City Offices

THE CITY OF MOAB

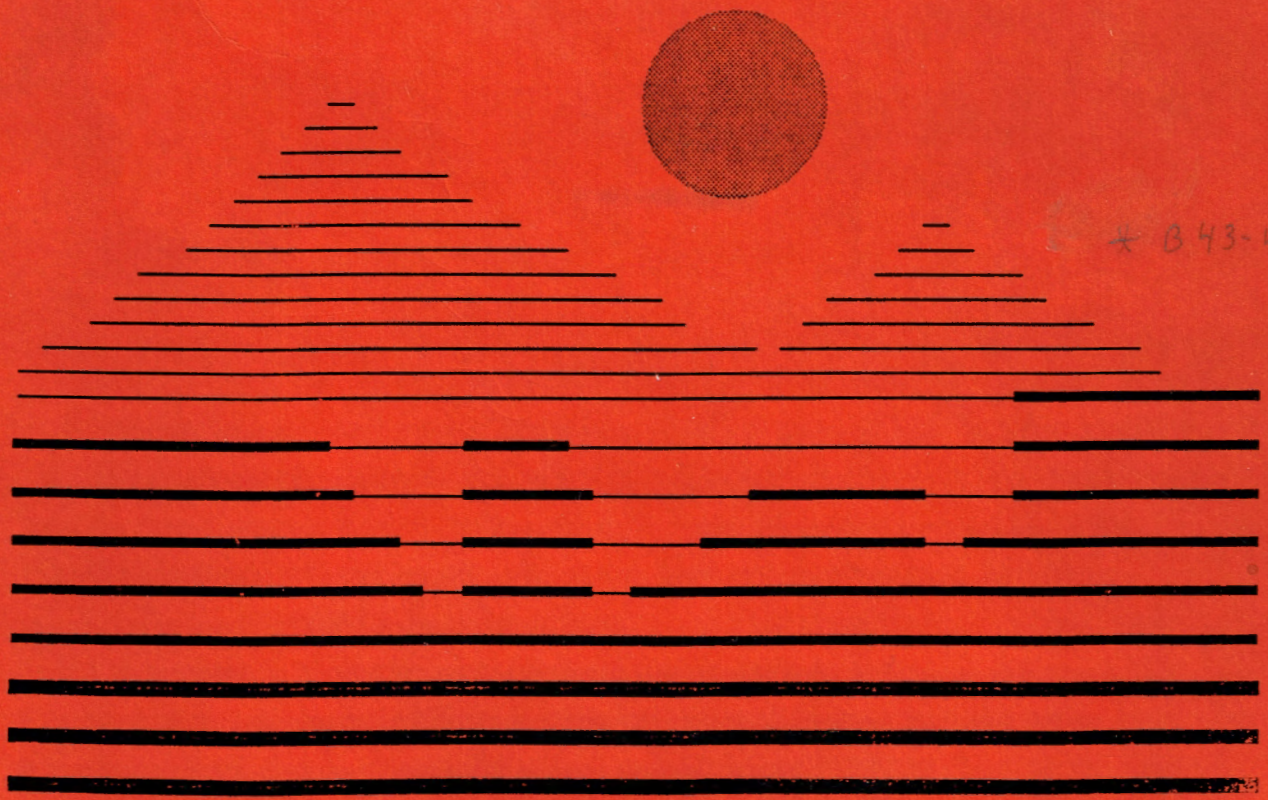
SPATIAL ANALYSIS

AND

PHYSICAL PLANNING GUIDELINES

PHASE II

FINAL REPORT



UTAH STATE UNIVERSITY 1989 ENVIRONMENTAL FIELD SERVICE

DEPARTMENT OF LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL PLANNING

City of Moab
Land Use Suitability Study:
Planning And Design Guidelines

Prepared by:
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1989

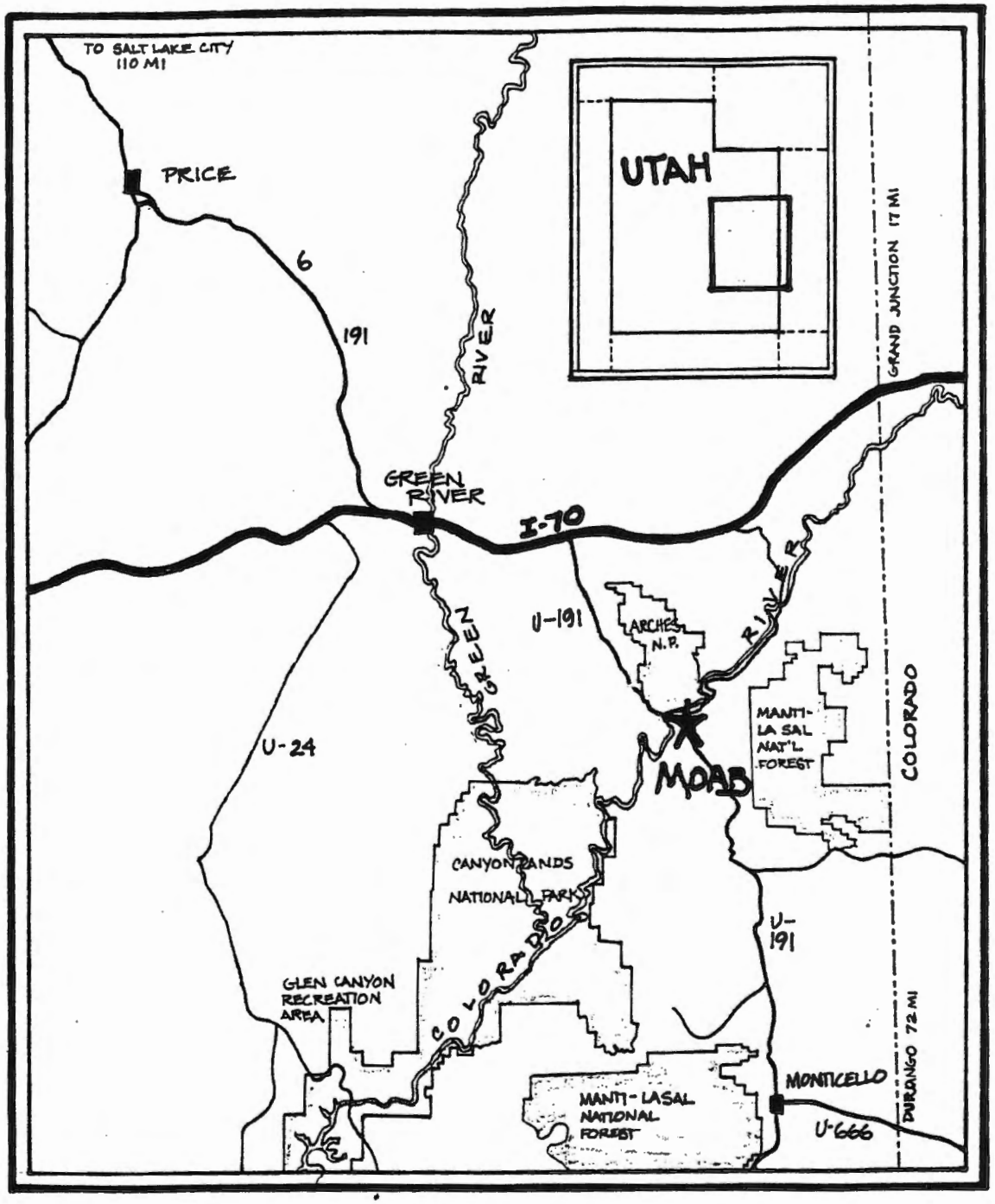
ACKNOWLEDGEMENTS

The Field Service Team would like to recognize those who contributed time, services, resources, and information to the completion of this study.

We would like to thank the Mayors office, the Chamber of Commerce, the Grand County Engineers office, the City of Moab Planning Commision , the BLM and other individuals who provided accomodations and assistance during our study process. Information gathered on our visits from these interested groups was greatly appreciated.

We are also appreciative of the work that was done by the Field Service Team in 1987 on the Moab/Spanish Valley project . We relied heavily on their base data. Expertise from other departments at Utah State University was also invaluable.

We would also like to thank Roger Marr for his efforts in the reproduction of the many maps throughout the publication.


TO SALT LAKE CITY
110 MI
PRICE
6
191
GREEN RIVER
UTAH
GRAND JUNCTION 17 MI
GREEN RIVER
I-70
U-191
ARCHES N.P.
COLORADO RIVER
MANTI-LA SAL NAT'L FOREST
U-24
MOAB
CANYONLANDS NATIONAL PARK
COLORADO
U-191
GLEN CANYON RECREATION AREA
MONTICELLO
MANTI-LASAL NATIONAL FOREST
U-666
DURANGO 72 MI

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INTRODUCTION

Background of Project: Moab is located in Spanish Valley approximately 200 air miles southeast of Salt Lake City in Grand County. The area has a diverse culture much the same as it did before it was settled in the latter portion of the 19th century. Ancient cultures inhabited the area and the valley was used as a rendezvous point for trappers and explorers. In 1855 Brigham Young's settlement program brought the first settlers to the valley but they did not remain long. It was not until 1874 that the first group of cattlemen arrived and by 1881 there were 16 families residing in the valley. In 1890 Grand County was created by legislature and on December 20, 1902 Moab became incorporated as a town.

Moab has a rich background in agriculture and mining and at one time or another these have been the chief employment in the area. during the 1950's Moab became the central location of the uranium boom which brought much fiscal and population growth to the area. More importantly though was the change brought to Moab by the mining, which changed the town from strictly an agricultural based community to one of mining and ore processing. Along with this came the change of growth which took Moab from less than 50% of the county's population to almost 75%. Mining was also responsible for one-third of the total personal income of the families living in Moab during the 1960's.

After the Atlas Mining Company closed, a vacuum was created, not only were jobs lost but half of the tax base for the county and half of the population of Moab also. Moab was in another state of transition but did not have the resources to help plan for the future. In 1986, professors Toth and Nicholson, with the help of Craig Bigler who at that time was the economic planner for Grand County, presented a proposal to the Grand County Commission that would offer assistance to Moab and Grand County in helping them focus on community revitalization, economic development, and planning. The response was favorable and the "Moab Project" became a long-term commitment for the Field Service Team. The purpose of the study at that time was to define the essential physical structure of the Moab/Spanish Valley area, and to suggest planning and design approaches to protect and enhance these unique characteristics. The original efforts of the Field Service Team was presented in the spring of 1987. The presentation helped the citizens of Grand County and especially Moab to gain a perspective of the potential that Moab has in its natural resources.

With the passage of time comes change and in the fall of 1988 the Field Service Team was once again called upon to study the city of Moab and provide assistance. With a new group of students the team came to Moab in October and met with city officials and other members of the community to begin a new study for growth and economic development in Moab. The focus of this team, however, is not to present detailed designs for the revitalization of the city of Moab. The focus is to provide a framework whereby the officials of Moab and Grand County can evaluate assets already existing and determine unfavorable change before it occurs.

During the initial field work the Team found Moab to have significant potential for growth within its service industry. Moab is settled among public lands with a wealth of beautiful scenic attractions and recreation sites. Visitors to Arches National Monument and Canyon Lands National Park invariably buy gas or pay for other services in Moab when visiting these public lands. However, because of the linear boundaries created by the cliffs on two sides of Moab, Moab can only expand in two directions, north and south, which, in turn, has resulted in a series of planning problems for the city.

Moab, within its civic boundaries, lacks a visual quality compatible with the beauty of its surroundings. Land use combinations are incompatible. State highway 191, running through the downtown of Moab is little more than a "strip." The city lacks local bike and pedestrian lanes. And the list continues. The bi-product of these nuisance conditions in a time when Moab's resource based industries are virtually nonexistent is a depressed economy.

The purpose of this study, therefore, is to assess the physical infrastructure of Moab, giving Moab civic leaders the necessary tools and criteria to: 1) evaluate the effect of both existing and future development activities, and 2) determine whether such activities are desirable given stated long-term community goals. To this end, the following IV-step planning process was employed:

THE PLANNING PROCESS

I. Data Mapping

Important existing and potential land uses were defined and the physical data necessary to properly locate each of these land uses were mapped. Important land uses inluded in this list were: commercial, transportation, recreation, agriculture, public facilities, industry, and residential. To map these land use activities the following data were

prescribed and subsequently mapped: existing land use, hydrology, slope, circulation, geology, vegetation, zoning, and soils.

II. Activity Modeling and Mapping

In this step of the process, it was important not to laden each of the above land use activities with individual values or a priori. Instead, an economic, "black hat" approach was used, whereby, activities were mapped based on referenced engineering criteria. For example, USDA recommends for the construction of heavy industrial facilities the following site requirements: slopes less than 5%; slopes less than 2% where railroads are used; soil depth to bedrock greater than 10 feet; dry surface ground: low shrink-swell, water table deeper than 10 feet; free of geologic hazards and flood plains. (USDA, 1974, 166).

III. Environmental Evaluation

This step in the process, however, recognized that "health, safety and welfare concerns" often preclude the location of various land use activities. Health, safety and welfare concerns are manifested, in the extreme, when structures are forbidden to locate in areas of geologic hazards, sensitive flood or riparian areas, critical viewsheds, or along particular traffic corridors. They are manifested, in moderation, when only mitigative measures are required prior to a structures being located within such areas of "public" concern. Moab and its surrounding landscape have such areas of public concern. Environmental models, intended for official use, were developed, documented and mapped in order to draw attention and hopefully protective planning for these amenities.

IV. Suitability

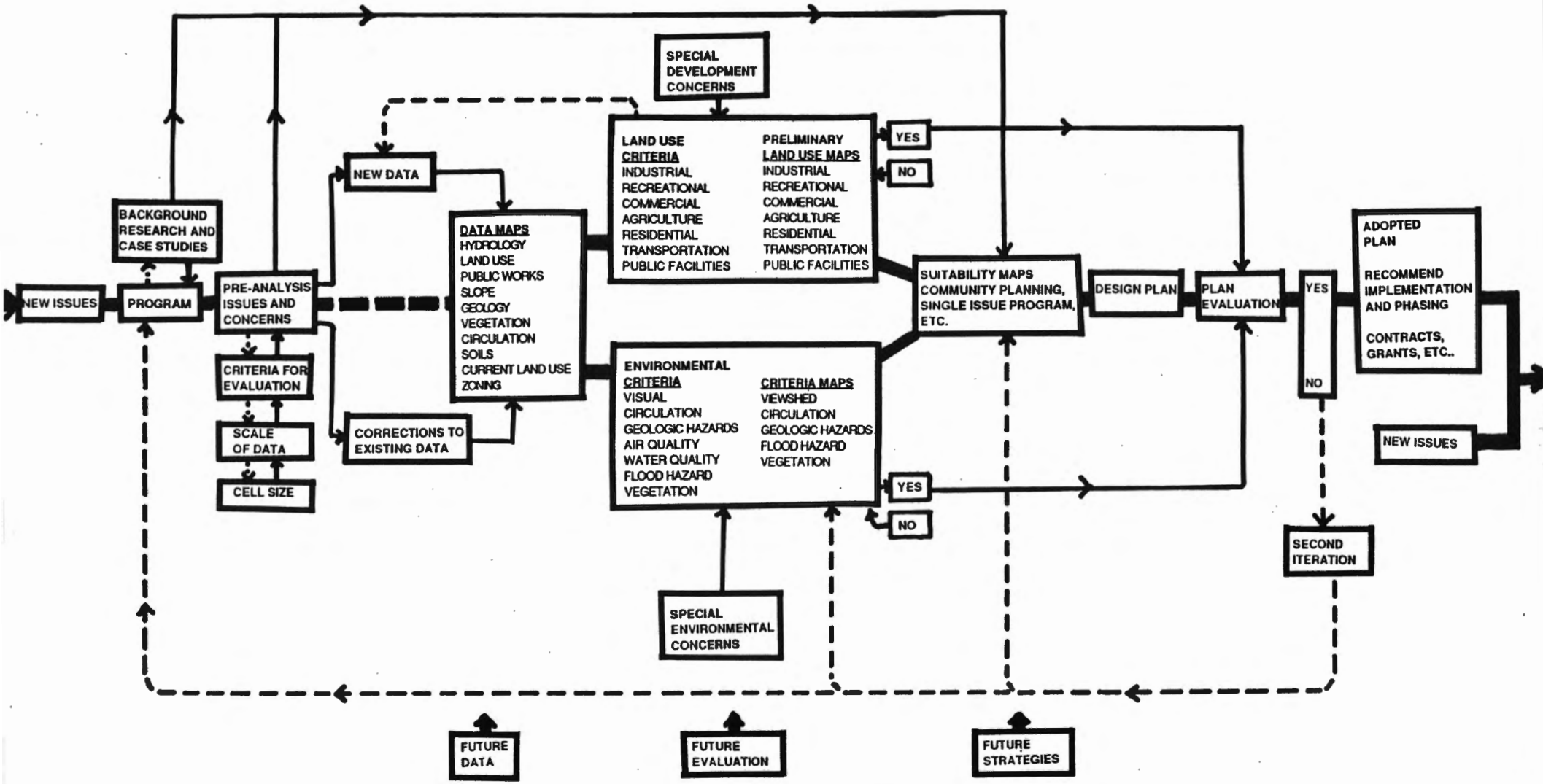
The fourth step in this planning process combined information developed in steps I, II and III. It featured an overlay process, which was used to determine the suitability of an activity based on pertinent values (from step III) and facts (step I-II). For example, a final suitability map for residential homes was prepared by combining developable land, as determined in step II, with evaluation maps featuring sensitive riparian areas, hazardous areas and sites in critical viewshed. These maps combined to create a suitability mapping for residential housing. This suitability map is, however, subject to change as new information, land use and other issues arise. Nonetheless, these suitability maps can be used in a variety of ways, such as:

* by the planning and engineering departments, to give prospective developers preliminary guidelines as to the suitability of a site for a particular type of development;

* by citizens, to evaluate plans approved or considered for approval by the planning commission;
* by investors/realtors, to evaluate vacant land values and these lands potential marketability;
* by the planning commission, to develop a comprehensive and/or zoning map for the city; and,
* by subsequent city governments, to revise comprehensive and/or zoning plans, as changes are required.

It should be stressed that this document with its final map overlay (See Map 16, entitled "Proposed Development Plan for the City of Moab"), which combines suitability maps for all land use activities, is not intended to be the comprehensive plan for the city of Moab. This document and its maps are meant as guidelines to the process of creating a final plan. It features a comprehensive listing of activities and criteria which require compliance prior to physically locating a residence, a firm, and so forth. It additionally sets forth environmental criteria to protect or enhance such amenities as wetlands, riparian areas and viewsheds. These criteria are included to insure quality of life issues which have been stressed to be important to Moab citizens. Together, these considerations led the Utah State University Field Service Team to develop a "Proposed Development Plan for the City of Moab." It is hoped, that this document and process will be scrutinizingly reviewed by Moab civic leaders and any and all necessary changes made, resulting in a Planning Commission generated "Comprehensive" and/or "Zoning Plan for Moab."
(See flowchart showing planning process figure a)

DEVELOPMENT EVALUATION MODEL: MOAB



FACTORS CAUSING CHANGE	FACTORS MANAGING CHANGE	FACTORS IMPLEMENTING CHANGE
DEVELOPER	PLANNING STAFF/PLANNING COMMISION	MANAGING AGENCY AND PUBLIC

LAND USE CRITERIA

Land use criteria is based strictly upon engineering and construction criteria. This criteria , termed "black hat" models, depict specific site requirements defining the economic feasibility of siting given land uses. No consideration is given at this point to existing land uses, environmental concerns, or public health and welfare issues. Maps drawn pursuant to this criteria depict areas that are either "attractive" or "unattractive" for the given land use.

AGRICULTURE (unmapped)

In the area surrounding Moab, water is a valuable commodity. Although the valley itself supports some agriculture lands, the area as a whole is quite dry and arid. The possibility of expanding agricultural lands to include new areas appears doubtful and impracticable. Many of the soils are highly alkaline with shallow A and O horizons, this makes them unattractive as agricultural soils. Because of the limiting soils the major agriculture products remain orchards and animal production. Many orchard crops and all animals can be produced on soils that would be relatively unattractive for row crops.

The history of agriculture in the Moab area is a long one, dating back to the first settlers and their small plots of ground. In contrast to those early settlers, todays farming community represents a small percentage of the area's work force with diminishing numbers expected in the future. According to the state, there is no State Important or Prime Agricultural land in Moab. This means that there are not soils in and around Moab that the state feels should be reserved exclusively for agriculture. Because of information like this, agricultural land in the Moab area will eventually give way to development and urban sprawl. This does not mean, however, that the best land use for any given area might be Plant or Animal production. It does mean that within the limits of our study area that no land is being recommended for expansion or development into agricultural lands. It also means that as the city expands, agricultural lands will not be protected within the city limits.

Although agricultural lands are not protected from development and urban sprawl, land under agriculture management offers some amenities worth consideration. Wildlife often use these lands, and agricultural land is often attractive open space. Under agriculture management these lands might be economically held until the development need arises.

Agricultural lands are not without their problems, one concern of these areas is the point source of pollution. For example, cattle using a stream in excess often eutrify the waterway with their waste and pollute the stream. Another concern is the erosion of soil. Soil erosion is now recognized as a major cause of air and water pollution. Agricultural practices can increase the possibility of erosion up to 100 times its normal erosion potential. Sediment deposits can alter stream and

irrigation channels and fill ponds and reservoirs. If land is determined to remain under agricultural practices proper management procedures should be enforced.

sources:

Troeh,F.R., J.A. Hobbs, R.L. Donahue, Soil and Water Conservation for Productivity and Environmental Protection,1980, Prentice-Hall N.J.

