We have already suggested that the city employ geotechnical specialists to pinpoint local suspect areas in and beneath the cliff. The city also could inspect builder's plans for procedures to preclude piping and saturation, increased flow into unstable areas or the indiscriminate use of explosives.

A conservative approach might be to require a setback for development to an area where collapse of rimrock is not considered a problem and where soil has sufficient depth to bury utility lines and to provide for natural dissipation of excess groundwater. What such a setback would be might vary by site, depending on local conditions, but it should be determined as a result of existing and analysis by qualified specialists. General soil testing including depth to bedrock throughout the larger areas of Volcano Cliffs Subdivision should provide information useful to contractors and city engineers concerned with expense of installing utilities and with soil moisture retention and discharge.

A less conservative approach might be to allow selective development along the marginal area of the cliff edge. Only sites without underlying weakness could be developed, and it might be required that utilities somehow be concealed in an embankment or, if buried in bedrock, that trenching plans be reviewed by the city to avoid distressing of the rimrock. A difficulty with this approach is development where the weak places in the rimrock are not obvious and escape detection. The escarpment has been retreating generally toward the north and west the past 190,000 years through natural erosional processes. The rate of retreat is not known. Retreat takes place block by block, area by area. Although the overall rate of retreat is slow, small local sections of the escarpment probably collapse each year or every few years. Development could accelerate the rate of natural rim collapse in any particular area. Narrow promontories that protrude out from the general cliffline and points where arroyos pass over the escarpment are potential trouble spots; however, collapse also occurs along straight sections of cliff, so predicting the next point of collapse or its size with strong certitude (aside from mathematical averages) is not possible.

It is apparent the city is greatly concerned about allowing development on the margin of the escarpment. In the Albuquerque area, a new and unfamiliar geologic environment is to be tested for residential puposes. Human safety and protection of property investments cannot be neglected. Other factors such as the economics of landownership, the aesthetics of building on the skyline, and needs for open space, are part of the concern, but are beyond the scope of our report.

APPENDIX M

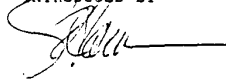
HOUSE MEMORIAL 26
SENATE MEMORIAL 116

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HOUSE MEMORIAL 26

38TH LEGISLATURE - STATE OF NEW MEXICO - FIRST SESSION, 1987

INTRODUCED BY



A MEMORIAL

RELATING TO THE PETROGLYPH ESCARPMENT AREA IN BERNALILLO COUNTY.

WHEREAS, the ancient petroglyphs on the escarpment area on the mesa north of the interstate highway and west of Atrisco and Unser boulevards are highly valuable examples of this country's first settlers, the American Indians; and

WHEREAS, the preservation of these petroglyphs is of great importance not only to the descendants of those early Americans, but also to all citizens of the state since the petroglyphs are an essential part of New Mexico's tricultural heritage;

NOW, THEREFORE, BE IT RESOLVED BY THE HOUSE OF REPRESENTATIVES OF THE STATE OF NEW MEXICO that it urges efforts to be made to preserve the petroglyph escarpment area in Bernalillo county, as above described, by declaring that area to be a national monument under the care of the national park service; and

BE IT FURTHER RESOLVED that copies of this memorial be sent to the Santa Fe headquarters of the national park service and to each member of the New Mexico congressional delegation.



The Legislature of the State of New Mexico

THIRTY-EIGHTH LEGISLATURE
FIRST SESSION, 1987

SENATE MEMORIAL 116

INTRODUCED BY SENATOR JOSEPH J. CARRARO

A MEMORIAL RELATING TO STATE SUPPORT FOR PROTECTION AND PRESERVATION OF THE WEST MESA PETROGLYPHS NEAR ALBUQUERQUE, NEW MEXICO.