Southard, Alvin R. Chairman, Department of Soil Science Utah State University 1989, (conversations)

Unpublished Soil Survey of the Grand County, Moab Utah Area, United States Department of Agriculture, Soil Conservation Service. (in press 1989)

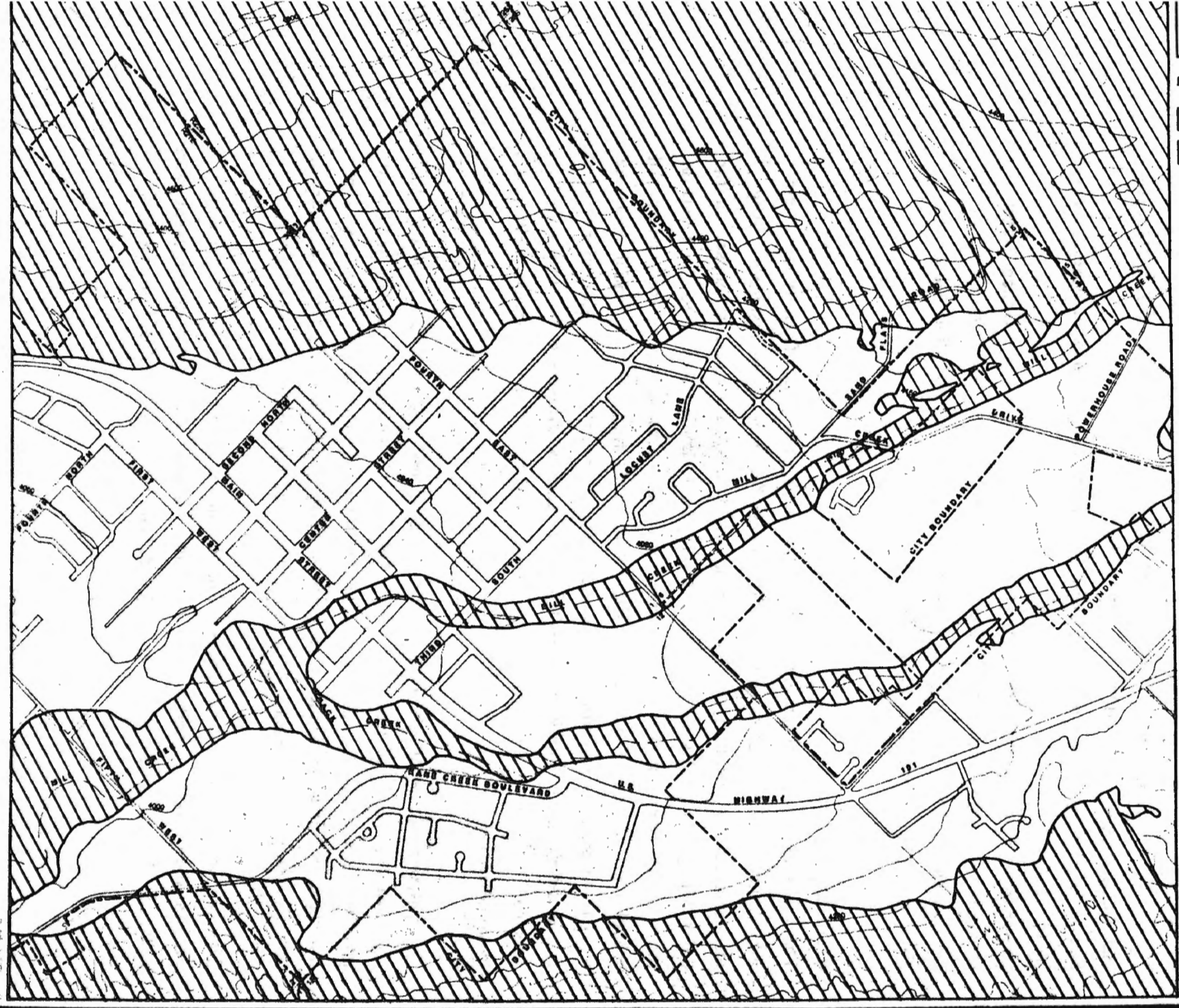
Comprehensive Development Plan if Grand County, Utah. Including Moab and Spanish Valley, November 1968.

RESIDENTIAL(map 1)

The types of residential development in the Moab area range from trailer homes for seasonal residents to single family residents for year round residents. Any residential development in the Moab area would make a significant impact on the cities lifestyle. For this reason future development should respond to the needs of the resident. Some of the needs residents require are as simple as road safety and school locations(see A appendix). The future needs for Moab residential areas are unclear because of the cloudy economic picture, however any considerations for the future development should include feasibility studies evaluating the needs of seasonal residents. This information could redirect residential development needs to some extent.

The purpose of the attractiveness model is to identify areas of development that are most attractive and least cost. This "black hat" approach is applied with least possible constraints to health, safety and welfare. The main considerations were the capability of siting homes in a given location. This least cost approach helps us identify some of the attractive possible locations for residential development.

The two residential models appearing in the index were evaluated by the same criteria and therefore combined on one map. Areas suitable for development were selected after reviewing slope, water table, soil types and geologic formations.


MOAB
UTAH
RESIDENTIAL ATTRACTIVENESS
ATTRACTIVE
UNATTRACTIVE
CRITERIA: SLOPE 25% OR GREATER
DEPTH TO BEDROCK LESS THAN 60 INCHES
SHALLOW WATER TABLE
CITY BOUNDARY
MAIN
FOURTH
SECOND
THIRD
MILL
POWERHOUSE ROAD
SPANISH VALLEY
MILL CREEK
PACK CREEK
MAIN CREEK BOULEVARD
U.S. HIGHWAY 191
DEPARTMENT OF
LANDSCAPE ARCHITECTURE AND
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CHRIS HARTMAN
LIZA STADTMAN
MICHAEL FERRARA
MICHAEL WARNER
CONTOUR INTERVAL 40 FEET
0 1/4
MILES
0 500 1000
FEET
17

COMMERCIAL(map 2)

The proper location of commercial activities within the city of Moab is of concern to both the residents of the community as well as the potential developer. Commercial centers can become a nucleus of activities in small towns, meeting the needs of the residents as well as the non-residents of a community. The commercial center of a town can act as a major element that gives the town its particular identity and structure. A part of this identity and structure may already exist in the natural environment found in the Moab area. Through proper planning small towns can either preserve or enhance their identity by the choices made with regard to commercial development.

Commercial development has been broken into three basic categories applicable for Moab in both size and scale, i.e. cluster development, strip development, and office parks. Commercial cluster developments are usually organized around a main anchor store with smaller stores adjoined to form the cluster. Cluster developments typically have off street parking for their customers.

Commercial strip developments are a straight line of stores along a major street sometimes tied together by a canopy over the pedestrian walk extending along the entrance fronts to the stores. Buildings are set back from the access street with parking placed between the street and the building. Usually a market or drug store is placed at either end of the strip, with anchor stores occurring at major street intersections.

Small scale office complexes are generally organized around a major tenant with related services and sales adjoined to it. Off street parking is provided on site for customer convenience.

Each of these categories of development may have differing requirements as to space needed for development, essential site features, service and access, and plans for expansion. Each category will also effect its surrounding land uses differently, therefore support activities, complementary activities, and conflicting activities will also differ. The model for commercial development in this study specifically addresses these issues.

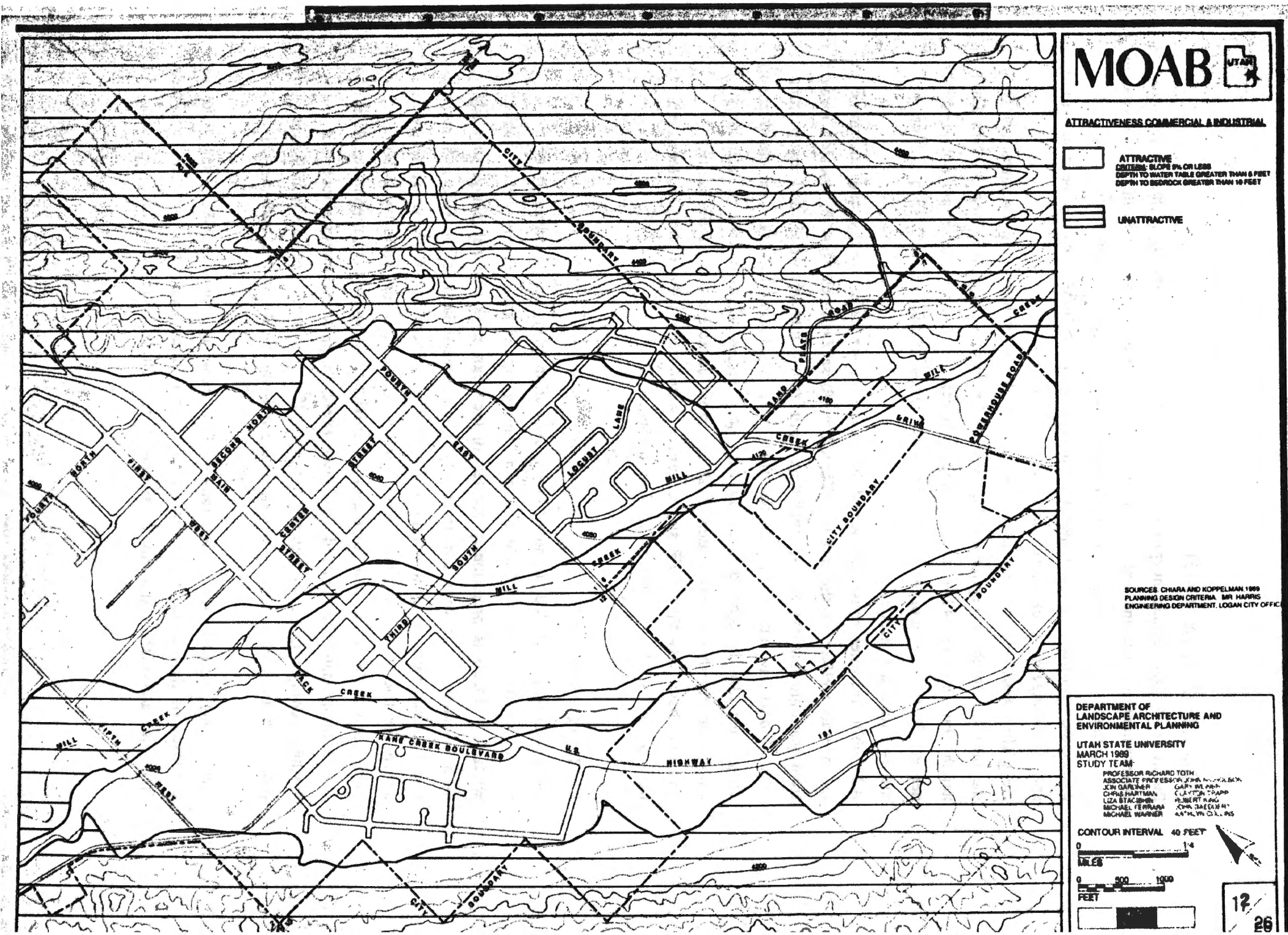
The visual quality of all categories of commercial development will vary greatly depending upon the types of plans approved by the community. If requirements for setbacks and zoning, as well as vegetative planting requirements, are not met by a particular plan: that plan should not be approved. until it meets the requirements set by the community.

INDUSTRY (map 2)

In order to ensure economic vitality to Moab, it is necessary to address the possibilities and potentials of growth associated with industry. An influx of industry would benefit the community in numerous ways. The available jobs would decrease unemployment, thereby increasing expenditures within the city. This would also serve to improve the psychological well-being of the residents. Due to the large number of unemployed, and the orientation of their skills, the impact of industrial development within Moab could prove to be quite substantial.

In order that industrial development contributes to the long-term goals and prosperity of Moab, it is necessary that appropriate strategies are incorporated into growth scenarios. Well-sited development and sensitive design will ensure the quality of life for the residents as well as serving to attract additional revenues through increased industry and tourism. The Industry Activity Model, Attractiveness Map, and Suitability map serve to locate and describe appropriate industrial development potential.

The general requirements of industrial development include a viable community with available resources and manpower. As suggested previously, Moab seems to satisfy these basic criteria. Site-specific needs include slopes less than 5%, permeable soils, a water table deeper than 10 feet, and a soil depth to bedrock greater than 10 feet. These parameters are further described in the Industry Activity Model (appendix A-22). The Industry Attractiveness (map 2) delineates areas that meet these minimal requirements for development, while disregarding those areas that might require expensive construction and/or engineering alterations.


MOAB
UTAH
ATTRACTIVENESS COMMERCIAL & INDUSTRIAL
ATTRACTIVE
CRITERIA: SLOPE 5% OR LESS
DEPTH TO WATER TABLE GREATER THAN 6 FEET
DEPTH TO BEDROCK GREATER THAN 10 FEET
UNATTRACTIVE
SOURCES: CHIARA AND KOPPELMAN 1969
PLANNING DESIGN CRITERIA MR. HARRIS
ENGINEERING DEPARTMENT, LOGAN CITY OFFICE
DEPARTMENT OF
LANDSCAPE ARCHITECTURE AND
ENVIRONMENTAL PLANNING
UTAH STATE UNIVERSITY
MARCH 1969
STUDY TEAM:
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LIZA STACKMAN
MICHAEL FERRARA
MICHAEL WARNER
GARY WILKIN
CLAYTON TRAPP
ROBERT KING
CONTOUR INTERVAL 40 FEET
MILES
FEET
CITY BOUNDARY
KANE CREEK BOULEVARD
U.S. HIGHWAY 191
MILL CREEK
PACK CREEK
POWERHOUSE ROAD
MAIN STREET
FOURTH EAST
FOURTH SOUTH
FIRST NORTH
FIRST WEST
SECOND NORTH
SECOND WEST
SECOND EAST
SECOND SOUTH
THIRD SOUTH
LOCUST LANE
12/26

PUBLIC FACILITIES (map 3)

Public Facilities include hospitals, clinics, public schools, libraries, churches, government offices, and police and fire stations. These types of facilities are vital to any community and as the population increases so must the public services and associated facilities. It is important, therefore, that careful attention be made to the spatial arrangement of these important features.

Generally, areas that are attractive for one of these facilities will be attractive for the others with the exception of the over all lot size (sizes range from 3 acres for a health clinic to over 40 acres for a high school). If these facilities are not presently needed, it may be appropriate to hold these lands in reserve until such a time as the facilities are needed.

All public facilities must be located in areas that are safe, healthy and contribute to the overall welfare of the public. Therefore, these facilities must be located away from geologic hazards zones, (including fault zones, unstable soils, and away from talus slopes) and out of all potential flood ways (including the 100 year flood zone.) They must also be located centrally with easy access on a primary or secondary circulation corridor. Those areas that are most attractive for public facility locations have less than 10% slope, have a water table greater that 10 feet, and have a soil depth greater that 10 feet to bedrock.

RECREATION (map4)

Occasionally overlooked as superfluous, recreation plays an essential role in creating a high quality of life and contributing significantly to the public health and welfare. Moab is propitiously located in the heart of a regional playground rife with mountains, canyons and rivers. Publicly owned land is the rule and includes two national parks located within a short drive. These expansive areas are well-suited for the tourist and local alike desiring a full day or multi-day outdoor experience. Yet it is also important to provide city-based recreational facilities that can accommodate the demand for daily exercise, passive entertainment and aesthetic enjoyment in an outdoor setting. The recreation activity model was developed to help identify the essential requirements for siting such facilities.

Recreational pursuits are varied, ranging from bowling alleys to bike paths. For the purposes of the model, they were stratified into three categories: mobile activities, fixed-site activities, and commercial activities. These latter, consisting of such

MOAB UTAH

ATTRACTIVENESS PUBLIC FACILITIES

ATTRACTIVE

CRITERIA: SLOPE 15% OR LESS
DEPTH TO WATER TABLE GREATER THAN 10 FEET
DEPTH TO BEDROCK GREATER THAN 10 FEET

UNATTRACTIVE

SOURCES: CHIARA AND KOPPELMAN, 1988.
PLANNING DESIGN CRITERIA.
LDS CHURCH ARCHITECTS OFFICE
MR. HARRIS, ENGINEERING DEPARTMENT, LOGAN CITY OFFICE

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UTAH STATE UNIVERSITY
MARCH '989
STUDY TEAM

CHRIS HARTMAN

CONTOUR INTERVAL 40 FEET

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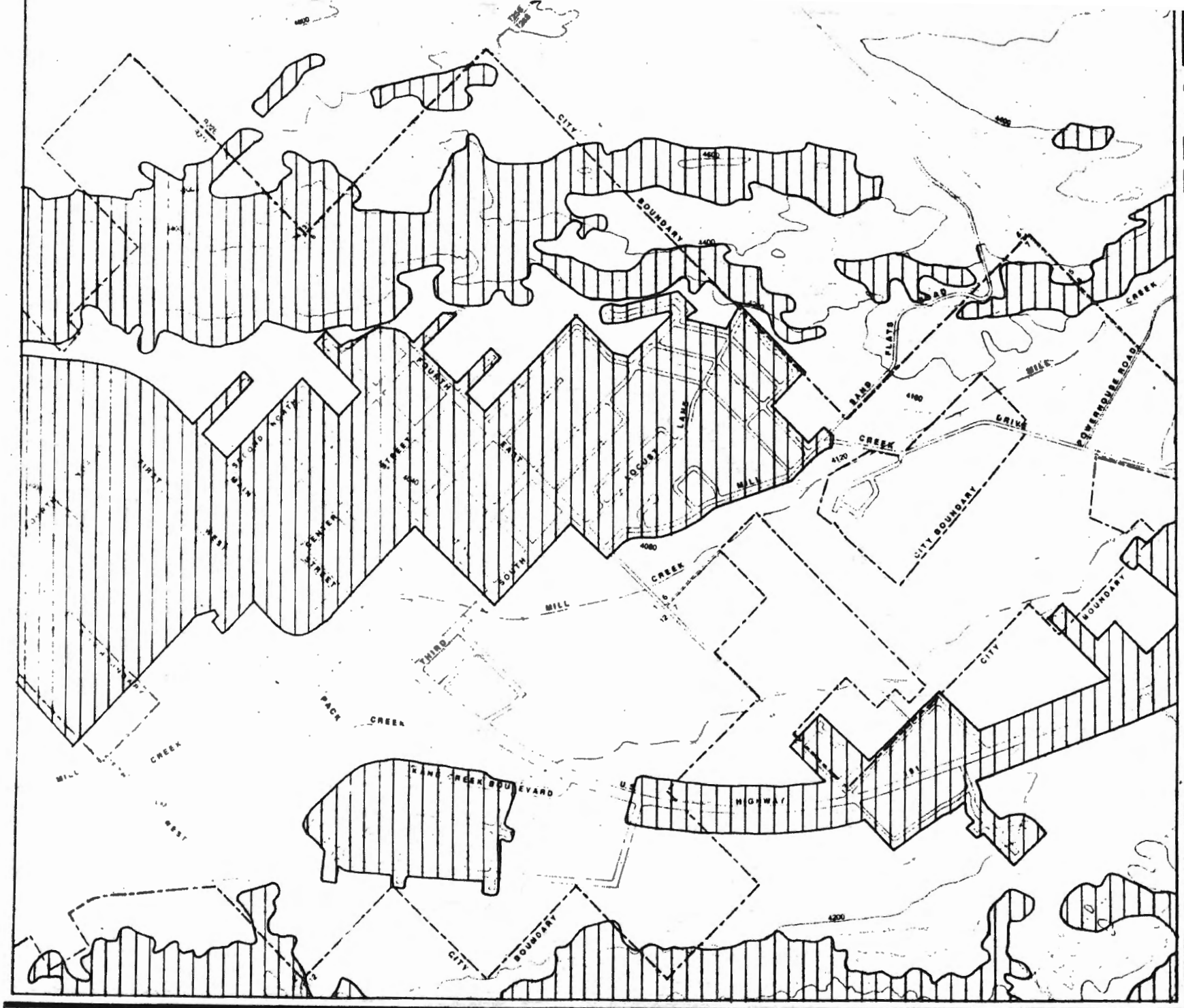
MOAB
UTAH
LINEAR RECREATION
ATTRACTIVENESS AND SUITABILITY
ATTRACTIVE & SUITABLE
UNATTRACTIVE & UNSUITABLE
CITY BOUNDARY
MILL CREEK
PACK CREEK
MILL CREEK DRIVE
MILL CREEK BOULEVARD
HIGHWAY
FIRST WEST
SECOND NORTH
SECOND SOUTH
THIRD SOUTH
FOURTH EAST
LOCUST LANE
MILL CREEK DRIVE
POWERHOUSE ROAD
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CONTOUR INTERVAL 40 FEET
MILES
FEET
4

things as theatres, video arcades and batting cages, were considered more akin in land-use requirements to commercial activities and were accordingly considered in that model.

Mobile recreation includes such activities as hiking, biking, horseback riding and fishing. These are linear in nature, requiring little site development and typically having a relatively minor impact on neighboring land uses and the environment. From a "black hat" perspective, site data needs include only topography, soils, surface water hydrology, and existing circulation and land use.

Fixed-site activities include parks, golf courses, nature areas and river launches. Site requirements for these are generally stricter than for mobile activities. Space requirements can vary from less than 1/4 acre for a small trailhead to 160 acres for an 18-hole golf course. Vegetation, groundwater hydrology, depth to bedrock and microclimatic data may be required in addition to that mentioned above.

Due to the extreme variability in spatial requirements for fixed-site activities, only mobile activities were considered in the recreation attractiveness map. As is the case throughout this study, the map is a somewhat gross application of the more specifically detailed model. Broad swatches were broken out as attractive for linear recreation based upon two exclusionary criteria: steep slopes and intensive road development. Current land uses were ignored for the purpose of constructing a graphic tool whose usefulness will postdate changes in these land uses.

TRANSPORTATION (map5)

Transportation is a critical area in the future growth of the city of Moab. This is true not only because of the monetary benefits realized by tourism but also because of the goods and services transported to and through the community. Because of the importance of these two areas to Moab it is vital that planning implementations are carefully thought out.

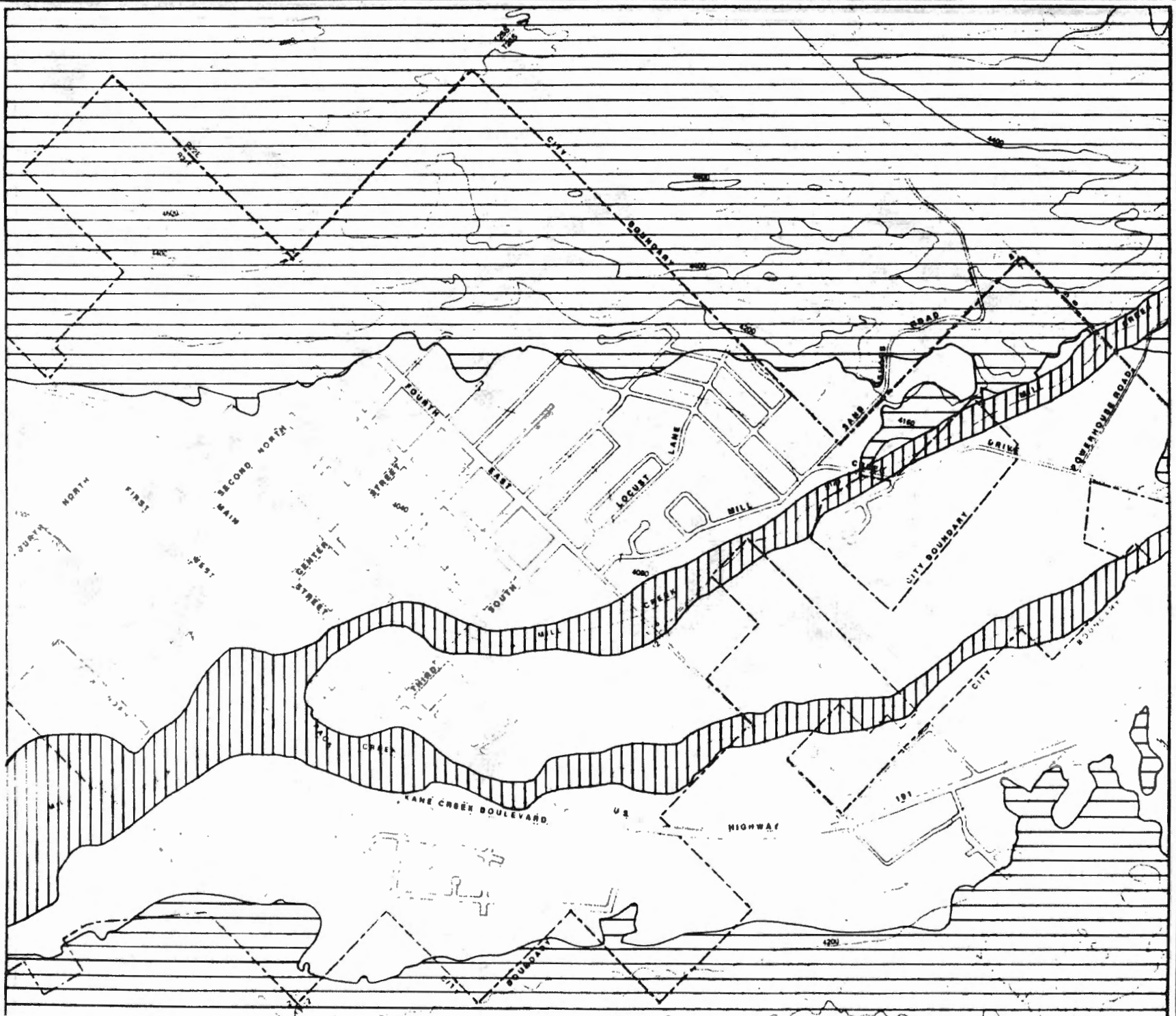
For the purposes of this study transportation was divided into four general areas. Roads and highways, airports, railways, bikeways, and walkways. These areas have similar

requirements for site planning in regards to types of soil, slope, etc, but as far as conflicting activities as well as the size of the site needed for each activity within transportation, they differ.

The transportation activity map is divided into three areas of attractiveness based upon differing criteria. The overall criteria included the following:

- slope 0-15 ft.
- depth to bedrock >10'
- water table >10'
- permeable soils

These criteria were then compiled and mapped according to the varied uses. The results give three attractiveness distinctions and are documented in the legend the activity model for transportation gives the pertinent information and specifics required for each activity and should be adhered to to maintain the integrity of the regional and local attributes of Moab.



MOAB

UTAH

TRANSPORTATION ATTRACTIVENESS

- ATTRACTIVE FOR ROADS & HIGHWAYS
- ATTRACTIVE FOR BIKEWAYS WALKWAYS
- UNATTRACTIVE

SOURCES: SITE PLANNING , KEVIN LYNCH
ANTELOPE ISLAND STUDY, ROBERT SCOTT 1974
CACHE CO PLANNING DEPARTMENT, A TRANSPORTATION STUDY 1979
URBAN PLANNING AND DESIGN CRITERIA, DECHIARA, JOSEPH AND LEE KOPPELMAN 3RD EDITION 1982

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UTAH STATE UNIVERSITY
MARCH 1989
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CONTOUR INTERVAL 40 FEET

MILES

0 500 1000

FEET

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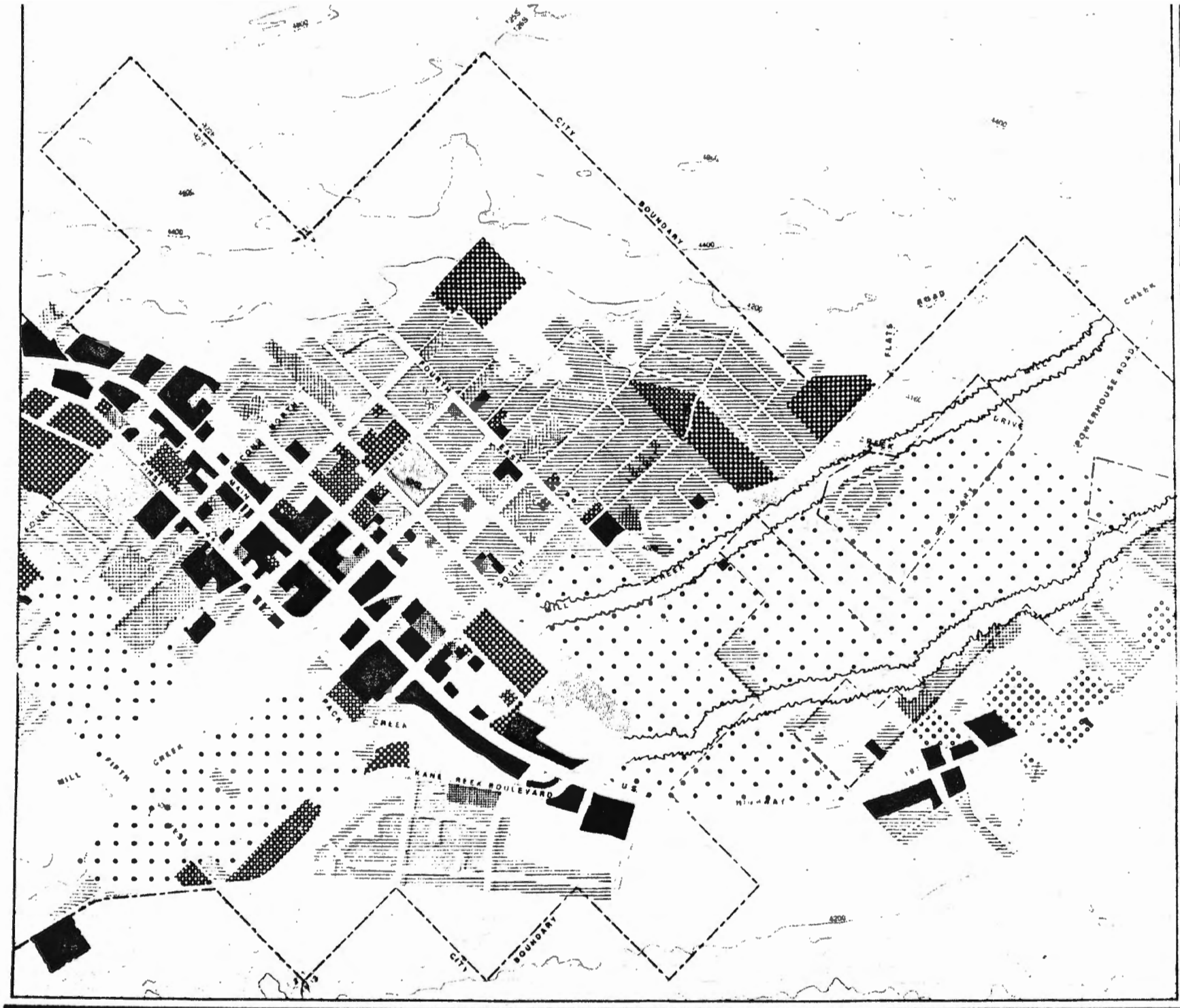

MOAB

UTAH

LAND USE

- RESIDENTIAL - SINGLE FAMILY
- RESIDENTIAL - APARTMENTS
- RESIDENTIAL - MOBILE HOMES
- COMMERCIAL
- SCHOOLS CHURCHES
- CITY / COUNTY FACILITIES
- RECREATIONAL - CITY
- RECREATIONAL - COUNTY
- AGRICULTURE
- INDUSTRIAL
- OPEN SPACE OR VACANT

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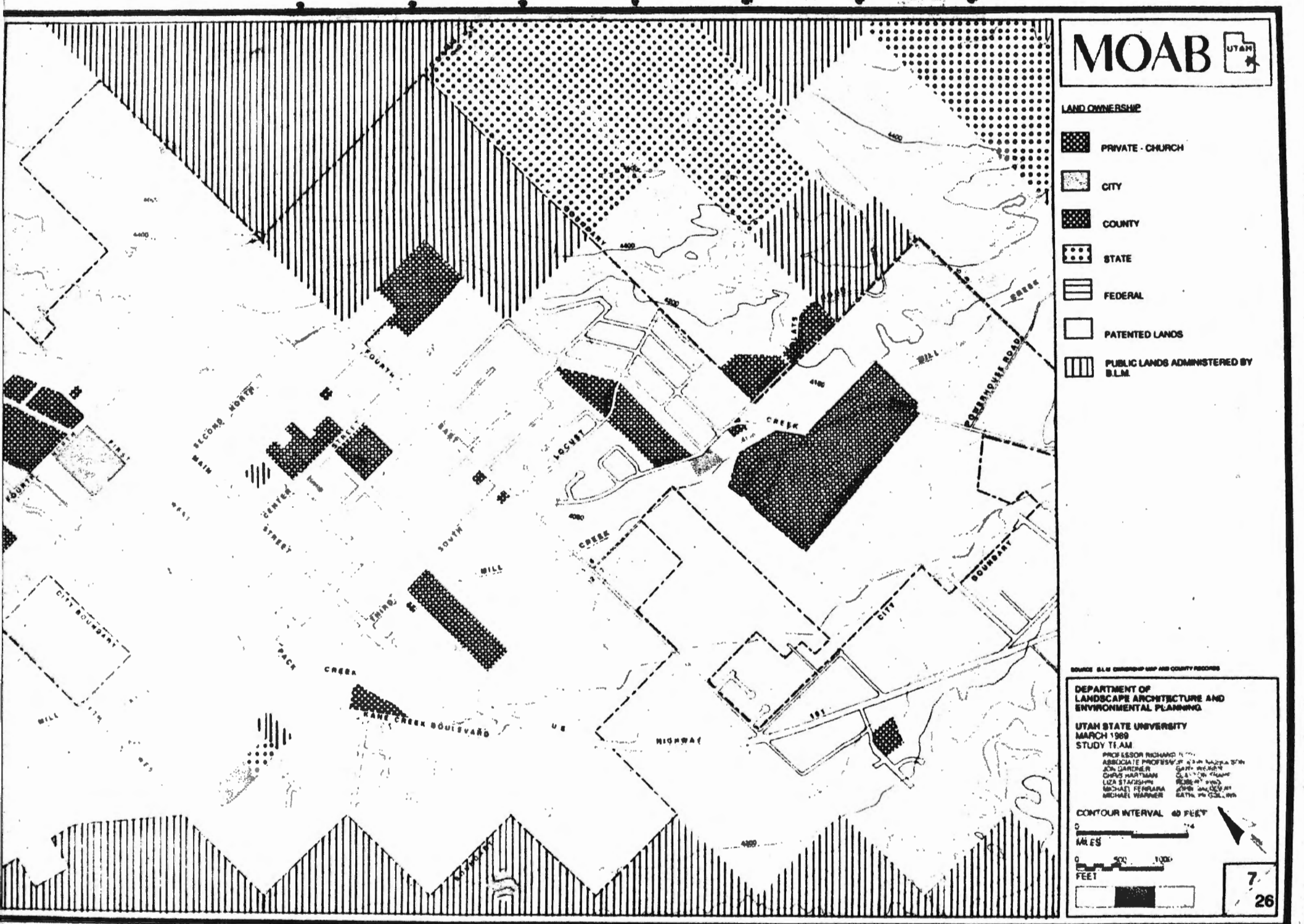
6


MOAB
UTAH
LAND OWNERSHIP
PRIVATE - CHURCH
CITY
COUNTY
STATE
FEDERAL
PATENTED LANDS
PUBLIC LANDS ADMINISTERED BY B.L.M.
SOURCE: BLM OWNERSHIP MAP AND COUNTY RECORDS
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CHRIS HARTMAN
LIZA STADISHIN
MICHAEL FERRARA
MICHAEL WARNER
CONTOUR INTERVAL 40 FEET
MILES
FEET
7
26
SECOND NORTH
MAIN
CENTER
STREET
SOUTH
LOCUST
MILL
CREEK
CITY BOUNDARY
HIGHWAY
101

ENVIRONMENTAL CRITERIA

This criteria is based on public health, welfare, current land uses and environmental concerns. They are designed to be evaluated in conjuction with the "black hat" Activity models to produce areas suitable for development. They are kept seperate from the attactiveness "black hat" models to insure the integrity of the study and prevent contamination of evaluation procedure.

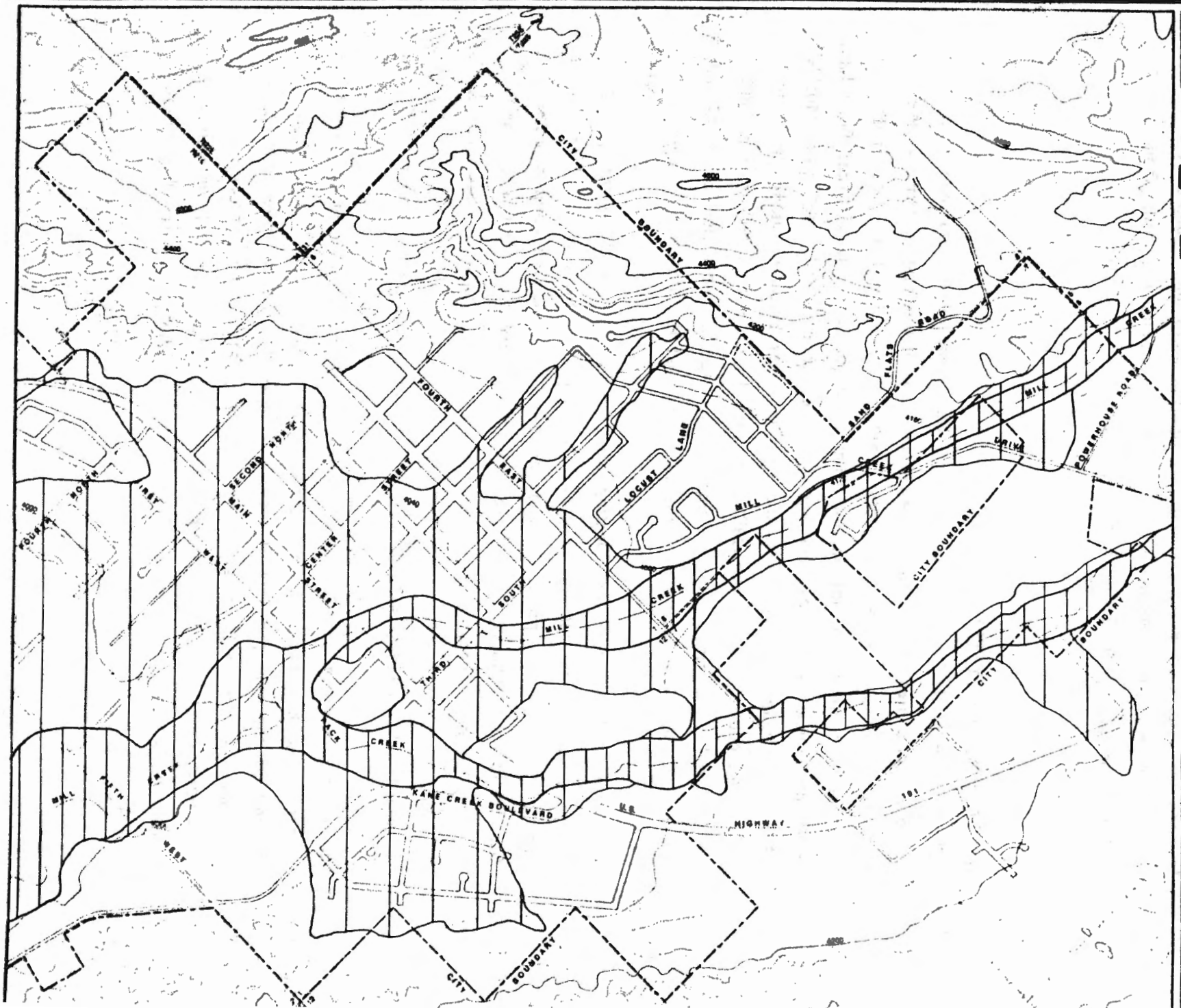
FLOODING HAZARD (map 8)

The possibility of flooding poses a very real threat, (though perhaps not an imminent one), to the citizens of Moab. Yet the spectra of a catastrophic flood is one that has been largely ignored during the course of the city's physical development. The vast majority of town, including the entire central business district, has been built in the designated 100-year floodplain. As delineated by National Flood Insurance Program maps, the 100-year floodplain is an area determined to be historically susceptible to inundation by 100-year floods of record. The flooding map and model are intended to provide planners with a delineation of hazardous areas and a checklist-type guide for predicting impacts from development in flood-prone areas.

The hazard resulting from new construction in the floodplain is not limited to the new structures themselves. As more and more of the floodplain is blanketed with impermeable materials such as concrete, asphalt and other urban surfaces, rising floodwaters have an ever-dwindling opportunity to infiltrate. Vertical structures can also act to channelize and speed the flow of floodwaters, further exacerbating the risk to life and property during a catastrophic event.

Pack and Mill creeks join the Colorado river in contributing to the area's flooding hazard. The 100-year floodplain extends up the two creeks, and development along these stream corridors will share in the consequences described above.

To the extent that riparian communities are disturbed, there will be additional penalties. As an integrated system of soils, water, flora and fauna, riparian communities serve a multifarious function, providing economic as well as environmental benefits to the community. As well as flood hazard abatement, a healthy riparian zone traps sediments in runoff and channel flow, filters surface water pollutants, purifies percolating water in recharge areas, and provides fish and wildlife habitat, varied recreational opportunities, natural travel corridors and perceptual relief from urban harshness. Broad, slow-water riparian areas, or wetlands, are particularly valuable in serving the functions of flood abatement, water filtration, atmospheric oxygenation and wildlife production.



MOAB UTAH

ENVIRONMENTAL EVALUATION

SURFACE WATER SYSTEMS

FLOOD CONTROL ZONE/ RIPARIAN SYSTEMS
RESTRICTIONS: NO FURTHER DEVELOPMENT WITHOUT RIGOROUS ENVIRONMENTAL AND VISUAL MITIGATION MEASURES

100 YEAR FLOODPLAIN
RESTRICTIONS: CONSIDER INEVITABLE FLOODING HAZARD IN ALL FUTURE PLANNING EFFORTS NO SITING OF PUBLIC FACILITIES

SOURCES U.S. DEPT HOUSING AND URBAN DEVELOPMENT 1980 1981
1974 ZONING MAP MOAB, UT UPDATED 1988
1982 U.S.D.A. AIR PHOTO

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MARCH 1989

STUDY TEAM

CONTOUR INTERVAL

MILES

FEET

8

26

Moab is fortunate enough to inherit riparian areas in a relatively intact state; appropriate planning can guarantee the preservation of these valuable community resources.

In addition to large-scale features such as riparian areas and floodplains, microsite landscape depressions blanketed with a mantle of impermeable soils should be evaluated for local flood risk as well.

SURFACE WATER SYSTEMS (map 8)

The purpose of the Surface Water Systems Environmental Criteria map is to delineate those areas where surface water systems should play a primary role in land use decisions for reasons of public health, safety and welfare. The map represents a composite of information from three sources: the 100-year floodplain, as depicted on the Hydrology data map (18), the "flood control zone", from Moab's 1972 zoning map (updated 1988), and riparian zones extending along the three main water courses (Pack creek, Mill creek and the Colorado river) from a 1982 USDA aerial photograph. This information was organized to delineate two distinct zones: a "flood control/riparian systems zone", and the 100-year floodplain.

As summarized in the sections dealing with flooding hazard and water quality, certain assets and hazards can be positively ascribed to these areas. Stream corridors and wetlands provide a wide array of economic and environmental benefits to the community, and floodplains pose a very real threat to life and property when inappropriate development is allowed to occur. Preserving fragile riparian areas and regulating development in hazardous floodplains are unquestionably activities consistent with the long-term public interest.

It is strongly recommended that no further structural development be allowed to occur within the designated flood control/riparian systems zone. This will accomplish the dual purposes of preserving riparian function while creating a continuous system of linear greenways physically linking the community. Once developed, such a system will improve the quality of life for locals as well as proffering a strong, positive community image to tourists and potential future inhabitants.

There may be instances wherein it may prove acceptable to bend this rule. In such circumstances, development should only be allowed to occur when design features and/or mitigation measures can absolutely guarantee the continuing visual and physical integrity of the corridor. Allocation of funding to pay for such measures must be a certainty, and monitoring to assure compliance should be assured.

Areas within the designated zone that are already developed can be grandfathered. However, the city should consider negotiated acquisition and restoration of these parcels to be a high priority use for public development funds.

Regulating development in the 100-year floodplain presents a more problematic situation. The relatively long span of time between catastrophic flood events has tended to lull residents and city planners into a false sense of security about the topographic location of the bulk of the city. To be sure, there is variation in the degree of hazard depending upon the location under consideration. Certain areas closer to the water courses are subject to life-threatening levels of inundation, whereas others may suffer only a relatively minor economic loss.

To now begin to prohibit all further development in the floodplain will undoubtedly raise vocal protest. Site-specific physical factors will have to be considered alongside economic and political realities and weighed against long-term public health and welfare concerns.

Recognizing this reality, we have chosen to treat the floodplain not as an exclusion, but rather as a strongly flagged hazard zone. This treatment allows differentiation between hazardous but otherwise suitable sites, and hazardously unsuitable sites. In no way should this be misconstrued as a recommendation to build in the floodplain. Suitable sites outside of the floodplain are always to be considered preferable. Should city planners choose to develop within the floodplain, serious attention must be paid to formulating appropriate mitigation measures. Finally, under no circumstances should public facilities be sited within the floodplain. Hospitals and fire stations must be protected from the direct effects of catastrophic events in order to be left capable of responding to them.

WATER QUALITY

As is the case with most communities, water quality is an issue of great concern to the town of Moab. Domestic drinking supplies as well as agricultural irrigation water derive respectively from local aquifer and surface water systems. Riparian systems, which provide the community with recreational opportunities and aesthetic amenities as well as significant economic benefits also vary in their utility depending upon the quality of the fluid resource. The water quality model highlights some of the pollutants, pollution sources and mitigation measures that have become nationally common.

Quantifying "suitable" water quality depends upon the desired water use. Human consumption demands the highest standard in water quality. In-stream recreational standards fall next in the hierarchy, with fish and wildlife habitat, agricultural, and industrial uses following in descending order.

Quantity, quality and timing are all important factors with respect to water quality. Quantity and timing are most affected by climatic and regional land use factors which are largely beyond the scope of this study. Yet it is quite likely that local vegetation manipulation can and will result in some alteration of flow rates.

Planning efforts at the scale with which we are concerned can have their greatest impact upon water quality. Both point and non-point sources of pollutants should be addressed.

Point sources of pollution, such as municipal and industrial effluents, can be controlled by enforcing applicable federal and state water quality standards. When these prove insufficient to accomplish water quality goals, they can be bolstered by local control measures such as more stringent regulation and zoning.

A more vexing problem both for Moab and the nation as a whole is non-point source pollution. Regulation difficulties arise in determining the natural background level of pollutants, isolating sources of additional pollutants, and instituting an equitable system of pollution reduction. Non-point problems can be more easily ameliorated with good planning prior to additional development than by remedial efforts once an activity is entrenched.