WHEREAS, the State of New Mexico and the City of Albuquerque jointly have funded a Comprehensive Archaeological Study of the West Mesa volcanic escarpment, and that study has documented over ten thousand five hundred prehistoric Indian and colonial period Hispanic petroglyphs, thereby ranking the area as the largest concentration of prehistoric art in the world near a metropolitan area; and

WHEREAS, the New Mexico Cultural Properties Review Committee has placed the West Mesa escarpment archaeological district on the state register of cultural properties, and the district has been officially listed on the national register of historic places as well; and

WHEREAS, the outstanding educational, recreational and open space values of the west mesa have long been recognized and identified for preservation as major open space in the Albuquerque and Bernalillo County comprehensive plan of 1975 and the Northwest Mesa Area Plan of 1980, and the city is currently preparing a Northwest Mesa Volcanic Escarpment Preservation plan due for completion by May, 1987; and

WHEREAS, over seventy acres of the escarpment petroglyphs have been preserved as Indian Petroglyph State Park, and nearly another five thousand acres of the West Mesa volcano, tablelands and escarpment have been preserved by the City of Albuquerque in volcano and La Boca Negra Parks; and

WHEREAS, the Albuquerque Convention and Visitors Bureau has completed an economic impact analysis for a proposed Petroglyph National Monument on the West Mesa which projects an estimated four hundred thousand visitors per year to the monument, with nineteen million dollars in direct spending, thirty-eight million dollars in indirect economic impact and two million three hundred thousand dollars in city and state tax revenues resulting directly from the monument; and

WHEREAS, the New Mexico Congressional Delegation has introduced the El Malpais-Mesaau Trail Legislation, which would incorporate the West Mesa petroglyphs, along with other federal, state and Indian-owned cultural areas, in a regional automobile tour encompassing western New Mexico for educational and economic purposes; and

WHEREAS, Senator Pete V. Domenici has requested and received from the United States Congress an appropriation of fifty thousand dollars for an alternative feasibility study by the National Park Service to determine the West Mesa's suitability for designation as a national monument or other unit of the national park system, and that study is scheduled for

transmittal to Congress in August, 1987; and



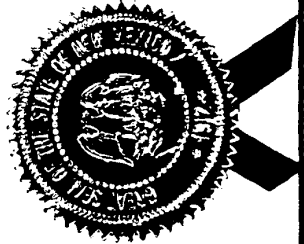
WHEREAS, staff from the Office of Cultural Affairs and the Natural Resources Department now represent New Mexico on the National Park Service Study team for the Albuquerque West Mesa petroglyph area, and the planning alternatives being studied by that team include cooperative acquisition or management of a new national park system unit by city, state or federal agencies; and

WHEREAS, over eight hundred acres of the National Park Service Albuquerque West Mesa Petroglyph Study area are New Mexico trust lands administered by the State land office;

NOW, THEREFORE, BE IT RESOLVED BY THE SENATE OF THE STATE OF NEW MEXICO that it directs the Office of Cultural Affairs, Natural Resources Department, State Land Office Economic Development and Tourism Department and the Department of Game and Fish to actively consult with and provide technical assistance to the National Park Service and the City of Albuquerque in preparation of the alternatives feasibility and Volcanic Escarpment Preservation Studies now underway; and, further, to evaluate and determine what the state's ultimate roles should be in assisting with this project and to report their recommendations to the second session of the thirty-eighth Legislature in 1988; and

BE IT FURTHER RESOLVED that the State Land Office be directed to cooperate fully and explore with the City of Albuquerque and the National Park Service the feasibility of sale or exchange of state trust lands within the National Park Service Albuquerque West Mesa Petroglyph Study area in order to consolidate land ownership as necessary to implement creation of a new unit of the National Park System; and

BE IT FURTHER RESOLVED that copies of this Memorial be sent to the above named State agencies, to the Mayor of the City of Albuquerque, New Mexico, to the National Park Service Regional Headquarters in Santa Fe, New Mexico, to Mr. Ike Eastwood, chairman of the friends of the Albuquerque petroglyphs and to each member of the New Mexico Congressional Delegation.



Signed and Sealed at The Capitol,
in the City of Santa Fe.