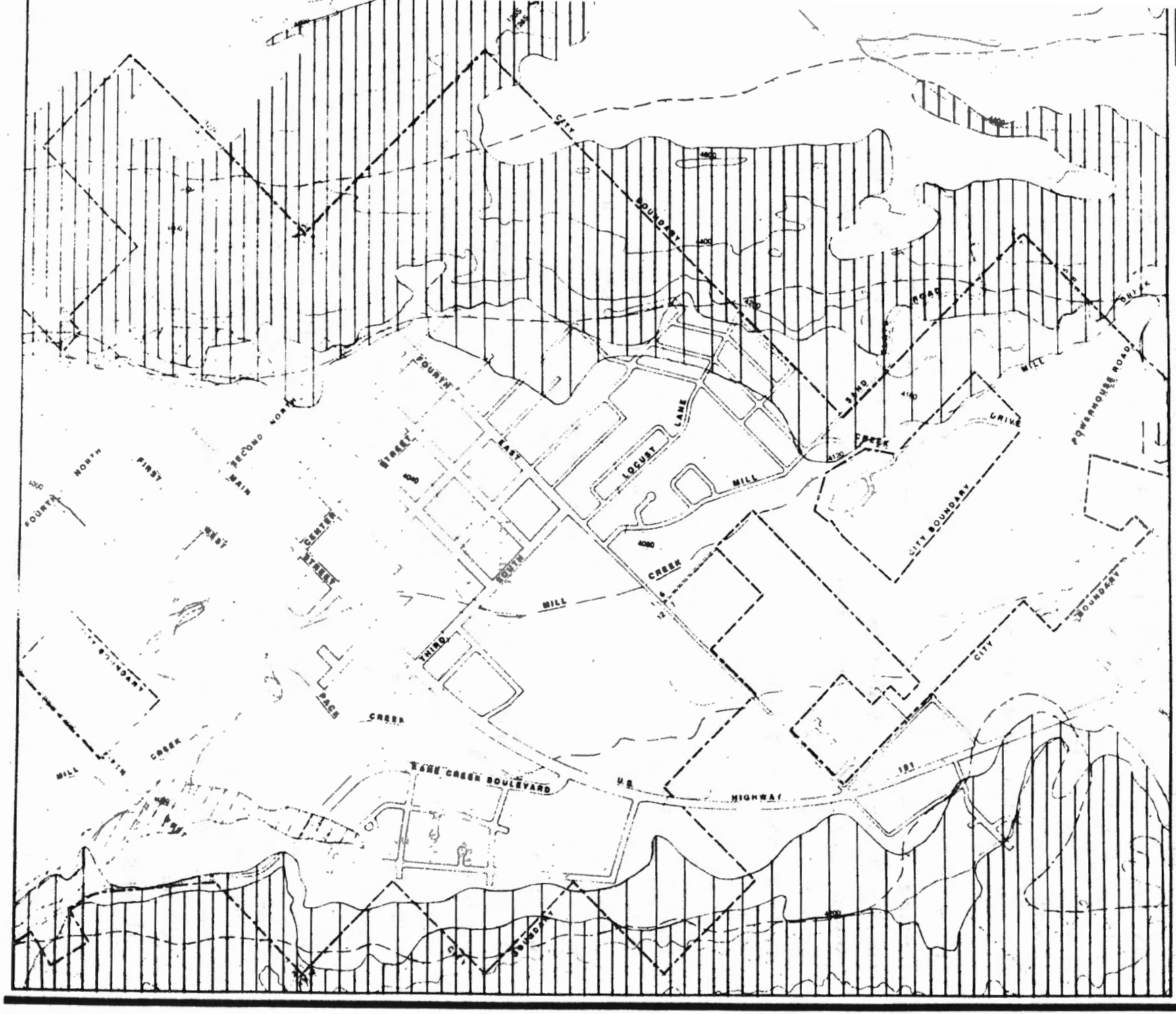
Some of the pollutants of prime concern are sediments suspended in runoff, nutrients from agricultural and urban lawn fertilizers, fecal coliform from sewage system deficiencies and animal feedlots, and heavy metals from transportation activities and urban runoff. In the course of planning for future as well as existing development, there will be many opportunities to reduce the extent of these pollutants and the resulting reduction in quality suffered by receiving waters. Retention basins, conservation tillage, proper siting of roads, and erosion abatement procedures during construction are but a few examples of mitigation measures that can be required, requested and/or rewarded.

Of special concern to Moab is groundwater quality, since the town draws its drinking water from the aquifer. Sewage, nitrates, and petroleum products are the three most nationally prevalent groundwater pollutants, and may derive from such Spanish Valley sources as underground storage tanks, septic systems, agricultural activities and landfills. Particular care must by taken to not pollute an aquifer due to the inordinate length of time required for self-purging.

GEOLOGIC HAZARD (map 9)

Geologic concerns are beginning to take on a vital role in the planning process, often forming the basis of future land-use decisions. Current trends suggest that this pattern will continue to evolve (McCalpin, 1985). As Moab continues to grow, there will be increasing pressure for development to occur within areas of potential danger. In order to ensure public health, safety, and welfare, it is necessary to acknowledge the different hazards, where they exist, and implement appropriate planning and design strategies. The Geologic Hazards Environmental Criteria (Appendix B) describe and delineate the areas of potential concern, and recommend appropriate strategies for the city of Moab.

The scenic cliffs surrounding Moab are a primary natural resource that provide unique opportunities and views. However, these areas correspond to potential geologic hazard zones, and are susceptible to hazards associated from rockfall, talus, slumping, piping (collapsing pockets), and fault ruptures. Each of these hazards pose varying degrees of danger, and each requires site-specific analysis to determine actual hazard levels.



MOAB UTAH

GEOLOGIC HAZARDS

- ROCKFALL - TALUS ZONE (MEDIUM TO HIGH HAZARD)
- FALLOUT ZONE (MEDIUM TO LOW HAZARD)
- UNSTABLE ZONE PARADOX FORMATION - INTERBEDDED GYPSUM AND BLACK SHALE (HIGH HAZARD)
- FAULTLINE ZONE (MINIMAL HAZARD REFER TO EVALUATION MODEL)

NOTE: RESTRICTIONS ON DEVELOPMENT MUST BE EVALUATED ON A SITE-SPECIFIC BASIS AS OUTLINED IN THE EVALUATION MODEL

SOURCE: HB PHOTOGEOLOGIC MAP OF THE MOAB QUADRANGLE GRAND CO., UT. BY W.R. HEMPHILL (1:24,000)

SOURCE: QUATERNARY FAULT MAP OF UTAH, 1979 BY LARRY W. ANDERSON AND DARRYL G. MILLAR. (1:500,000)

SOURCE: U.S.D.A. AIR PHOTOGRAPH, 1982.

SOURCE: U.S.G.S. BULLETIN 841 GEOLOGY AND OIL POSSIBILITIES OF THE MOAB DISTRICT, GRAND AND SAN JUAN COUNTIES, UTAH, 1933. BY A.A. BAKER.(1:62,500)

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MILES

FEET

9
2

The Geologic Hazards Environmental Criteria and map identify and describe four potential hazard zones: Rockfall, talus, and slumping zones (medium to high hazard), Fallout zones (medium to low hazard), Unstable zones (Paradox Formation - high hazard), and faultline zones (minimal hazard). It is recommended for public health, safety, and welfare that all development including housing, sewer, and utilities be located outside of all geologic hazard zones. It is especially critical that public facilities (hospitals, schools, fire and police stations) be located outside these hazardous areas.

Due to the nature of geologic hazards, and the data available, it must be emphasized that this information should be field checked and verified before any conclusions can be reached. Development within these zones should be analyzed by qualified geologists on a site-specific basis to determine actual hazard levels. As geologic information for the area becomes more complete and verified, current updates of the actual hazard locations and classifications will be necessary.

VEGETATION (Appendix C, map 24)

The vegetation of any given area can provide both functional and aesthetic structure to existing and proposed development. Plant species, ranging from trees to ground cover, can help to enhance an areas livability. A sensitivity to the particular needs of any one activity with respect to plant choices will enhance the overall quality of the activity. Vegetation is an integral part of nearly all forms of activities because of its potential for defining space.

The vertical structure of trees can be used functionally to define systems of movement or circulation, i.e. vehicle, bicycle, pedestrian. Trees may be used to emphasize major circulation routes when utilized in street tree plantings. The overhead canopy of deciduous trees can provide relief from the summer sun not, only for pedestrians but also for parked vehicles.

Vegetation not only can be used to create more livable spaces for man but for wildlife as well. By analyzing the particular needs of a wildlife species, native but not presently existing in the area, vegetative choices can be made to create its environment.

Vegetation may also be used in erosion control strategies because of its ability to shelter and preserve the earth's surface from the climatic influences of wind and rain.

The vegetation of a particular site is the result of the region's geology, climate, soils, hydrology, natural disturbances, topography, animal life, and human influences. At any one point in time, vegetation may appear to be static; in reality vegetation is a dynamic entity changing in response to these natural and human influences.

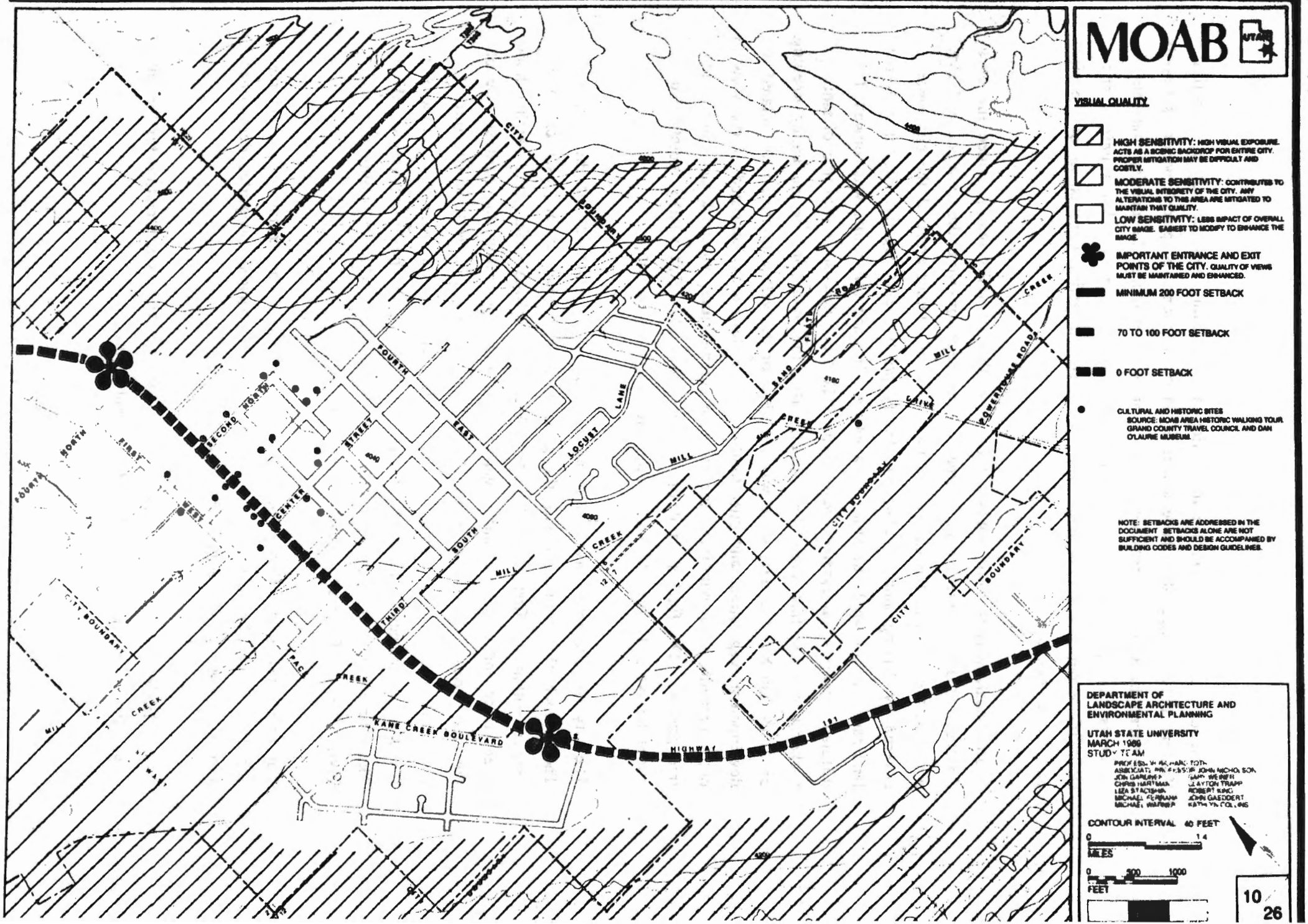
Plant communities that presently exist in the Moab area have been defined and mapped from the 1982 air photo of the area. The previous Utah State University Extension Service Field Study of the entire Spanish Valley in 1986-1987 indicated potential for vegetative communities based of the factors explained in the preceding paragraph. The combination of information from the 1986-1987 study coupled with the knowledge of what is actually existing in Moab should prove invaluable for the selection of plant materials for any given development.

The plant associations identified from the air photo include: wetlands, riparian, desert, agricultural fields, agricultural orchards, and urban vegetative types. The areas most sensitive to development would be the wetlands, riparian, and desert associations because of the small amount of human influence currently existing in these areas. Information as to the exact locations of street tree plantings within the city of Moab may be obtained from the street tree inventory that is currently being completed by another agency.

Two excellent references for more information on the subject of vegetation and planning for small towns are A Community Forestry Manual for the Cities and Towns of Utah and Southern Idaho, and A Wildlife Conservation Manual for Urbanizing Areas in Utah. Both of these sources may be purchased from the Utah State University Extension Service.

VISUAL QUALITY (map 10)

The purpose of the visual quality map is to delineate those areas that are significant visual attributes to the city of Moab. The visual image is not purely


MOAB
VISUAL QUALITY
HIGH SENSITIVITY: HIGH VISUAL EXPOSURE. ACTS AS A SCENIC BACKDROP FOR ENTIRE CITY. PROPER MITIGATION MAY BE DIFFICULT AND COSTLY.
MODERATE SENSITIVITY: CONTRIBUTES TO THE VISUAL INTEGRETY OF THE CITY. ANY ALTERATIONS TO THIS AREA ARE MITIGATED TO MAINTAIN THAT QUALITY.
LOW SENSITIVITY: LESS IMPACT OF OVERALL CITY IMAGE. EASIEST TO MODIFY TO ENHANCE THE IMAGE.
IMPORTANT ENTRANCE AND EXIT POINTS OF THE CITY. QUALITY OF VIEWS MUST BE MAINTAINED AND ENHANCED.
MINIMUM 200 FOOT SETBACK
70 TO 100 FOOT SETBACK
0 FOOT SETBACK
CULTURAL AND HISTORIC SITES
SOURCE: MOAB AREA HISTORIC WALKING TOUR, GRAND COUNTY TRAVEL COUNCIL AND DAN O'LAURIE MUSEUM.
NOTE: SETBACKS ARE ADDRESSED IN THE DOCUMENT. SETBACKS ALONE ARE NOT SUFFICIENT AND SHOULD BE ACCOMPANIED BY BUILDING CODES AND DESIGN GUIDELINES.
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FEET
10
26
SECOND NORTH
FOURTH EAST
CENTER STREET
SECOND SOUTH
THIRD SOUTH
MAIN STREET
LOCUST LANE
MILL CREEK
KANE CREEK BOULEVARD
HIGHWAY 191
POWERHOUSE ROAD
CITY BOUNDARY

cosmetic. It should reflect the integration of the setting and the human activities. Visitors and residents alike have a feel of Moab, or 'sense of place', which is heavily influenced by visual impressions. The point is to maintain the quality that the residents take pride in, that encourages development and provides a unique and satisfying experience for visitors. It is the first and lasting impressions of the city that are of concern.

Short visual surveys were conducted on a number of visits that provided the data for the visual assessment map. Areas of concentration were the entrance and exit points of the city and the Central Business District. Other areas of the city were covered by driving and bicycling to identify positive and negative elements of the landscape as they apply to Moab as a whole. In each scene that was viewed, four different scales of assessment were used. The first view scale was the distant background scene that show the redrock cliffs, the mountains or the valley opening up to the south. The next scale was the view of the valley floor; usually related to development, vegetation, and cliff foothills. The third scale consisted of the view of ones' immediate surroundings, for instance, architecture, sidewalk and and shade tree canopy. The final scale dealt with the view from high vantage points that might be typically reached by driving, bicycling and hiking.

The city is quite impressive within all of these scales depending on the location The redrock cliff formation with the green vegetation gives it an 'oasis' charm as viewed within the first and last scale. Within the second scale some neighborhood street trees and the creek side vegetation are a welcome from the hard surface of the city streets. And there is visual delight in some of the historic structures throughout the the city within the third scale. Along with the many attributes are the negative images. This study is meant to build on the positive points of Moab. The ultimate goal is to enhance Moab's 'sense of place' while providing a clean, inviting image for visitors and residents alike.

The categories of the Visual Quality map are based on the visual survey and the resulting Visual Assessment Map. There are three spatial categories determined by visual importance and sensitivity to change.

HIGH SENSITIVITY: High visual exposure. Acts as a backdrop for the entire city. Proper mitigation may be difficult and costly.

MODERATE SENSITIVITY: Contributes to the visual integrity of the city. Any alteration to this area are mitigated to maintain that quality.

LOW SENSITIVITY: Less impact of overall city image. Easiest to modify to enhance the image.

Much of the sensitivity criteria is based on the vegetation, or lack of it. The cliffs are sensitive because any disturbance is immediately noticed and the scar remains, such as a cut into the slope. The silhouette of a structure along the cliff edge would also be disturbing. Modifications to the activity to make it less visible or unnoticeable may be costly. The very minimum should be to match the color of a structure with its surroundings or locate a slope cut where there is the least amount of disturbance visually. The vegetation along the creek system, the Colorado River riparian system and marsh are not quite as sensitive to visual alterations because vegetation can help to buffer the impacts. However, due to the fact that plant materials, especially trees, take time to grow to a substantial height, every effort should be made to retain as much of this vegetation as possible. It will not only provide immediate desired effect, it also means less replacement costs. The foothills and on other sites without the advantage of trees should modify their disturbance and architecture to blend in with the topography and background color. The low sensitivity category generally encompasses the town proper. It is an area that can enhance the visual image through architecture, planting street trees and better utilization of space. In all instances, the judgement of degradation and mitigation should be made on a case by case basis. This visual assessment and spatial delineation is general in nature and does not preclude a specific on-site analysis. (see Appendix B: Vegetation, Visual Quality and Buffers)

In addition to the above categories, points along highway 191 that visually indicate IMPORTANT STAGES OF ENTRANCE INTO AND EXIT FROM THE CITY are identified. It is recommended the quality of these views be maintained or enhanced.

RECOMMENDED SETBACK ZONES are indicated by the dashed line. This is only a guide to support the 'sense of place' through a sequence of spaces that visually indicate the approach into town, downtown, then the exit from town. Another technique that compliments this one are street tree plantings. (see Appendix B: Vegetation and Visual Quality)

CULTURAL AND HISTORICAL locations are also indicated. These sites contribute to the identity of Moab. The sites range from being placed on the Historic Register to early buildings that may have been altered from their original form. Many of these are taken from the "Moab Historic Walking Tour", a pamphlet by the Grand County Travel Council and the Dan O'Laurie Museum. The city can encourage recognition of this resource and renovation where appropriate. Those buildings of architectural note should be the integrated into the general architectural scheme of the city. (see Appendix B: Visual Quality/Architecture) The cultural aspect of vegetation should also be noted although it is not mapped here. Historic individual trees and species of historical use are important to enhance Moabs' cultural image. It is recommended that a special effort be made to protect old individual trees and encourage planting of historical species where appropriate. (see Appendix B: Vegetation)

Other cultural sites that should be considered by the city are the places that the people of Moab think are important. These places are what Randy Hester, in a analysis of a small tourist town in North Carolina , coined as "sacred spaces." Through observation, surveys and community dialog, certain sites were indicated as being important to the citizens socially. These sites were designated off limits to encroachment of development or alteration without the citizen's approval. The result was not only the preservation of the small town way of life but a opportunity for the community be involved in their own town planning. For more information, see Appendix D: Manteo Community Guide.

CIRCULATION

A clearly structured and consistent circulation system to and from, as well as, within Moab is vital to move people and essential materials. Safety should be of paramount concern when designing and implementing a system or part of a system. The circulation model provided in this report is designed to help decision makers address all pertinent issues related to system design and implementation. Roads are broken into three hierarchical categories: primary, secondary, and tertiary. Each of these categories have slightly different concerns due to a difference in traffic volume. Walkways and bikeways are becoming increasingly important due to people becoming more health conscience, and the increasing costs of vehicular transportation. It is essential that changes or additions made to road circulation systems be viewed with the other systems also in mind. A

comprehensive and legible system for all modes of transportation is the key to safety and well-being for the citizens of Moab.

SUITABILITY MAPS

Recognizing that public health and welfare concerns should play a legitimate, in fact a crucial role in physical planning, suitability maps are drawn which fine tune the preliminary "black hat" land use maps. Areas initially considered as attractive for a particular land use activity may be designated as unsuitable for that activity if located in hazardous or fragile zones, as depicted on the environmental criteria maps.

RESIDENTIAL (map 12)

As developments are permitted to take place, sensitivity should be applied in the process to insure the safety and welfare of the residents and the city. It is not uncommon for residential areas to be developed in locations that can compromise the health and welfare of those in the home and in the surrounding community. Residential developments also affect the entire image and quality of the city.

The residential suitability map is designed to provide health and safety to the Moab residents as well as to insure the integrity of the Moab Valley. The residential areas often fall in 100 year flood plains and for this reason we caution development here and restrict development from the creek corridors. To maintain the integrity of the majestic walls of th Moab valley we recommend a ceiling on development of the hillsides. Other cautions for development were given for attractive open spaces entering the city and geologic caution areas.

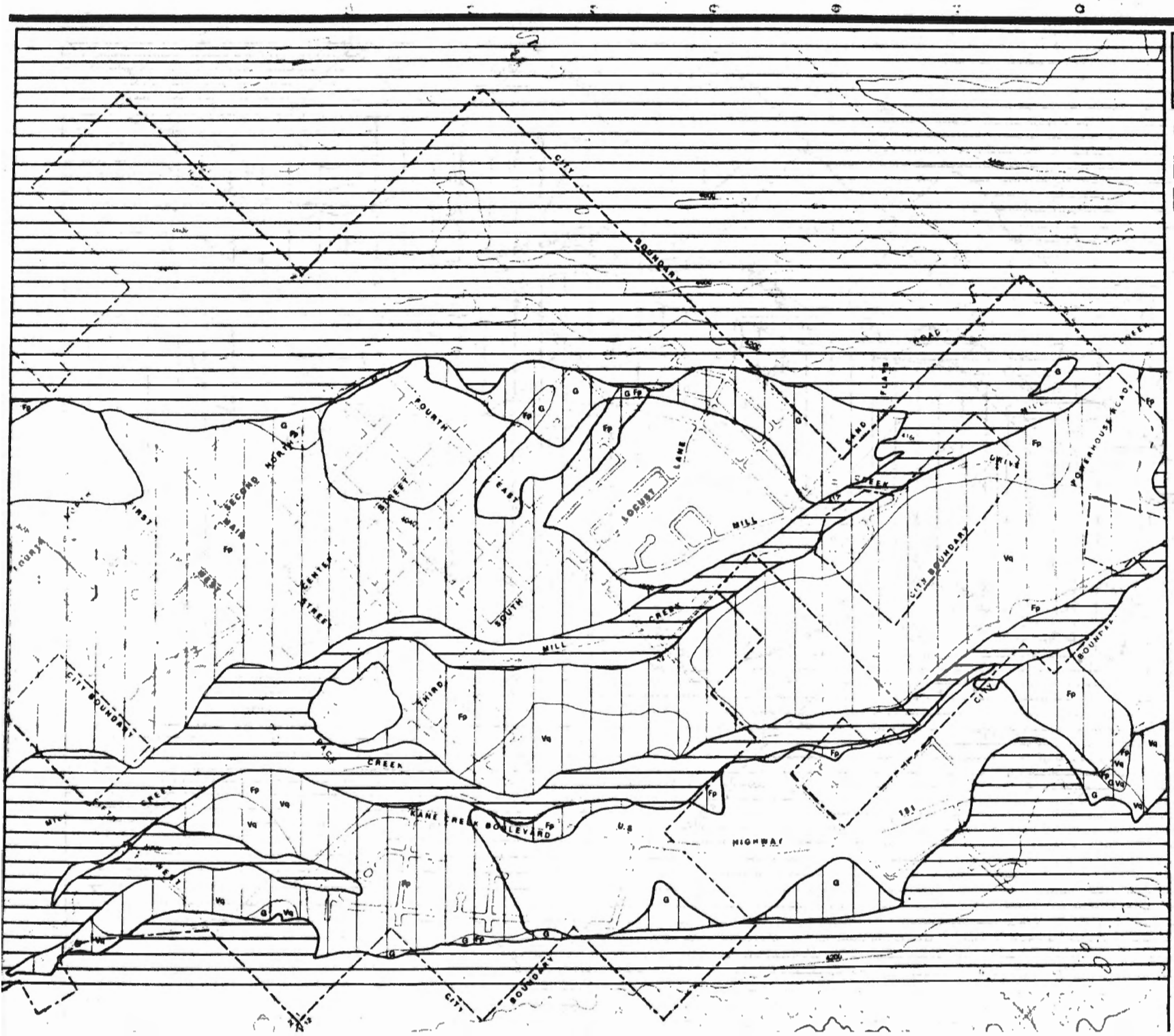
The goals of the private owner and the developer are often divers. This model will help serve the community by insuring a measure of safety and preserving the elements that help Moab remain a place of distinction and a nice place to live.

INDUSTRY/COMMERCIAL (map 13)

Areas suitable for industrial and commercial development are delineated with regards to both attractive and vulnerable areas. The Industry and the Commercial Land Use map (2) was overlaid with the Surface Water Systems (8), Geologic Hazards (9), and Visual Assessment (10) maps in order to determine areas suitable, restricted, or unsuitable for location of industrial development.

Restricted zones are those areas that require mitigation in order to minimize negative impacts and/or ensure public health, safety, and welfare. In many cases, restricted zones necessitate additional costs for development. For example, locations within talus fallout zones might require additional bank stabilization prior to development.

Unsuitable zones delineate areas that are unattractive due to economic reasons, and those locations that jeopardize public health, safety, and welfare.



MOAB

UTAH

SUITABILITY RESIDENTIAL

SUITABLE

RESTRICTED
Vq = VISUAL QUALITY
Fp = 100 YEAR FLOOD PLAIN
G = GEOLOGIC CAUTION

UNSUITABLE

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MICHAEL FERRARA — JOHN GARDNER
MICHAEL WARNER — KATHLYN COLLINS

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0 500 1000

FEET

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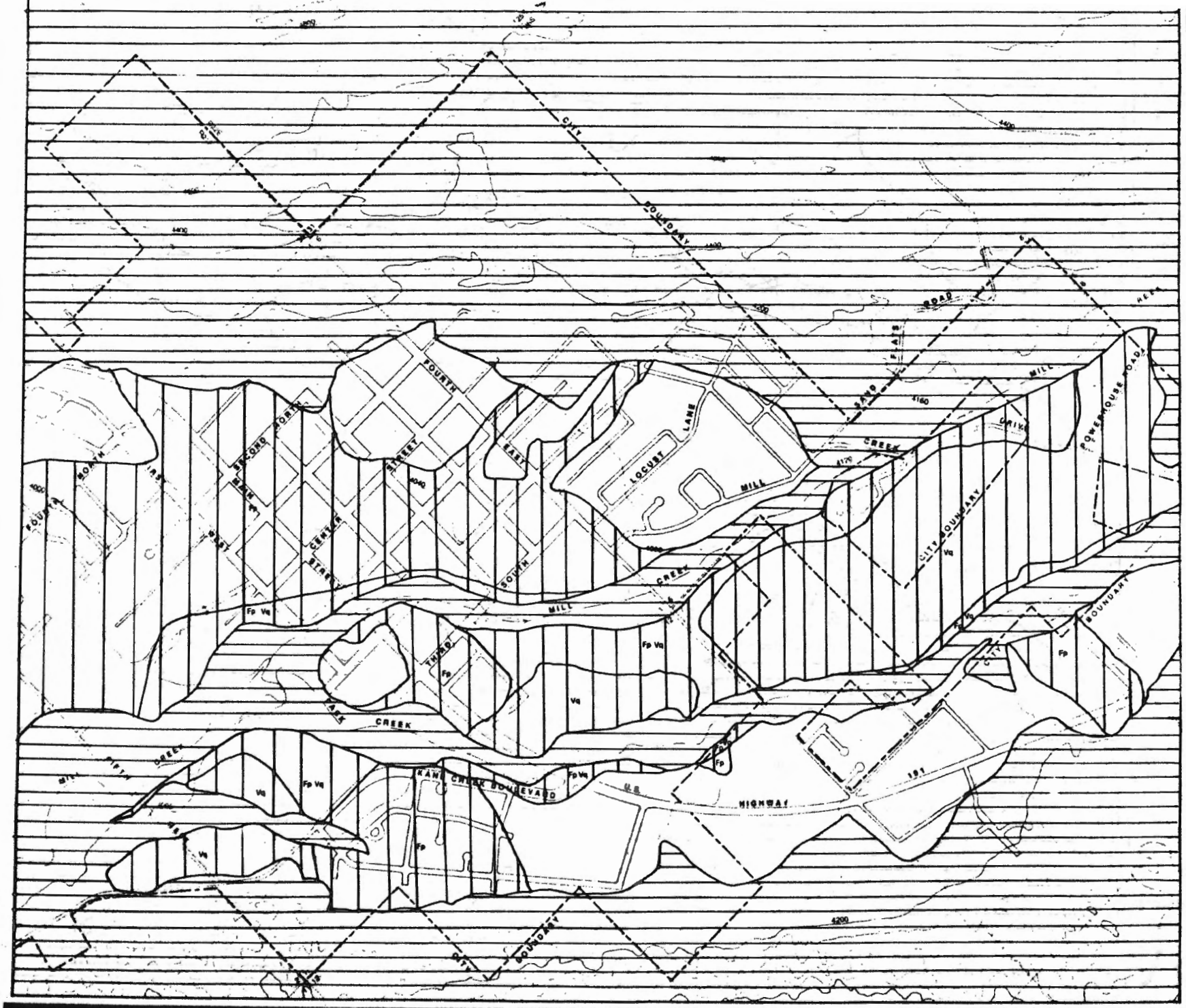
26



MOAB

SUITABILITY COMMERCIAL & INDUSTRIAL

SUITABLE

RESTRICTED
Vg = vegetation Fp = flood plain

UNSUITABLE

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LIZA STAC
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MICHAEL WARNER

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FEET

It is important to note that the suitability map should only be interpreted at a general level. The areas delineated are meant as estimates and are subject to change according to current land-use and site-specific evaluations.

PUBLIC FACILITIES (map 14)

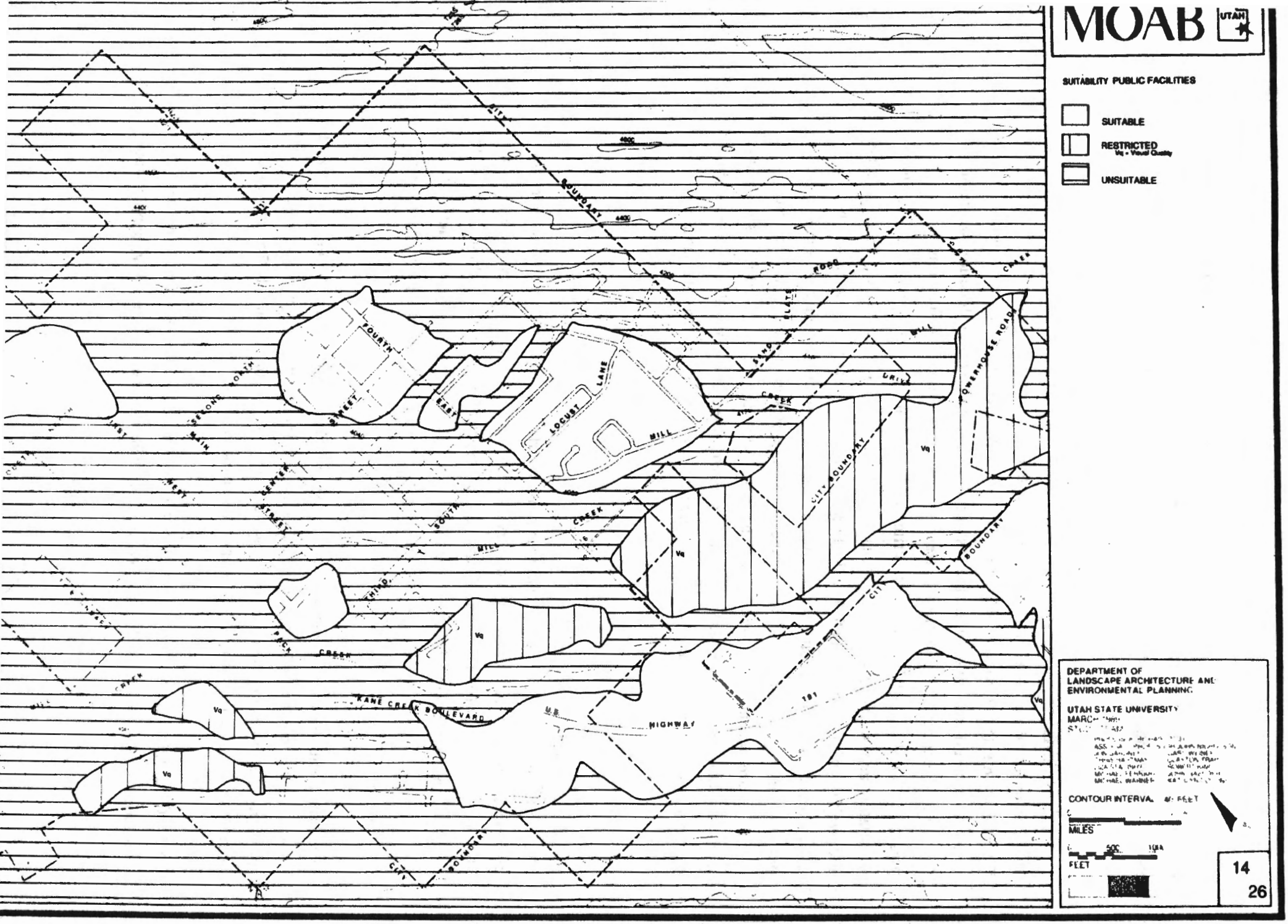
The Public Facilities Land Use map (3) was overlaid with the Surface Water Systems (8), Geologic Hazards (9), and Visual Assessments (10) maps, in order to determine areas suitable, restricted, or unsuitable for location of public facilities. Location in a restricted area is acceptable with modifications as prescribed in the visual assessment criteria. If potential sites are desired in the unsuitable zones, careful consideration should be made to insure the health, safety and welfare of the public before a location decision is reached. Location in unsuitable areas may result in serious impacts. As with all other potential developments, field investigations should be undertaken before final location decisions are reached. It should also be noted that the public facilities suitability maps do not take current land use into consideration and careful evaluation should be made so that these facilities are located in areas with compatible land use adjacencies.

TRANSPORTATION (map 15)

The suitability map was compiled using an overlay of the attractiveness map for transportation and the environmental evaluation models. This gives as a product the locations that are best suited for any transportation activity without regard to size or land use compatibility. This should be taken from the specific activity requirements. It is imperative that proper land uses and planning measures be utilized.

This final suitability map would have to be overlaid with a current land use map to eliminate the chances of improper placement of the proposed activity. The planning commission should utilize resident experts in the field of the proposed activities and current city and county ordinances.

With the implementation of the previous maps the city of Moab can provide a transportation system which can become an efficient tool for moving people and


MOAB
UTAH
SUITABILITY PUBLIC FACILITIES
SUITABLE
RESTRICTED
Vq = Visual Quality
UNSUITABLE
FOURTH EAST STREET
LOCUST LANE
MILL CREEK
POWERHOUSE ROAD
CITY BOUNDARY
MAIN STREET
SECOND SOUTH
PACK CREEK
KANE CREEK BOULEVARD
U.S. HIGHWAY 191
Vq
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MILES
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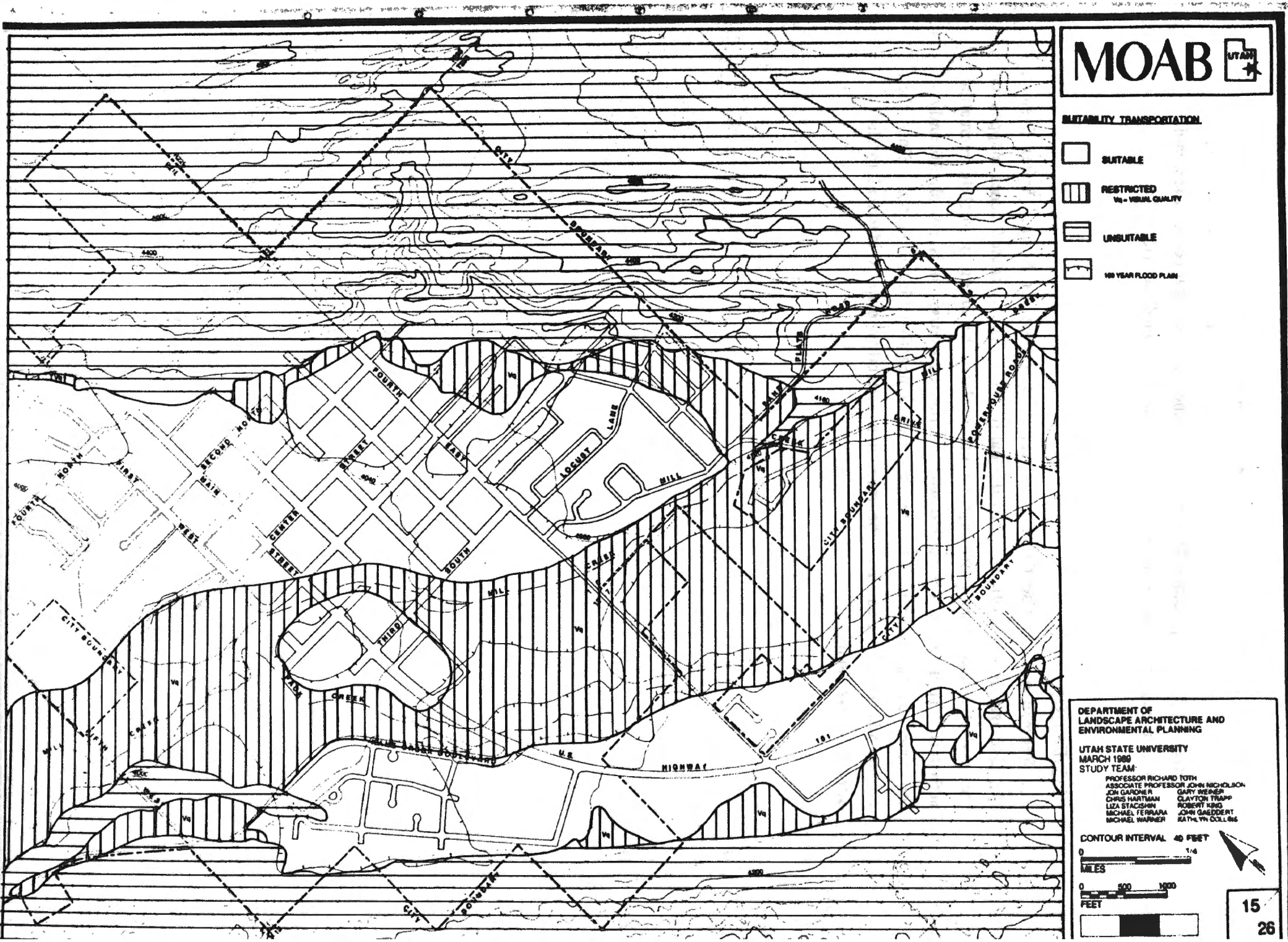
14
26


MOAB
UTAH
SUITABILITY TRANSPORTATION
SUITABLE
RESTRICTED
Vq - VISUAL QUALITY
UNSUITABLE
100 YEAR FLOOD PLAIN
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CLAYTON TRAPP
LIZA STACISHIN
ROBERT KING
MICHAEL FERRARA
JOHN GAEDDERT
MICHAEL WARNER
KATHLYN COLLINS
CONTOUR INTERVAL 40 FEET
0 1/4
MILES
0 500 1000
FEET
15
26

goods in a timely manner, as well as integrating into the city with as minimal a negative impact as possible This eliminates the need to changes courses mid-stream to rectify negative attributes of a poorly planned activity.

RECREATION

The Recreation Land Use Criteria was reviewed against the Surface Water Systems (8), Geologic Hazards (9), and Visual Quality (10). The restricted zones mapped on the environmental criteria overlays do not exclude the siting of mobile recreation activities. Trail use is compatible with riparian corridors; it is not significantly threatened by falling talus nor does it create a negative visual impact. Since there are no additional exclusions, the recreation suitability map is identical to the attractiveness map.

PROPOSED DEVELOPMENT PLAN (map 16)

After the suitability maps and models were compiled, a Proposed Development Plan was formulated. The purpose of this plan is to locate the best appropriate land for each activity. Although much of the land in Moab is suitable for a variety of activities the plan focuses not only on suitability but on current land use. The plan also focuses on broad development areas rather then specific development proposals.

The goals of the plan are:

1. Enhance Moab as a great place to live.
2. Follow proposed activity and suitability models.
3. Ensure future economic development possibilities.

The plan in no way, suggests that existing features that are not compatible with the proposed plan be removed. The plan merely is an outline for future development activities. It may, however, be appropriate when lands become available, that the city purchase options so that they can be made available to developers for future considerations.

The plan does not stress one type of development over another but tries to combine activities into a cohesive unit. The plan suggests the best land for the most appropriate uses. Because effort was made to identify the most appropriate lands for each activity, they should be given first priority when an activity is to be sited.

If an activity is to be considered outside its preferred location, careful consideration should be made to assess its impacts and mitigation requirements determined. If this plan is to be used as a tool for any rezoning efforts, site specific studies should be undertaken before such action is taken.

The goals of the plan are articulated in the following objectives:

PLANNING AND DESIGN OBJECTIVES FOR TOURISM AND COMMUNITY DEVELOPMENT OF MOAB

OBJECTIVE ONE: DEVELOPMENT SHOULD BE COMPATABLE WITH MOAB'S LIFESTYLE

1. Moab must remain a working /living town while sharing its culture and surrounding natural beauty. Tourist attractions should integrate into the community and not spoil Moab's character

2. Moab residents must be able to continue small town lifestyle even though tourism is increasingly accomodated. Tourist activity impact on neighborhoods and local access should be minimized.

3. Pressure to build more tourist spots will increase and may infringe on local citizen's 'special' places. These places must first be identified and then continued local access to and use of these highly valued places should be preserved.

OBJECTIVE TWO: PROMOTE TOURISM AND DEVELOPMENT THAT IS CONSISTENT WITH MOAB'S COMMUNITY HERITAGE.

Promote the historical and support the current cultural aspects of the community.

HISTORICAL:

1. Native American Culture
2. Mormon Settlement
3. Mining and Ranching
4. Early Trails and Colorado River crossing

ACTIVE CULTURAL:

1. National Parks and Other Public Lands
2. Whitewater River Running and other outdoor recreational activities
3. Diverse Population
4. Artist Community
5. Movie Industry

OBJECTIVE THREE: COMMUNITY DEVELOPMENT PROCESS SHOULD BE LONG TERM

Development will not occur all at once. There will be surges of interest and economic development. A long term approach is vital to keep track of the communities goals and be selective for quality of development. The question should continually be asked: How will this benefit Moab in the short and long run? Sometimes the idea that strict land use controls or development standards are detrimental to attracting businesses. It has been demonstrated that this is not necessarily the case. If that developer is really interested in the quality of life for Moab and not just scouting a town to take advantage of their lenient controls, they will show it through cooperation with reasonable standards and regulations. It is also in their interest to be assured that they will be protected

in the future from neighboring incompatible land uses and change in the quality of life for their employees.

OBJECTIVE FOUR: MOAB'S SMALL TOWN CHARACTER SHOULD BE ENHANCED AND PROTECTED

To enhance the town character, an acceptable balance must be struck between change and preservation.

1. Architecture should reflect the independent lifestyles and unobtrusively reinforce Moab's past.

2. Buildings and details should be consistent with small town, human scale.

3. Public space should be provided to serve as the 'front porch' of the town to welcome tourists and accomodate the local citizens.

4. No private development should be allowed that prevents access to the local citizen's 'special' places.

5. Natural features should be preserved visually and functionally. This includes: Pack Creek, Mill Creek and their tributaries, the Colorado River and its wetlands, the cliffs and mesas enclosing Spanish Valley, the LaSal Mountains, and strategic agricultural open spaces. Since the regional landscape is the reason many live in or visit Moab, concern should also extend to the degredation that is the result of activities on public lands beyond Spanish Valley confines.

6. Intrigue and excitment created for the auto user and the pedestrian.

7. Additional site details subject for review such as lighting, signage, street furnishings and plantings.

Adapted from: Randy Hester, et al. 1981. Guide for Development: Public Report Three. Town of Manteo, North Carolina.

The following activities have been located on the proposed development plan:

1. COMMERCIAL- Proposed areas are near other existing commercial facilities which will help keep the business district area cohesive and within walking distance.

2. INDUSTRIAL- Proposed sites are located on primary roads, away from other conflicting activities. Visual sensitivity will be necessary in siting industrial locations.

3. RESIDENTIAL- Proposed areas are either adjacent to existing residential areas or meet site requirements as outlined in the residential activity model.

4. PUBLIC FACILITIES- Areas best suited are those that are out of the flood plane,(including the 100 year flood) away from geologic hazards, and are on primary or secondary roads.

5. TRANSPORTATION- The plan proposes a bypass with some local street modifications, where an additional street takes traffic from Mill Creek Road and funnels it directly to the downtown business district.

6. RECREATION- The plan outlines proposed linear recreation corridors for pedestrians and bicyclists in town and in the stream corridors and proposes a change in the softball complex to a community park used as a gathering place and community events.