Joseph J. Carraro
for State President
New Mexico State Senate

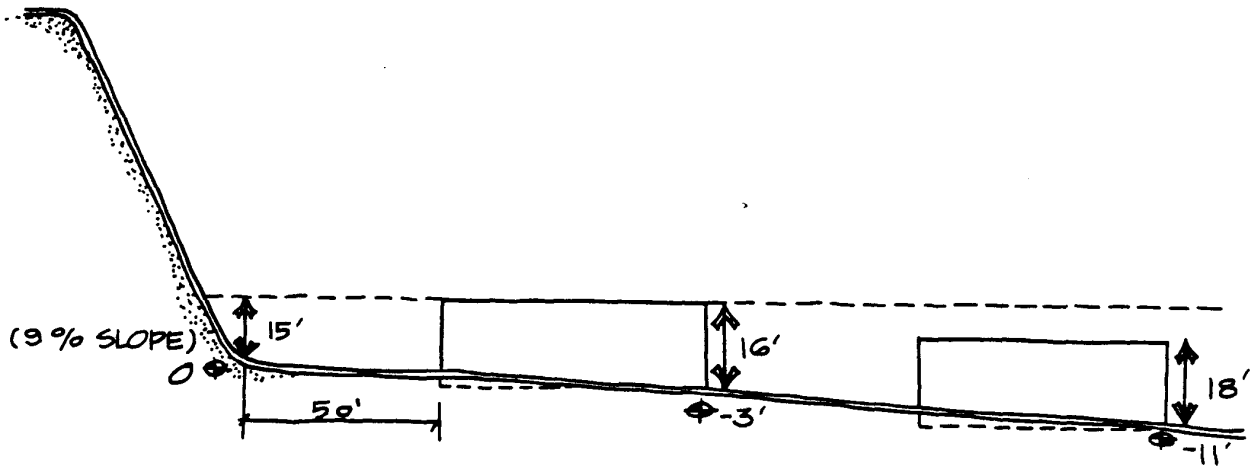
Johnnie Pina, Chief Clerk
New Mexico State Senate

APPENDIX N

SITE PLAN CRITERIA FOR
EXCEPTIONS TO POLICY #12-2
(15' HEIGHT LIMIT)

A. HEIGHT/SLOPE:

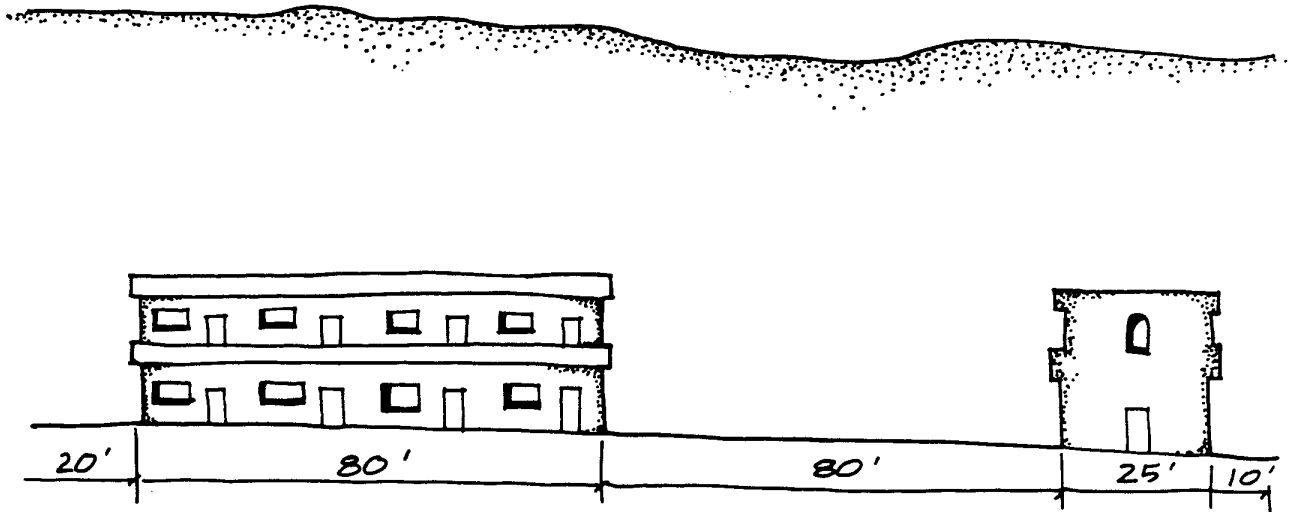
Allow an increase in height in response to slope. For example, 1' in increased height may be granted for every 3' to 4' drop in ground elevation from a base elevation established at the 9% slope line. This will provide a stepped-down effect and a smooth transition in scale. Buildings could also be depressed below the natural grade. (See regulation 11-7) The maximum height which may be granted within the Impact Area is 19' above natural grade.