ANNEXATION GUIDE

Annexation, the traditional method for expanding the boundaries of municipalities, is a controversial issues in the State of Utah. The potential for conflict is greatest when the achievement of the goals and objectives of two or more municipalities is dependent upon their ability to expand into the same urban fringe areas. This concern, although real for many Utah communities is not manifested in Moab. Nonetheless, annexation in Moab is an issue.

Generally, areas are annexed by a region to insure future development or to protect a given amenity. In many respects this is a necessary realism for the city of Moab. Areas worthy of protection from development potentially include: the redrock cliffs to the east and west of Moab, the riparian areas along Mill and Pack Creek, and the wetland area on the north-side of Moab along the Colorado River. Areas worthy of development and, therefore,

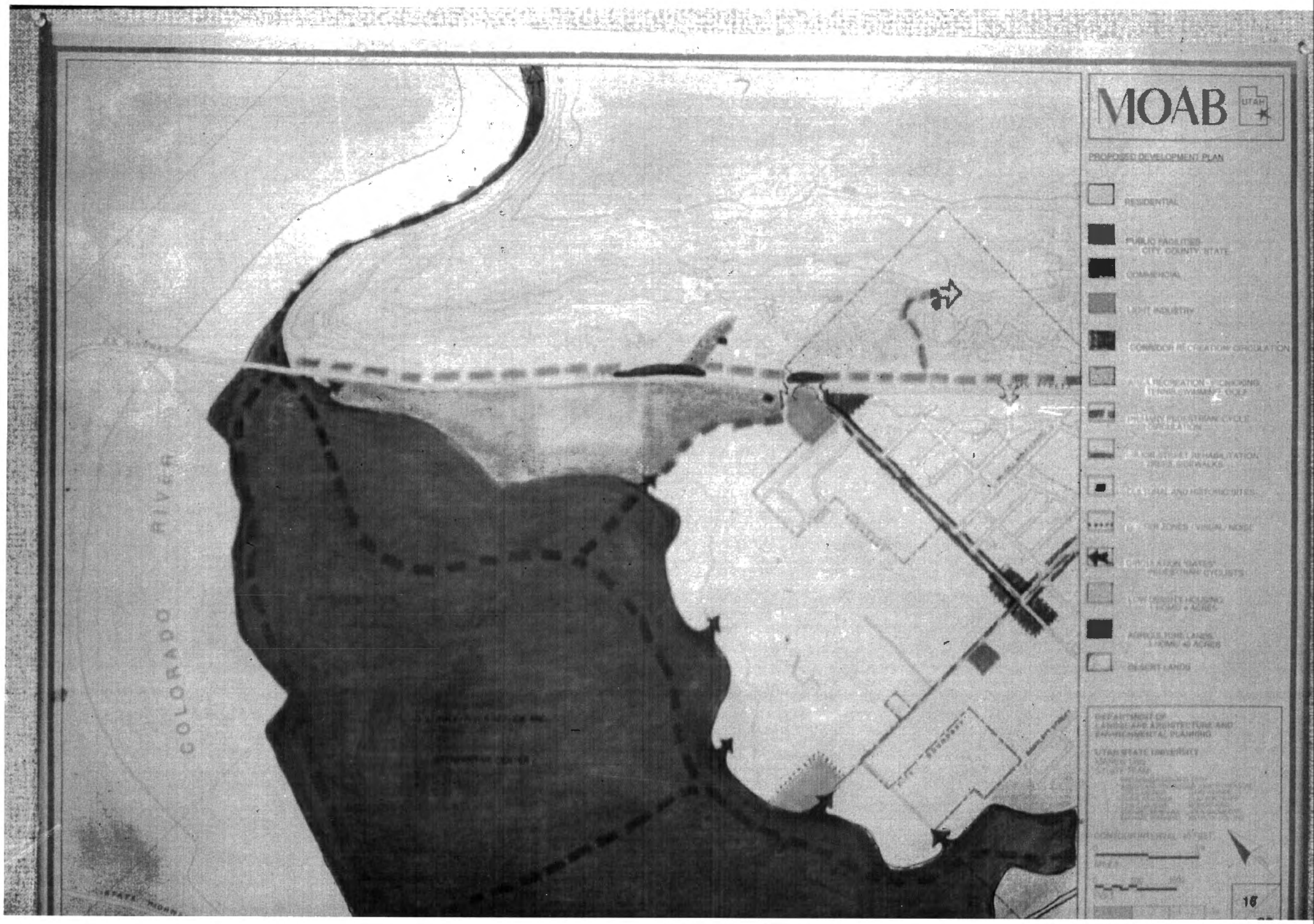
worthy of annexation potentially include: parcels of land along highway 191, Mill Creek Drive and Kane Creek Boulevard.

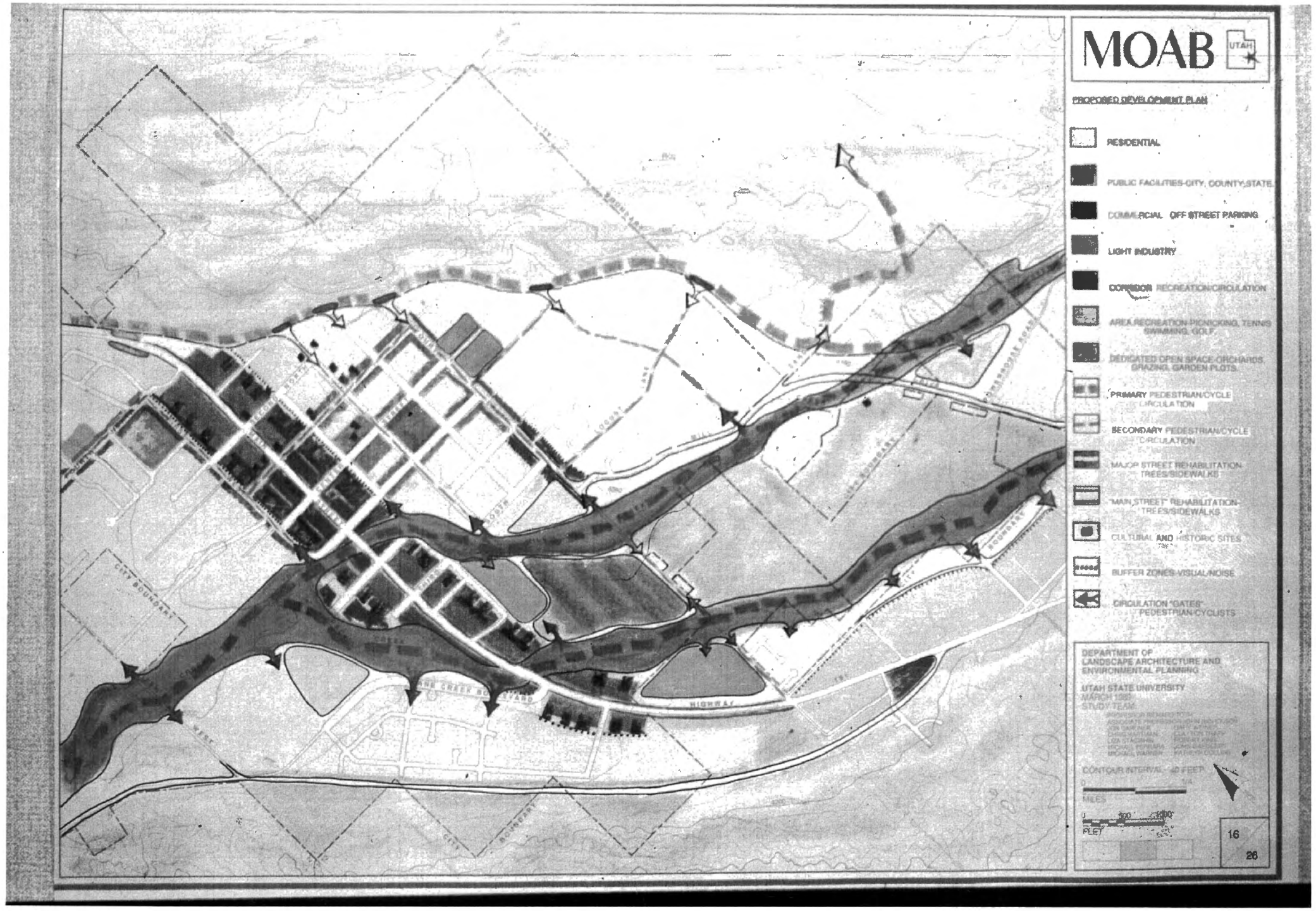
Annexation is not without its responsibilities. Services to annexed areas, are typically required, including police protection, sewage treatment, domestic water service and solid waste disposal. Consequently, Moab civic leaders should be aware of the many pros and cons associated with annexation.. There are laws to be considered as well.

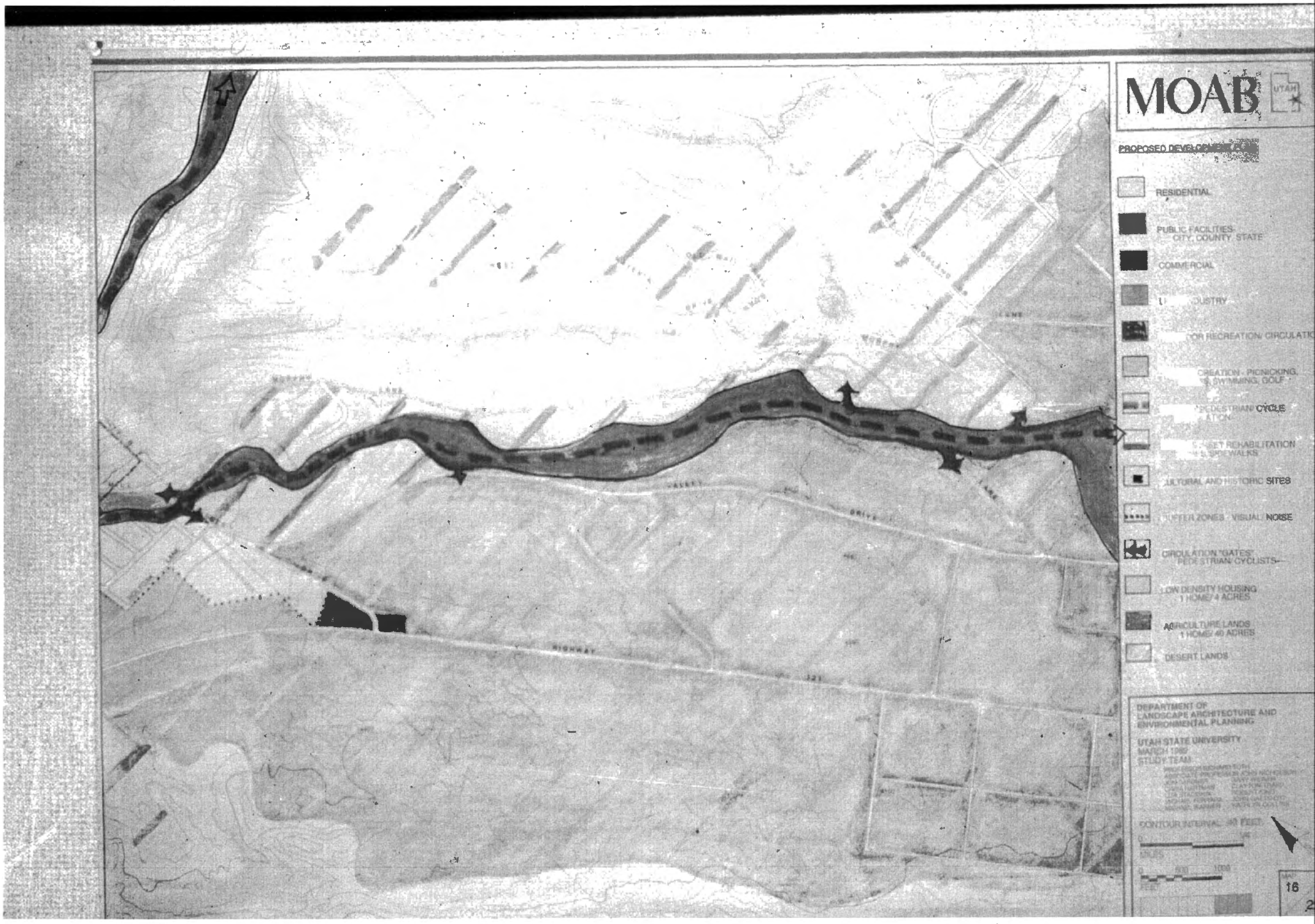
Major features of Utah's 1979 Annexation Laws include:

* establishes a state policy on annexation (10-2-401 UCA)
* provides for the creation of local boundary commissions (10-2-402 UCA)
* requires municipalities to prepare and adopt "policy declarations" with regard to annexation of five acres or more (10-2-414 UCA)
* establishes annexation standards and procedures (10-2-414 through 417 UCA)
* grants permission for municipal-initiated annexations of islands and peninsulas (10-2-420)
* provides a process for appealing the decisions of the boundary commissions (10-2-412 UCA)
* grants municipalities a limited form of extraterritorial jurisdiction on new urban developments within one-half mile of their boundaries (10-2-418 UCA)
* allows municipalities to adjust common boundaries (10-2-421 UCA)
* provides that general obligations and revenue bonds will not be jeopardized by boundary adjustments (10-422 UCA)
* places a one-year limitation on challenges to annexation (10-4-23 UCA)

(SOURCE: The Annexation Process and Your Local Government: an outline of the processes set forth in the Local Boundary Commission Act of 1979, 43rd General Session of the Utah State Legislature, Salt Lake City, June 30, 1979.).


MOAB
UTAH
PROPOSED DEVELOPMENT PLAN
RESIDENTIAL
PUBLIC FACILITIES
CITY, COUNTY, STATE
COMMERCIAL
LIGHT INDUSTRY
CORRIDOR RECREATION CIRCULATION
COLORADO RIVER
DEPARTMENT OF
LANDSCAPE ARCHITECTURE AND
ENVIRONMENTAL PLANNING
UTAH STATE UNIVERSITY
16


MOAB
UTAH
PROPOSED DEVELOPMENT PLAN
RESIDENTIAL
PUBLIC FACILITIES-CITY, COUNTY, STATE
COMMERCIAL OFF STREET PARKING
LIGHT INDUSTRY
CORRIDOR RECREATION/CIRCULATION
AREA RECREATION-PICNICKING, TENNIS SWIMMING, GOLF
DEDICATED OPEN SPACE-ORCHARDS, GRAZING, GARDEN PLOTS
PRIMARY PEDESTRIAN/CYCLE CIRCULATION
SECONDARY PEDESTRIAN/CYCLE CIRCULATION
MAJOR STREET REHABILITATION-TREES/SIDEWALKS
"MAIN STREET" REHABILITATION-TREES/SIDEWALKS
CULTURAL AND HISTORIC SITES
BUFFER ZONES-VISUAL/NOISE
CIRCULATION "GATES" PEDESTRIAN/CYCLISTS
DEPARTMENT OF LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL PLANNING
UTAH STATE UNIVERSITY
MARCH 1980
STUDY TEAM
CONTOUR INTERVAL 40 FEET
MILES
FEET
16
26


MOAB
UTAH
PROPOSED DEVELOPMENT PLAN
RESIDENTIAL
PUBLIC FACILITIES: CITY, COUNTY, STATE
COMMERCIAL
INDUSTRY
OR RECREATION CIRCULATIO
CREATION - PICNICKING, SWIMMING, GOLF
PEDESTRIAN/CYCLE ATION
ET REHABILITATION S, SIDEWALKS
ULTURAL AND HISTORIC SITES
BUFFER ZONES - VISUAL NOISE
CIRCULATION "GATES" PEDESTRIAN/CYCLISTS
LOW DENSITY HOUSING 1 HOME/ 4 ACRES
AGRICULTURE LANDS 1 HOME/ 40 ACRES
DESERT LANDS
DEPARTMENT OF LANDSCAPE ARCHITECTURE AND ENVIRONMENTAL PLANNING
UTAH STATE UNIVERSITY
MARCH 1980
STUDY TEAM:
CONTOUR INTERVAL 40 FEET
0
500
1000
FEET
16

APPENDIX A
LAND USE CRITERIA AND DATA NEEDS

PUBLIC FACILITIES

Description

Hospitals and Clinics

General Space Standards

- 1,000 sq. ft. / doctor.
- 3 parking spaces/doctor.

Site Requirements

- 3 acres or larger.
- 30 parking spaces minimum.
- slopes 1% - 10%.
- soil depth 10' or greater to debrock.
- depth to water table 10' or greater.
- avoid geological hazards.

Service and Access Requirements

- daily services should be readily available.
- daily garbage removal.
- easy access to a major highway or traffic arteries.
- special handling of infected waste.
- close proximity to residential area.

Improvements

- all utilities.
- additional acreage for expansion.
- paved access and parking.

Necessary Support Activities

- housing units for base population.
- transportation services. (private ambulance service)

Complimentary Activities

- residential
- quiet recreational
- business area (pharmacy, hospital equipment rental, etc.)

Conflicting Activities

- all other activities.

PUBLIC FACILITIES

Description

High School, Junior High School

General Space Standards

- 40 to 42 acres (1800 students)
- 1 mile radius served by bus service.
- 1 parking space per class plus 16

Site Requirements
- slopes 1 - 10%.
- soil depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater.
- location in close proximity to housing areas.

Service and Access Requirements
- near main traffic artery but not on it.
- central location near other community facilities.
- all services.
- paved access and parking.
- service access.

Improvements
- all utilities.

Necessary Support Activities
- housing units for base population.
- public library branch
- playfield or activity park.

Complimentary Activities
- schools
- residential areas.
- low-scale shopping area.

Conflicting Activities
- industrial
- agricultural
- business center
- heavy traffic loads

PUBLIC FACILITIES

Description
Elementary School

General Space Standards
- 12 to14 acres (800 students)
- 1/2 mile radius served by bus service.

Site Requirements
- slopes 1 - 10%.
- soil depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater.
- location in close proximity to housing areas.

Service and Access Requirements

- near main traffic artery but not on it. (students shouldn't have to cross main artery)
- centrally located.
- drop-off/pick-up area.
- paved access and parking.
- service access.
- large open area for variety of activites. (small park or playground)

Improvements

- all utilities.

Necessary Support Activities

- housing units for base population.
- public library branch
- playfield or activity park.

Complimentary Activities

- schools
- residential areas.
- low-scale shopping area.

Conflicting Activities

- industrial
- agricultural
- business center
- heavy traffic loads

PUBLIC FACILITIES

Description

Public Library Branch

General Space Standards

- 2 acres (4,000 sq. ft. for 20,000 volumes)
- parking for 20 cars.

Site Requirements

- slopes 1 - 10%.
- soil- depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater.

Service and Access Requirements

- easily accessible, preferable on main thoroughfare.
- near neighborhood center.
- near sub-shopping area.
- near transportation arteries.

- all services.
- paved access and parking.
- service access.

Improvements
- all utilities.

Necessary Support Activities
- housing units for base population.

Complimentary Activities
- schools
- residential areas.
- low-scale shopping area.
- park
- business area
- neighborhood center.

Conflicting Activities
- industrial

PUBLIC FACILITIES

Description
Fire Station

General Space Standards
- 2 acres includes parking (2 engine station)

Site Requirements
- slopes 1 - 10%.
- soil- depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater - not on a hill
- not restricted by any natural barriers.
- central location.
- near high value district.
- near high density district.

Service and Access Requirements
- not on a heavily trafficed street.
- not on a one-way street. - on an intersection.
- near a main artery and highway.
- all services.
- paved access.

Improvements
- all utilities.

Necessary Support Activities
- housing units for base population.

Complimentary Activities
- commercial
- industrial

Conflicting Activities
- schools
- hospitals

PUBLIC FACILITIES

Description
Church

General Space Standards
- 2 or 3 acres
- parking for 200 cars.

Site Requirements
- slopes 1 - 10%.
- soil- depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater.

Service and Access Requirements
- easy pedestrian access.
- all services.
- service access.

Improvements
- all utilities.

Necessary Support Activities
- housing units for base population.(100 units per)

Complimentary Activities
- schools
- residential areas.
- park

Conflicting Activities
- industrial
- central business district

PUBLIC FACILITIES

Description

Government Offices and Police Station

General Space Standards

- 1 - 4 acres (size varies as to number of offices)
- 1 parking space/ 150 sq. ft. office area.

Site Requirements

- slopes 1 - 10%.
- soil- depth to bedrock 10' or greater.
- avoid geological hazards.
- depth to water table 10' or greater.
- near or in central business district.

Service and Access Requirements

- near access to main traffic artery.
- all services.
- service access.

Improvements

- all utilities.

Necessary Support Activities

- central business district.

Complimentary Activities

- most institutions
- business area

Conflicting Activities

- industrial
- agriculture

Visual Quality of Activity

- neutral

COMMERCIAL/CLUSTER DEVELOPMENT

Definition: A cluster development is a group of buildings separated by pedestrian malls or courtyards and generally grouped around a single tenant McKeever, 1973).

General Space Standards

30.000 to 100,000 square feet (McKeever, 1973,p.10).
4-10 acres including parking (McKeever, 1973, p.10).
5.5 parking spaces per 1000 square feet of leasable area.

Site Requirements

Slopes 1-10% varying with design characteristics.
Soil depth 10 feet or greater to bedrock.
Depth to water table 5 feet or more.
Site not divided by highways and streets.
Zoning must allow for development.

Service and Access Reguirements

Locate at collector street intersections.
Avoid having principle traffic access by means of local neighborhood streets.
Close proximity to residential areas with buffering in between.
Easy access for daily services.
Service facility separate from customers.
Allow for vehicular, bicycular, and pedestrian access for customers.

Improvements/Present and Future

Additional area for future expansion.
Electrical, sewer and water utilities necessary to development.
Landscaping for visual and sound buffer zones.
Good circulation for vehicles, bicycles, and pedestrians.

Necessary Support Activities

Serves a trade area of 5,000 to 40,000 people (McKeever, 1973, p.10)
Public services

Complementary Activities

Restaurants, bars, motels, service stations, offices, banks, maintained green spaces.

Conflicting Activities

Industrial, Agricultural
Recreational, Residential, and public facialities with mititgation.

Visual Quality of Activity

May vary depending upon design characteristics, materials and landscaping.

Data Needs

Maps: Geology, Flood Plains, Circulation, Soils, Zoning, Hydrology, Land Use

Models: Visual, Geologic Haxards, Air Quality, Flood Hazard, Riparian, Circulation, Vegetation, Annexation.

COMMERCIAL/STRIP DEVELOPMENT

Definition: A strip development is a straight line of stores tied together by a canopy over the pedestrian walk extending along the entrance fronts to the store. Usually a supermaket or drugstore are placed at either end of the strip (McKeever,1973).

General Space Standards

May vary depending upon size and scale of development.
5.5 parking spaces per 1000 square feet of leasable area.

Site Requirements

Slopes 1-10% varying with design characteristics.
Soil depth 10 feet or greater to bedrock.
Depth to water table 5 feet or more.
Site must be divided by highways and streets.
Zoning must allow for development.

Service and Access Requirements

Locate at collector street intersections.
Avoid having principle traffic access by means of local neighborhood streets.
Close proximity to residential areas with buffering in between.
Easy access for daily services.
Service facility separate from customers.
Allow for vehicular, bicycular, and pedestrian access for customers.

Improvements/Present and Future

Fill in vacant land adjacent to existing development.
Additional area for future expansion.
Electrical, sewer and water utilities necessary to development.
Landscaping for visual and sound buffer zones.
Good circulation for vehicles, bicycles, and pedestrians.

Necessary Support Activities

Serves a trade area of 5,000 to 40,000 people (McKeever, 1973, p.10)
Public services

Complementary Activities

Restaurants, bars, motels, service stations, offices, banks, maintained green spaces.

Conflicting Activities

Industrial, Agricultural
Recreational, residential, and public facialities with mititgation.

Visual Quality of Activity

May vary depending upon design characteristics, materials and landscaping.

Data Needs

Maps: Geology, Flood Plains, Circulation, Slope, Hydrology, Land Use, Zoning
Models: Visual, Geologic Hazards, Air Quality, Flood Hazard, Riparian, Circulation, Vegetation, Annexation.

COMMERCIAL OFFICES/PROFESSIONAL AREA

Definition: A commercial office park is a cluster of offices structures having characteristics of a planned unit development (McKeever, 1973).

General Space Standards

May vary depending upon size and scale of development.
2.5 parking spaces per 1000 square feet of leasable area.

Site Requirements

Slopes 1-10% varying with design characteristics.
Soil depth 10 feet or greater to bedrock.
Depth to water table 5 feet or more.
Site must be divided by highways and streets.
Zoning must allow for development.

Service and Access Requirements

Avoid having principle traffic access by means of local neighborhood streets.
Easy customer access.
Easy access for daily services.
Service facility separate from customers.
Convenient travel time to residential areas, shopping area, airports.

Improvements/Present and Future

Additional area for future expansion.
Electrical, sewer and water utilities necessary to development.
Landscaping for visual and sound buffer zones.

Necessary Support Activities

Residential population sufficient to support the scale of the development.
Public services

Complementary Activities

Restaurants, motels, service stations, banks, shopping centers.

Conflicting Activities

Industrial, Recreational

Visual Quality of Activity

May vary depending upon design characteristics, materials and landscaping.

Data Needs

Maps: Geology, Flood Plains, Circulation, Slope, Hydrology, Land Use, Zoning
Models: Visual, Geologic Hazards, Air Quality, Flood Hazard, Riparian, Circulation,
Vegetation, Annexation.

RESIDENTIAL MODEL

Activity description

Low density housing
Single family housing detached

Site Requirements

Utility Access
Reasonable slopes(less than 25%)
Water table deeper than 5 feet
Sense of community
Safe geologic formations

Service and Access Requirements

Close to secondary roads
Primary school and other facilities in the area.
Utilities available

Improvements

Utilities
Road access large enough for emergency vehicles
Sewage hook-up or on site septic

Necessary Support Activities

Sense of community
Social facilities
Public Services Emergency, snow removal etc.
Schools

Complementary Activities

Gardening
Plant production
Open Space
Parks
circulation routes

Conflicting Activities

Excessive noise
Strong smells and pollution
Excessive traffic and congestion

Visual Quality of Activity

Variable

Data Needs

Geology
Hydrology
Soil Survey
Slope

RESIDENTIAL MODEL

Activity description

High density housing.
Multiple family units and trailer parks

Site Requirements

Utility Access
Reasonable slopes(less than 25%)
Water table deeper than 5 feet
Sense of community
Sewer and utility hook-up
Safe geologic formations

Service and Access Requirements

Close to secondary roads
Primary school and other facilities in the area.
Utilities available

Improvements

Utilities
Road access large enough for emergency vehicles
Sewage hook-up or on site septic
Adequate parking

Necessary Support Activities

Sense of community
Social facilities
Public Services Emergency, snow removal etc.
Schools
Trash removal
Secondary road system

Complementary Activities

Public Services & business district
Open Space
Parks
Circulation routes

Conflicting Activities

Excessive noise
Strong smells and pollution
Heavy Industry

Visual Quality of Activity

Variable

Data Needs

Geology
Hydrology
Soil Survey

Engineering specifications
Slope

TRANSPORTATION

ROADS AND HIGHWAYS

General Space Requirements

- surface width - a 24' surface is 2 - 12' lanes with 8' shoulders
- length in miles

Site Requirements

- slope - 7% - 10% maximum
- soils- permeable, sand and gravel preferred.
- vegetation density and type- open as possible.
- geology- depth to bedrock should be considered.
- existing land use.
- conflicts and obstacles- water, faults, mountains.
- orientation - east/southeast, south/southwest, and west/northwest

Service and Maintenance Requirements

- road maintenance staff and facilities.
- gravel, oil, and materials.
- plowing, grading, resurfacing.

Improvements

- roads adequate with improvements.
- priority based on use, condition, and need.
- industrial access.
- bridge repairs.
- public transit.

Complimentary Activities

- residential
- industrial
- commercial

Conflicting Activities

- agricultural lands
- residential
- wildlife
- vegetation

TRANSPORTATION

RAILROADS

General Space Requirements

- tracks - 10'.
- right of way - 100' minimum.
- spurs to major industry.
- maintenance facilities.
- stations.

Site Requirements

- slope - 7% - 10% maximum
- slope 0% - 8% optimum.
- soils - no clays or extreme freeze thaw potential.
- orientation for maximum sun-time.
- vegetation - not densely wooded.
- depth to bedrock - to avoid excessive blasting.
- hydrology - subsurface and surface.

Service and Maintenance Requirements

- road maintenance staff and facilities.
- ties, tracks, and right of ways.
- access roads.
- repair facilities.

Improvements

- utilize defunct and existing tracks.
- commuter service.
- Amtrack connection.
- road crossings.

Complimentary Activities

- commercial

Conflicting Activities

- agricultural lands
- agriculture
- residential
- roads
- vegetation
- wildlife
- recreation

TRANSPORTATION

AIR

General Space Requirements

- runway length - 5200' - 5900', width - 100' - 150'.
- landing clearance (no wires, houses, etc.)
- access and parking.
- hagars.
- passenger and cargo terminals.
- tower.
- aircraft parking.

Site Requirements

- slope - 7% - 10% maximum
- see site requirements for roads.

Service and Maintenance Requirements

- road maintenance staff and facilities.
- all utilities.
- fuel.
- runway maintenance.

Improvements
- ILS system
- tower
- length of runway
- larger aircraft

Complimentary Activities
- freight delivery
- commerce

Conflicting Activities
- agricultural lands
- agriculture
- residential
- recreational

TRANSPORTATION

BIKEWAY

General Space Requirements
- none

Site Requirements
- slope - 7% - 10% maximum
- slope not greater than 5%.
- stable soils.

Service and Maintenance Requirements
- road maintenance staff and facilities.
- proximity to roads.

Improvements
- signage, paved paths, bike racks, traffic control.

Necessary Support Activities
- existing roadways for urban bike lanes.

Complimentary Activities
- all land use activites
- all fixed recreation activities

Conflicting Activities
- agricultural lands

- hunting

Visual Quality
- neutral

Data Needs
- slope
- land use
- circulation

TRANSPORTATION

WALKING

General Space Requirements
- none

Site Requirements
- slope - 7% - 10% maximum
- grade less than 3%

Service and Maintenance Requirements
- road maintenance staff and facilities.
- proximity to secondary, tertiary or unimproved roads.

Improvements
- signage, rest areas or benches
- walkway maintenance.
- side-walk or hardened surface trail.

Necessary Support Activities
- recreation - fixed areas.

Complimentary Activities
- all recreation activities except hunting and ORV.
- residential, commercial, industrial and agriculture.

Conflicting Activities
- agricultural lands
- hunting and ORV.

Visual Quality
- neutral

Data Needs
- slope
- land use
- circulation

AGRICULTURE MODEL

Activity description

Plant Production.

Site Requirements

A space where it is economically feasible to grow and or maintain horticulture or agricultural crops.
Capability units I-V.
Suitable soils for plant growth.
Specific salt limits.
Specific soil texture.
Adequate amounts of topsoil.
Suitable pH levels (salt related).
Specific water holding capacity for non-irrigated fields.
Water availability for irrigated fields.
Adequate drainage for surface drainage.
Adequate percolation rate through the soil.

Service and Access Requirements

Rural road access during the growing season to accommodate farming and harvesting equipment.

Improvements

Rural roads

Necessary Support Activities

None on site

Complementary Activities

Open Space
Heavy industry
Animal production
Wildlife management
Industrial park
Recreation

Conflicting Activities

Urban sprawl

Visual Quality of Activity

Variable

Data Needs

Hydrology
Soil Survey
Contour map

AGRICULTURE MODEL

Activity description

Animal Production

Site Requirements

A space where it is economically feasible to raise animals.
Capability units I-VII.
Areas that are or can be bordered to limit access of animals to undesirable locations.
Have access to water on site.
Rural road access.

Service and Access Requirements

Rural road access year round.

Improvements

Rural roads.
Fences.
Light structures(Barns, sheds pens, corrals, hen houses, etc.,).
Water (if not available on site).

Necessary Support Activities

None on site
Food production and storage for some animals.

Complementary Activities

Farming
Open Space
Heavy industry
Wildlife management
Industrial park
Recreation
Sewage treatment (strong smells)

Conflicting Activities

Urban sprawl

Visual Quality of Activity

Variable

Data Needs

Hydrology
Soil Survey
Contour map
Access availability
Wind direction

AGRICULTURE MODEL

Activity description

Structures and out buildings (Homes are covered in residential information).

Site Requirements

Dry surface ground.
Rural road access.
Areas that provide suitable slope to construct a structure.
Adequate drainage and soil moisture to provide a dry surface.
Adjacent proximity to the structures functional use.

Service and Access Requirements

Rural road access year round.

Improvements

Rural roads.
Possibly electric, water, and gas hook-up.

Necessary Support Activities

Adjacent proximity to the structures functional use. (ie. Barns close to cattle. Shed with farm equipment close to cultivated fields.)

Complementary Activities

Farming
Animal production
Heavy industry
Industrial park
Recreation

Conflicting Activities

Open space plan
Wilderness

Visual Quality of Activity

Variable

Data Needs

Soil Survey
Contour map
Access availability
Flood plain

AGRICULTURE MODEL

Activity description

Strong Smells

Site Requirements

Down wind form residential developments and populated areas.

Service and Access Requirements

See animal production activity

Improvements

See animal production activity

Necessary Support Activities

None

Complementary Activities

Farming
Animal production
Heavy industry
Industrial park
Sewage treatment

Conflicting Activities

Urban and suburban areas
Recreation areas

Visual Quality of Activity

Usually poor

Data Needs

Seasonal weather data including wind direction

HEAVY INDUSTRY

Mining (extraction), construction, power and waste disposal.

General Space Standards

Areas that provide suitable slope to construct a structure; adequate drainage and soil moisture to provide a dry surface; 50 acres minimum, 400 acres average (Lynch, 1971, p.338).

Site Requirements

Slopes less than 5% (Lynch, 1971, p.339); slopes less than 2% where railroads are used (ibid.); soil depth to bedrock greater than 10 feet; dry surface ground: low shrink-swell, water table deeper than 10 feet (USDA, 1974, p. 166); free of geologic hazards and flood plains (Lautenbach, 1974, p.552, 556).

Service and Access Requirements

Close proximity to highways, traffic arteries and railroads (if available); daily service access.

Improvements

Parking; power, water, and sewer necessary for development; landscape buffer; noise buffer.

Necessary Support Activities

Light industry; transportation and circulation.

Complementary Activities

Industrial parks; open space; heavy commercial; heavy industrial; extraction industry.

Conflicting Activities

Variable.

Data Needs

Slopes (less than 5%), soils (shrink-swell potential, type, and permeability); hydrology (rivers and swales); geology (depth to bedrock and hazardous area floodplain, talus slopes, faults); and. existing land use (roads, accessibility, utilities, ownership and zoning).

Environmental

Not in critical wildlife winter range (Lautenbach et al., 1974, p.556); unique flora; wind patterns (inversions); aquifiers;down wind of population centers; and, typically, there are visual quality concerns (i.e., buffers).

LIGHT INDUSTRY

Art/cottage industry (small scale); assembly; hi-tech; recreation; food processing/agriculture production; and mail order (U.P.S. using companies).

General Space Standards

Areas that provide suitable slope to construct a structure; adequate drainage and soil moisture to provide a dry surface; adjacent proximity to the structures functional use.

Site Requirements

Slopes less than 5% (Lynch, 1971, p.339); soil depth to bedrock greater than 10 feet; dry surface ground: low shrink-swell, water table deeper than 10 feet (USDA, 1974, p. 166); free of geologic hazards and flood plains (Lautenbach, 1974, p.552, 556).

Service and Access Requirements

Close proximity to primary and secondary roads; daily service access.

Improvements

Parking; power, water, and sewer necessary for development; landscape buffer; noise buffer.

Necessary Support Activities

Transportation and circulation; adjacent proximity to the industries functional use (i.e., food processing close to agricultural fields).

Complementary Activities

Open space/vacant; agriculture; industrial; other industry.

Conflicting Activities

Residential; schools/churches; city and county facilities, commercial.

Data Needs

Slopes (less than 5%), soils (shrink-swell potential, type, and permeability); hydrology (rivers and swales); geology (depth to bedrock and hazardous areas-floodplain, talus slopes, faults); and. existing land use (roads, accessibility, utilities, ownership and zoning).

Environmental

Not in critical wildlife winter range (Lautenbach et al., 1974, p.556); unique flora; wind patterns (inversions); aquifiers;down wind of population centers; and, typically, there are visual quality concerns (i.e., buffers).

RECREATION FIXED SITE

PARKS

General Space Standards

NEIGHBORHOOD PARKS

Suggested space standards for various units within the park. The minimum size is five acres.

Activities vary depending on local conditions and needs.

Facility or Unit	Areas in Acres Park Adjoining School	Separate Park
Play apparatus area- preschool	.25	.25
Play apparatus area- older children	.25	.25
Paved multipurpose courts	.50	.50
Recreation center building	*	.25
Sports fields	*	5.00
Senior citizens' area	.50	.50
Quiet areas and outdoor classroom	1.00	1.00
Open or "free play" area	.50	.50
Family picnic area	1.00	1.00
Off-street parking	*	2.30**
Subtotal	4.00	11.55
Landscaping (buffer and special areas)	2.50	3.00
Undesignated space (10%)	.65	1.45
Total	7.15 acres	16.00 acres

* provided by elementary school

**Based on 25 cars @ 400 sq. ft. per car

DISTRICT PARKS

Suggested space requirements for various units within the park. The minimum size is 20 acres.

Activities vary depending on local conditions and needs.

Facility or Unit	Area in Acres Park Adjoining School	Separate Park
Play apparatus area- preschool	.35	.35
Play apparatus area- older children	.35	.35
Paved multipurpose courts	1.25	1.75
Tennis complex	1.00	1.00
Recreation center building	*	1.00
Sports fields	1.00	10.00
Senior citizen complex	1.90	1.90
Open or "free play" area	2.00	2.00
Archery range	.75	.75
Swimming pool	1.00	1.00
Outdoor theater	.50	.50
Ice rink (artificial)	1.00	1.00
Family picnic area	2.00	2.00
Outdoor classroom area	1.00	1.00
Golf practice hole	*	.75
Off street parking	1.50	3.00**
Subtotal	15.60	28.35
Landscaping (buffer and special areas)	3.00	6.00
Undesignated space (10%)	1.86	3.43
Total	20.46 acres	37.78 acres

* Provided by Jr. or Sr. High School

** Based on 330 cars @ 400 sq. ft. per car

(Source: National Park Recreation and Open Space Standards, National Recreation and Park Association, Washington, D.C., 1971)

OTHER INDIVIDUAL ACTIVITIES

Volleyball- 30' X 60'; 2,800sq. ft.
Horseshoe Pitch- 10' X 50'; 1,000 sq. ft.
Baseball- 350' X 350'; 122,500 sq. ft.
Softball- 250' X 250'; 62,500 sq. ft.
Football- 165' X 300'; 50,000 sq. ft.
Soccer- 165' X 300'; 50,000 sq. ft.
Picnic Shelters- varies in size from 20'X30', accommodating approximately 60 persons seated at picnic tables, to 30'X50', which will accommodate about 150 people.

(source: Planning Areas and Facilities for Health, Physical Education and Recreation, Athletic Institute and American Ass. for Health, Physical Education, and Recreation, 1966)

Site Requirments

slope for play areas 2 to 2.5%
stable dry soils
trees and open space
specific use

Outdoor Amphitheater-
a natural bowl or depression on a hillside with a slope of 10 to 20 degrees, preferably bordered by slopes or densely-wooded areas. It should have good acoustical properties and be located in a quiet place away from the noise of traffic or of groups at play.

Service and Access Requirements

proximity to secondary roads
proximity to water, electricity
roads for on site services

Improvements

water, waste disposal, electricity
parking, hardened surface near facility access
open space for buffer

Necessary Support Activities

none

Complimentary Activities

generally other fixed site recreation activities
generally mobile recreation activities except ORV use
agriculture, residential

Confilicting Activities

ORV use

Visual Qualities of Activity

positive

Data Needs

Soils, Topography, Circulation, Land Use, Surface and Ground Water Hydrology, Vegetation, Depth to Bedrock

RECREATION FIXED SITE
TRAILHEAD

General Space Standards
Sufficient area to construct a parking lot
315 sq. ft. per car (includes normal space for entrance and exit)
500 sq. ft. per car and trailer combination
car/trailer turnaround radius 75 ft.
(source: Installation Design)

Site Requirments
stable, dry soils
above yearly high water mark if located near water course

Service and Access Requirements
unimproved, tertiary or secondary road

Improvements
at 2% grade for proper drainage, minimum site alteration is required
hard surfacing
signing
sanitation facilities
trailhead host for information and security
(depending on use level and allocated maintenance dollars)

Necessary Support Activities
none

Complimentary Activities
mobile recreation activities - intensity of use will dictate which of these activities are compatible.
agriculture, parks

Confilicting Activities
industrial, commercial, residential

Visual Qualities of Activity
negative

Data Needs
Soils, Topography, Circulation, Land Use, Surface and Ground Water Hydrology

RECREATION FIXED SITE
RIVER LAUNCH

General Space Standards
315 square feet per car

500 square feet per car and trailer combination
(Installation Design)
car/trailer turnaround radius 75'

Site Requirments

stable, dry soils
above yearly high water mark
gravel or sandy stable shore line
slope of shore less than ___% or ramp ___% maximum

Service and Access Requirements

proximity to secondary or tertiary road
parking located 100' from yearly high water mark

Improvements

minimum grade 2% for parking
hard surfacing
signing
sanitation facilities
trailhead host for information and security
development depends on the use level and allocated maintenance dollars

Necessary Support Activities

none

Complimentary Activities

rafting, kayaking, canoeing, small motor boats
trailhead and park
agriculture

Confilicting Activities

hunting, ORV
industrial, commercial, residential

Visual Qualities of Activity

negative

Data Needs

Soils, Topography, Circulation, Land Use, Surface and Ground Water Hydrology

RECREATION FIXED SITE

GOLF COURSE

General Space Standards

Standard 18-hole golf course --120 to 160 acres
Standard 9-hole golf course -- 70 to 90 acres
9-hole par-3 golf course -- 45 to 60 acres (including one or two par-4 holes)

These areas are normally sufficient to include a practice putting green, a practice driving range, the clubhouse area and parking facilities. (source: Planning Areas and Facilities for Health, Physical Education and Recreation, Athletic Institute and American Ass. for Health, Physical Education, and Recreation, 1966)

Site Requirments

slope greater than 2.5% and less than 25% on turf
varied topography
solar orientation (NW/SE being the poorest)
wind conditions dependent on site
(Source: Jack W. Zunino)

Service and Access Requirements

proximity to primary and secondary roads
proximity to water and electricity, sewer
roads for on site service

Improvements

water, waste disposal, electricity
parking
open space and trees

Necessary Support Activities

none

Complimentary Activities

generally other fixed site recreation activities
agriculture, residential

Confilicting Activities

mobile recreation activities, except during off season

Visual Qualities of Activity

positive

Data Needs

Depth to Bedrock, Surface and Ground Water Hydrology, Vegetation, Soils, Climate, Topography, Circulation, Land Use

RECREATION FIXED SITE

SWIMMING POOL

General Space Standards

1600 square feet of water surface (15 square feet per 3% of population)
deck space twice the water surface area
(source: DeChiara and Koppelman)

315 square feet per car
(source: Installation Design)

Site Requirments

slope less than 5%
soil with high bearing capacity and low shrink/swell potential

Service and Access Requirements

proximity to secondary road
proximity to water, electricity, sewer

Improvements

water, waste disposal, electricity, sanitation
parking

Necessary Support Activities

none

Complimentary Activities

generally other fixed site recreation activities
walking, jogging, biking
agriculture, residential

Confilicting Activities

hunting, ORV, wildlife watching, horseback riding
industrial

Visual Qualities of Activity

negative

Data Needs

Soils, Topography, Circulation, Land Use, Soils Shrink/Swell Potential, Surface and Ground Water Hydrology.

RECREATION

MOBILE ACTIVITY: ROAD AND MOUNTAIN BIKING

General Space Requirements

none

Site Requirements

road bike

-roads and trails (see walking/jogging)

mountain bike

-easiest: 10% maximum grade, 5% maximum sustained grade
-moderate: 30% maximum grade, 10% maximum sustained grade
-difficult: over 30%, 15% maximum sustained grade
(Trails Maintenance Handbook)
open space, varied topography, dry stable soils, some rock as the difficulty increases

Service and Access Requirements

trailheads, roads, paths and trails

Improvements

road bike

-signing, paved paths, bike racks within 50' of destination, traffic control

mountain bike

-trailheads, signing, trail maintenance, stream fords or bridges

Necessary Support Activities

none

Complimentary Activities

road bike

-all land use
-all fixed recreation activities

mountain bike

-all mobile recreation activities except ORV

Conflicting Activities

ORV

The conflict with other trail users depends on the intensity of use. Mountain biking may conflict with any of the mobile recreation activities if there is a moderate to high use of any of these activities.

Visual Quality

neutral

Data Needs

Soils, Topography, Land Use, Circulation

RECREATION

MOBILE ACTIVITY: FISHING

General Space Requirements

none

Site Requirements

State Standard for Water Quality Classification of use
minimum stream flow for fish habitat, open space

Service and Access Requirements

trailhead and shore access

Improvements

trailhead
right of way through private land

Necessary Support Activities

biking, horseback riding, camping, wildlife watching
agriculture, residential

Conflicting Activities

swimming and boating
industry
The conflict with other users depends on the intensity of use. Fishing may conflict with any of the mobile recreation activities if there is a moderate to high use of any of these activities.