A. HEIGHT/SLOPE (STEPPED DOWN)

B. (and B-1). VIEW CORRIDORS:

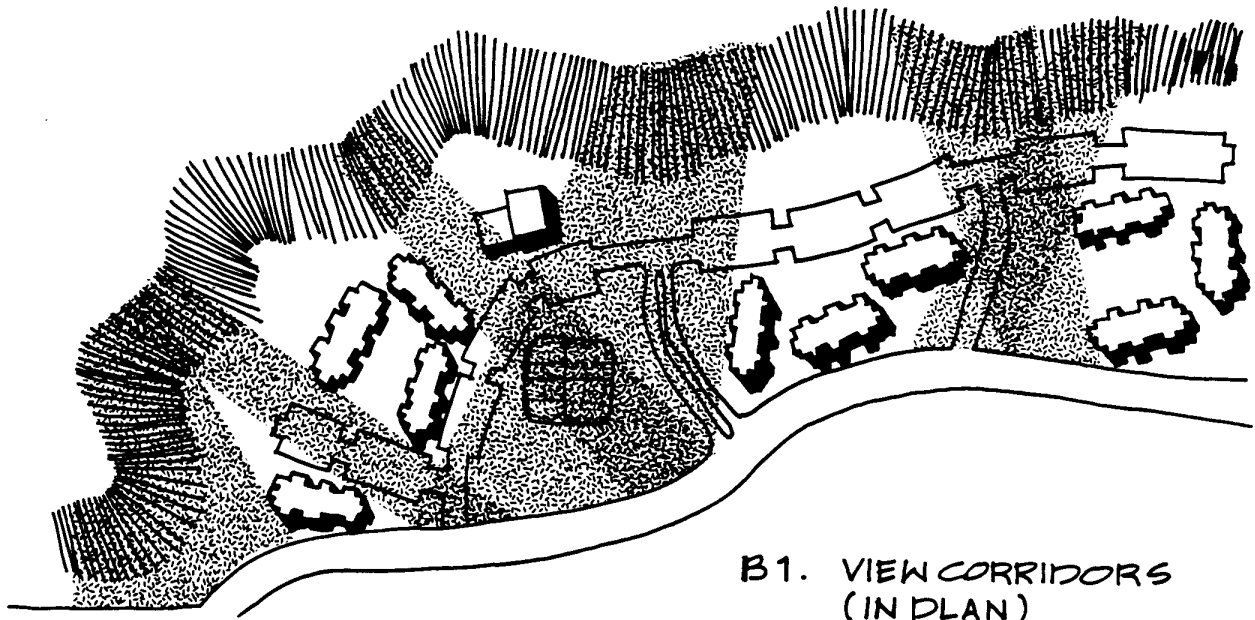
Allow two-story construction provided that views to the escarpment are maintained at the perimeter of the site, or at the nearest public road (whichever offers the predominant public views) and views from the escarpment -- primarily from public trails and access points -- are also maintained. The intent is to preserve the maximum amount of unobstructed lateral views to the base of the escarpment. (If the site is located above the escarpment, the views will be to the top of the escarpment.) The maximum height which may be granted within the impact Area is 19' above natural grade.



B. VIEW CORRIDOR

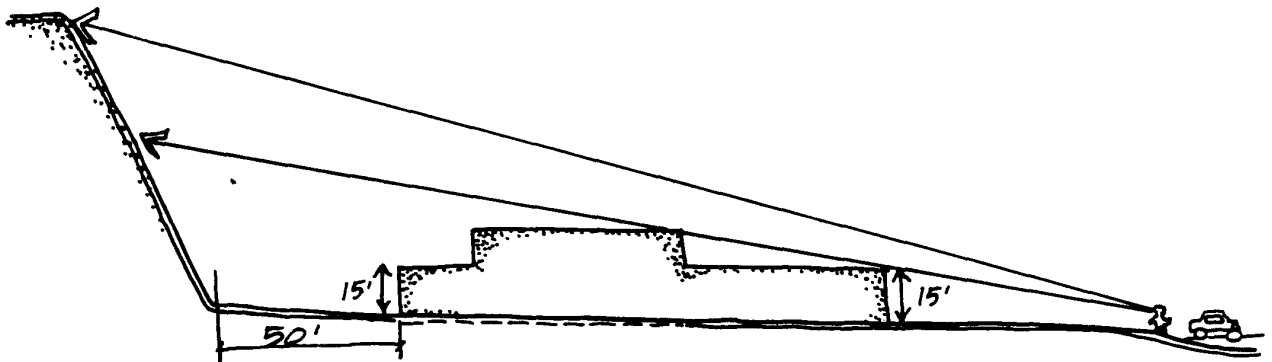
B. (and B-1). VIEW CORRIDORS:

Allow two-story construction provided that views to the escarpment are maintained at the perimeter of the site, or at the nearest public road (whichever offers the predominant public views) and views from the escarpment -- primarily from public trails and access points -- are also maintained. The intent is to preserve the maximum amount of unobstructed lateral views to the base of the escarpment. (If the site is located above the escarpment, the views will be to the top of the escarpment.) The maximum height which may be granted within the impact Area is 19' above natural grade.



C. HEIGHT/SLOPE/SETBACK:

The closer a structure is to the viewer, the more it blocks the view. If structures are set back further from the predominant viewing areas (generally either the site perimeter of the nearest public road and public trails and access points along the escarpment), then it is conceivable that the building height could increase in proportion to the size of the setback and the slope without increasing the visual impact from a particular vantage point. Both slope and setback should be used to determine the appropriate building height, up to maximum of 19' above natural grade.



C. HEIGHT /SLOPE SETBACK



Steven W. Donahue, photographer

Mike Walker, Director, Parks and Recreation Department
Rex Funk, Superintendent of Open Space Division
Barbara Baca, Project Planner

James L. Gill, Director Planning Department
Phil Garcia, City Planner
Cynthia S. Bruce, Chief of Advance Planning
Anne McLaughlin, Project Planner
Victoria Prinz, Planner
Sheran Matson, Unit Head, Land Use and Design

Susan McKee, Legal Department
Bob White, Legal Department
Joe David Montano, Public Works Department
Doug Faris, National Park Service
Joan Mitchell, National Park Service
Jim O'Hara, State Historic Preservation Division

Southwest Land Research, Inc.
Phyllis Taylor, Consultant

Cherry-See Architects
Edie Cherry, Consultant

CITIZENS AD HOC COMMITTEE

Leroy Chavez, Westland Development Corp.
David Dell, Sierra Club
Ike Eastvold, Friends of the
Albuquerque Petroglyphs
Irv Kulosa, Volcano Cliffs Property
Owners Association
Gerry Falls, Volcano Cliffs Property
Owners Association
Richard Hughes, Conservation Alliance
Virginia Kinney, Western Trail
Neighborhood
Dan McDaniel, Taylor Ranch
Neighborhood Association
Doug Reynolds, Bellamah Community
Development
Coda Roberson, Roberson Construction
Matthew Schmader, Open Space Task Force
Cliff Spirock, Community Sciences Corp.
Gordon Bronitsky, ARPAC Consultant

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WEST MESA COMMITTEE

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Jay Eberle
Richard Hughes
Paul Lusk
Barry Newberger
Norma Rivas-Miller
Matthew Schmader
Julia Stephens
Rosemary Thompson Glenn

SPECIAL THANKS TO:

American Society of Landscape Architects, New Mexico Chapter