Visual Quality

neutral

Data Needs

Soils, Topography, Land Use, Circulation, Surface Water Hydrology

RECREATION

MOBILE ACTIVITIES: HIKING

General Space Requirements

none

Site Requirements

grade

-easiest: 20% maximum grade for 100ft

-moderate: 30% maximum grade for 300 ft
-difficult: over 30% grade for 500 ft

tread
-width: 24 inches, easiest to 12 inches, difficult

clearing
-48 to 36 inches wide
-8 feet high
(Trails Maintenance Handbook)

open space, varied topography, dry stable soils, some broken rock as difficulty increases

Service and Access Requirements
trailhead and trails

Improvements
signing
trail maintenance
stream ford or bridge
trailhead

Necessary Support Activities
none

Complimentary Activities
all mobile activities

Conflicting Activities
ORV
residential, commercial, industrial and agriculture
The conflict with other trail users depends on intensity of use. Hiking may conflict with any of the mobile recreation activities if there is a moderate to high use of any of these activities.

Visual Quality
neutral

Data Needs
Soils, Topography, Land Use, Circulation, Surface Water Hydrology

RECREATION
MOBILE ACTIVITY: WALKING/JOGGING

General Space Requirements
none

Site Requirements
grade less than 15%

Service and Access Requirements
proximity to secondary, tertiary or unimproved roads

Improvements
signing
rest areas or benches
walkway maintenance
side walk or hardened surface trail

Necessary Support Activities
none

Complimentary Activities
all recreation activities except ORV
residential, commercial, agriculture

Conflicting Activities
ORV

Visual Quality
neutral

Data Needs
Circulation, Land Use, Topography

RECREATION
MOBILE ACTIVITY: HORSEBACK RIDING (excluding pack stock)

General Space Requirements
none

Site Requirements
grade of trail
-easiest: 15% maximum grade for 200 ft
-moderate: 25% maximum grade for 300 ft
-difficult: over 30% grade for 500 ft

tread (trail surface)
- 24 inches wide minimum

clearance (brush and rock free on either side and above tread)
-3 to 4 ft from center line
-10 feet high

(Trails Maintenance Handbook)

open space, varied topography, dry stable soils, some rock as the difficulty increases

Service and Access Requirements
trailhead and trails, unimproved roads

Improvements
signing
trail maintenance
stream ford or bridge
trailhead

Necessary Support Activities
none

Complimentary Activities
all mobile activities
agriculture

Conflicting Activities
ORV

The conflict with other trail users depends on intensity of use. Horseback riding may conflict with any of the mobile recreation activities if there is a moderate to high use of any of these activities.

Visual Quality
neutral

Data Needs
Soils, Topography, Land Use, Circulation, Surface Water Hydrology

RECREATION
FIXED SITE ACTIVITY: CAMPING, TENT AND CAR

General Space Requirements
tent

-minimum 150 square feet for tent pad

car camping with trailer
-area per unit including picnic space, spur and half of roadway: 2,100 to 4,500 sq. ft.
-approximate road surface per unit including spur: 80 to 190 sq. yds.
-campsites per acre: 10 to 20 units
(source: National Park Service, U.S. Department of Interior)

Site Requirements
tent and car pads 2% maximum grade
dry stable soils, open space

Service and Access Requirements
proximity to roads or trails
service access roads on car camp site

Improvements
minimum for tent sites, no improvements
car
-picnic table, fire pit
-sanitation facility, recreational vehicle sanitary dump
-hardened surface for car pad
-campground host for security and information

Complimentary Activities
all mobile activities
parks, trailheads and river launches
agriculture

Conflicting Activities
residential, commercial and industrial

Visual Quality
neutral

Data Needs
Soils, Topography, Circulation, Land Use, Surface and Ground Water Hydrology

RECREATION
FIXED SITE ACTIVITY: NATURE AREA

General Space Requirements
none

Site Requirements
wildlife habitat; water and vegetation desirable

Service and Access Requirements
proximity to secondary roads, trailhead, foot trails

Improvements
habitat manipulation under the direction of wildlife biologist,
signing, trailheads,
visual screens, platforms and points for viewing

Complimentary Activities

all mobile activities except ORV
all fixed activities except swimming pools

Conflicting Activities

Any activity that results in significant disruption of a species habitat. The disturbance depends on the wildlife species tolerance to numbers of people, noise, environmental change.

Visual Quality

positive

Data Needs

Soils, Surface Water and Ground Water Hydrology, Vegetation, Land Use, Circulation

RECREATION

MOBILE ACTIVITY: OFF ROAD VEHICLES (ORV)

General Space Requirements

none

Site Requirements

grade of trail

-all motorized vehicles
easiest: 15% maximum
difficult: 50% maximum

tread (road or trail surface) range determined by difficulty

-motorized bike
18 to 24 inches
-all terrain vehicle (ATV)
4.8 to 7.2 ft
-four wheel drive
5 to 10 ft

clearance (width of side clearance from rock and brush) range determined by difficulty

- motorized bike
3 to 6 ft wide, 8 ft high
-all terrain vehicle (ATV)
3 to 6 ft wide, 6 ft high
-four wheel drive
8 to 12.5 ft wide, 9' high
(Trails Maintenance Handbook)

open space, stable dry soils, varied topography, rock and obstacles as difficulty increases

Service and Access Requirements

unimproved roads and trails, trailheads

Improvements

trails, trailheads, signing, stream ford, tread surface hardening in wet areas

Complimentary Activities

trailhead

Conflicting Activities

residential, commercial
fixed site activities and other mobile activities
The conflict with other activities is physically due to noise and dust created by the machines plus the differences in expectations of a quality outdoor experience.

Visual Quality

neutral to negative

Data Needs

Soils, Topography, Land Use, Circulation, Surface Water Hydrology

APPENDIX B
ENVIRONMENTAL CRITERIA AND DATA NEEDS

VISUAL QUALITY TABLE OF CONTENTS

WATER QUALITY

Objectives:

- To maintain surface water quality for recreational opportunities, fish and wildlife habitat, aesthetic values, agricultural usage and public health and welfare.

- To maintain ground water quality for municipal, industrial and agricultural usage, including primary dependance upon aquifer withdrawals for local drinking water.

- To maintain the integrity of watercourses for riparian values, flood protection and in-stream water quality.

Background:

POINT SOURCES OF POLLUTION: (any discernable, confined and discrete conveyance from which pollutants are or can be discharged)

- INDUSTRIAL
- PUBLICALLY OWNED TREATMENT WORKS

NON-POINT SOURCES OF POLLUTION: (diffuse sources of pollution)

- AGRICULTURE
- URBAN RUNOFF
- CONSTRUCTION
- MINING
- LANDFILLS
- SEWAGE
- HYDROLOGIC MODIFICATION
- SILVICULTURE

(HIERARCHICAL ORDER BY NATIONAL CONTRIBUTION)

NON-POINT POLLUTANTS:

- SEDIMENT-TURBIDITY
- NUTRIENTS
- TOXICS (HEAVY METALS)
- BACTERIA (FECAL COLIFORM)
- BOD/DO

(HIERARCHICAL ORDER BY NATIONAL CONTRIBUTION)

GROUNDWATER CONTAMINANTS:

- SEWAGE
- NITRATES
- SYNTHETIC ORGANIC COMPOUNDS

(MOST COMMON NATIONALLY)

GROUNDWATER CONTAMINANT SOURCES:

- UNDERGROUND STORAGE TANKS
- SEPTIC SYSTEMS
- AGRICULTURE
- LANDFILLS
- SURFACE IMPOUNDMENTS
- ABANDONED WASTE SITES

(MOST COMMON NATIONALLY)

NON-POINT SOURCE CONTROL MEASURES AND STANDARDS:
REFER TO UTAH WATER QUALITY ACT STANDARDS BY STREAM CLASS

Potential for Water Quality Degradation
Hazard Checklist

AGRICULTURE:

NON-IRRIGATED: Sediment, nutrients, pesticides
IRRIGATED: Sediment, nutrients, pesticides, salts
PASTURE: Sediment, nutrients
FEEDLOTS: Nutrients, fecal coliform, organic matter, ammonia

Mitigation: Operational Best Management Practices (BMPs), such as conservation tillage

URBAN NON-POINT SOURCE:

NUTRIENTS (fertilizers), FECAL COLIFORM (faulty septic and sewer), HEAVY METALS, INORGANICS, PESTICIDES, INCREASED FLOOD HAZARD (greater runoff over impermeable surfaces, trash clogging storm drainage systems, SYNTHETIC ORGANIC COMPOUNDS (petroleum products from transportation activities).

Mitigation: Retention Basins, storm drain screens, appropriate land use planning

CONSTRUCTION:

SEDIMENT (erosion rate from lands undergoing construction is 10 to 20 times greater than that from agricultural lands), FERTILIZER, PESTICIDE, PETROLEUM PRODUCTS.

Mitigation: Good site planning, plantings for erosion abatement, retention basins.

INDUSTRIAL:

BOD, TOTAL DISSOLVED SOLIDS, pH, NUTRIENTS, TOXICS, THERMAL POLLUTION

Mitigation: Compliance with federal BAT standards.

PUBLICALLY OWNED TREATMENT WORKS:

FECAL COLIFORM, INADEQUATE TREATMENT OF INDUSTRIAL WASTES IN THE MUNICIPAL SYSTEM.

Mitigation: Compliance with federal secondary treatment standards.

POINT SOURCE CONTROL MEASURES AND STANDARDS:
REFER TO FEDERAL CLEAN WATER ACT "BEST AVAILABLE TECHNOLOGY" STANDARDS BY INDUSTRY CATEGORY

References:

Myers, C., Meek, J., Tuller, Stuart, Weinberg, Anne. "Nonpoint Sources of Water Pollution"

EPA Administrator's 1986 National Water Quality Inventory Report to Congress, as required by Section 305(b) of the Clean Water Act of 1972 (33 USC 1315).

Utah Water Quality Standards

U.S. Clean Water Act of 1972

VEGETATION

I. OBSERVATIONS

A. Budgets for street tree plantings and maintenance have traditionally been low.

B. Plantings are sometimes considered only for decoration without understanding many of its other functions

C. Inappropriate plant materials have been selected at times requiring extra maintenance or water resources

D. Inappropriate design of site features jeopardize the life and vigor of the plants.

II. OBJECTIVES

A. The overall objective of plantings are to improve the physical and psychological well-being of the residents and visitors to Moab.

B. Specifically, plantings:

1. Preserve and enhance existing landscape resources.
2. Improve the overall visual quality
3. Improve the environmental quality of Moab
4. Insure appropriate plant selection and site design
5. Minimize Maintenance requirements

III. GUIDELINES

A. EXISTING CONDITIONS

1. Vegetative Communities of Moab:

a. Wetlands

b. Canyon Lands Riparian-Typical species include: Fremont Cottonwood (Populus fremontii), Box Elder (Acer negundo), Tamarisk (Tamarix gallica), and Willows (Salix sp.)

c. Canyon Lands Desert- Typical species include: Juniper (Juniperus osteosperma), Sagebrush (Artimisia tridentata), and Yucca (Yucca navajoa).

d. Agricultural Fields

e. Agricultural Orchards

f. Urban-Typical species include: Globe Willow (Salix navajoa), Mulberry (Morus alba), Golden Raintree (Koelreuteria paniculata), Silk Tree (Albizia julibrissin), and European Ash (Fraxinus exelsior). FOR DETAILED INFORMATION AS TO STREET TREE LOCATIONS REFER TO THE 'STREET TREE INVENTORY OF MOAB.

2. Climate: Hardiness zone 5

3. Soils: Properties for plant growth

4. Hydrology: Existing water available for native plants. Irrigation required for plants not native to Moab.

5. Utilities: Both overhead and underground wires or utility lines near potential planting strips will, in most cases, dictate the selection of tree species whose natural form and size will not be limited or require pruning (Johnson).

B. PLANT SPECIFICATIONS

1. Plant Size: Mature plant size in both height and width will dictate desirable locations and spacing between plants, respectively.

2. Plant Form or Shape:

a. Plant forms should reiterate the intended quality of the space (Johnson 1976).

b. Plant forms should reflect the architectural context of the buildings they are visually related to (Johnson 1976).

c. Common plant forms are pyramidal, round, oval, vase, horizontal, weeping, or irregular.

d. Plant forms should take into consideration the space available for planting and plant growth (Johnson 1976).

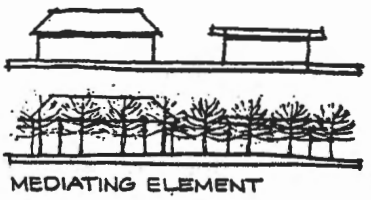
3. Color and Texture:

a. Color of leaves, bark, fruit, and flowers should be considered with respect to seasonal change for desired attributes.

b. Plant qualities that influence texture include: leaf size, leaf structure, leaf disposition, leaf gloss, flower, bark, branching pattern, budding size, and fruit size (Johnson 1976).

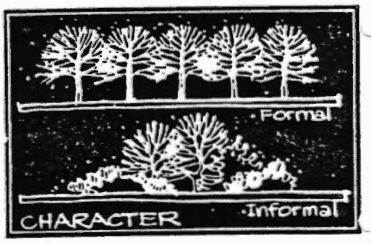
C. PLANTING DESIGN PRINCIPLES

1. Unity of Entire Composition: One of the greatest visual assets of street tree plantings. It is also useful to unify diverse architectural form and massing (see Visual Quality Guidelines). (fig. 1)



2. Balance Either Symmetrically or Asymmetrically: This can be achieved with a uniform, formal planting or a natural informal planting. (fig. 2)

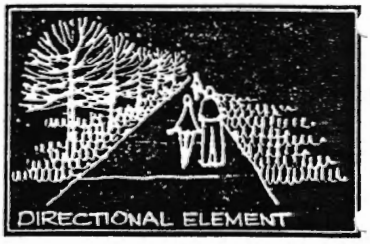
3. Contrast in Size, Shape, Color, or Texture: Plants can be used as a focal point, backdrop or frame depending on the arrangement and selection. (fig. 3)



4. Rhythm of Regularly Repeated Species: This may be used along streets or walks. Rhythm can also be achieved be color, shape or size. (fig. 4)

D. ACTIVITY SPECIFIC PLANTING CONSIDERATIONS

1. Circulation: Vegetation may be used to define differences in types of circulation, i.e. auto, pedestrian, bicycle, or parking entrances and exits, or junctions between and within circulation types(Johnson 1976).



a. Auto / Pedestrian / Bicycle-

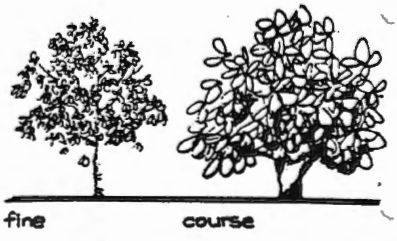
•Shade densities of deciduous trees act as a cooling effect during the summer.

•Evergreen plantings placed to allow for winter sun.

•A planting strip, the area between the walk and street may limit vegetation size(Johnson).

•The height to canopy bottom must be high enough to allow circulation activity beneath.

•The litter, in the form of excessive fruit, that drops on the path or roadway will require maintenance to insure a pleasurable experience for the user.



•A litter of thorns may pose problems for bicycles

•Disease or insect infested vegetation will not provide a pleasant experience as an overhead canopy.

•Safety-Vegetation that hides intersections between circulation types of intersections within the same circulation type should be avoided.

b. Parking for vehicles

•Shade densities of deciduous trees should be maximized as a cooling effect of parked cars during the summer.

•Height to canopy bottom for trees must allow for automobile parking as well as associated pedestrian activities

•Fruit or sap that drops from the canopy of trees onto parked cars will be undesirable

•Disease or insect infested plant species should be avoided.

•Safety-Vegetation that blocks views of oncoming traffic at entrances and exits, as well as within the parking area, should be avoided-a careful examination of plant height, form, and density of leaf cover will help to identify those species inappropriate to this use.

•Screening/Buffer-Vegetation that screens the parking lot from other activities will enhance the user experience-planted mounds or shrubs between parking and pedestrian walkways, so that the pedestrians are less aware of the parking facility

2. Picnic Areas:

a. Shade density of deciduous trees as a cooling effect during the summer evergreen plantings placed to allow for winter sun

b. Litter from overhead tree canopy avoided- fruit or sap the drops onto the picnic area

c. Insect infested and diseased plant choices should be avoided

3. Parks / Cemeteries / Golf Courses:

a. Same planting considerations as picnic areas

b. Compatibility of vegetation to a turfgrass environment should be investigated, not only in terms of competition for water, but also in terms of maintenance.

c.Vegetation choices should have adequate canopy height to allow for mowing beneath.

d. Plant choices that are naturally adapted to meadow invasion should be avoided.

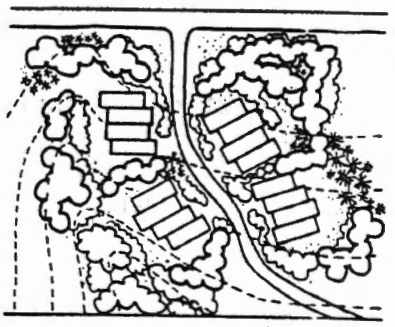
4. Wildlife Habitat:

a. Make the shapes of the built areas and open space less rectilinear, more curvilinear and irregular

b. Design corridor locations and shapes with regard to the directions of movement across the site, providing for a continuous system.

c. Make the habitat patches as large as possible.

d. Maximize heterogeneity in vegetation selection and arrangement. Heterogeneity in vegetation refers to variety of : SPACING, SIZE , AGE , and SPECIES, of individual plants, plant massings, or habitat areas. (fig. 5)


PLAN

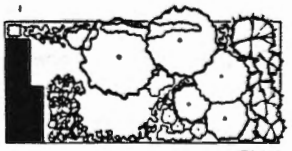

thick, diverse vegetation

e. Vary the tree structures. Incorporate trees that have multiple trunks, or trees whose lower branches reach the ground. In naturalized plantings, select trees that regenerate readily or whose lower branches form a thicket.

f. Maximize vegetation volume, structure , and diversity in all areas of the development.

g. Eliminate open lawn areas beyond what is necessary for presentation and activity. Replace mown bluegrass turf with unmown native grasses and forbes, shrub masses, or plantings of ground cover, shrubs, and trees.

h. Represent three vertical layers- ground cover, shrub layer, and tree canopy- in all plantings, and emphasize the shrub layer. Additional habitat structure may be provided by rock piles, fallen leaf litter, downed branches , and irregularly shaped plant materials. (fig. 6)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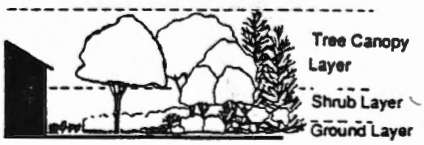


SECTION

i. Balance the amount of habitat edge and interior depending upon what types of wildlife are desired.

j. Maximize resource availability. Select plant species that offer the best food, cover, and nesting possibilities. Food producing plants should be selected to ensure year-round food offerings.

k. Familiarize yourself with the wildlife resource plants in the Moab area. Often this information is available from a local Audubon club, or from the State Department of Wildlife Resources.

Exclude habitat requirements of undesirable species(Nordstom 1989)

5. Erosion Control:

a. Root systems that are fibrous and/or that have dense ground hugging form are preferred(Johnson 1976).

b. Native plants will adapt well to existing plant materials in undisturbed areas. Native plant species will require no irrigation once established, a very important factor to consider in arid and semi-arid climate.

c. Texture of leaf surfaces may aid in erosion control by intercepting water before it hits the ground. Pubescent or hairy leaves have more surface water holding potential than do leaves with glossy surfaces.

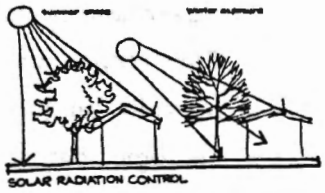
d.. Vegetation with dense canopies will offer better protection to the soil from rainfall than will those with sparse or thin canopies.

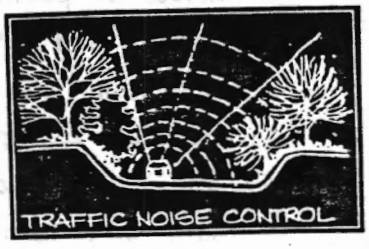
6. Other:

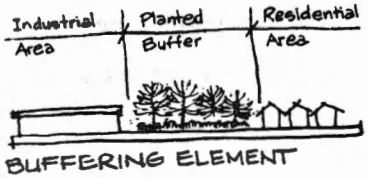
a. Energy Conservation-see Visual Quality Guidelines (fig. 7)

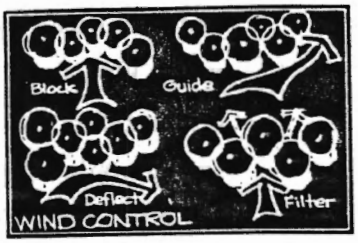
b. Noise and Visual Buffer-see Buffers (fig. 8)

c. Temperature and Wind Modifier-see Buffers (fig. 9)









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GEOLOGIC HAZARDS (map 9)

Observations and Objectives:

The scenic cliffs surrounding Moab are a primary natural resource that provide unique opportunities and views. However, these areas correspond to geologic hazard zones and are susceptible to hazards associated from rockfall, talus, slumping, piping (collapsing pockets), and fault ruptures. In the interest of public health, safety, and welfare, potentially hazardous areas were identified and delineated on the Geologic Hazards map. This map, in conjunction with the Environmental Evaluation Model can then be used to determine appropriate planning and design decisions with regards to the geologic structure and hazards of the Moab area. The different hazards and zones were identified and evaluated through analysis of various geologic maps, personal communications, and an aerial photograph (as cited in references).

The Geologic Hazards Environmental Evaluation Map identifies and delineates four potential hazard zones: *Rockfall and talus zone* (medium to high hazard), *Fallout zone* (low hazard), *Unstable zone* (Paradox formation - high hazard), and the *Faultline zone* (minimal hazard). Rockfall, talus and slumping zones were identified through analysis of an aerial photograph (U.S.D.A., 1982) in conjunction with slope interpolations. In areas where photographic interpretation was not possible, zones were identified solely upon slope data. Fallout zones delineate areas where debris may deposit as a result of movement. Generally, these areas are at the toe or sides of slide areas and are more gradual in slope. The hazard is considered to be lower here due to lower kinetic energy of debris movement and lower probabilities of collision. Unstable zones are identified as areas within the Paradox Formation. The gypsum content within these areas can produce sink holes (collapsing pockets) where water has infiltrated and dissolved the underlying structure (Bob Norman, 1989, U.S.G.S. Bulletin 841, 1933). This poses high hazard to structural development of any kind.

Faultline zones were identified as areas within 500 feet of known faults (consistent with California guidelines). Geologic hazards from fault ruptures are considered to be minimal in this area due to the nature and age of the faults. The faults identified in this area are considered not to be seismogenic

(active - deformation generating), but rather "passive" (moving in response to deformation), (McCalpin, 1989). In addition, the faults have had little or no movement recently (within 130,000 years), indicating that they are relatively inactive. However, natural hazards often occur at random intervals and *potential hazard* must be acknowledged. For this reason, the faultline is delineated as a dashed line, indicating only a spatial estimate of minimal hazard areas. In addition, there is evidence of potential movement within the valley. However, the nature of that faulting is uncertain, and it is unknown if in fact there is actual faulting (Hecker, 1989). For this reason no hazard has been mapped through the valley. The identification and evaluation of future fault rupture hazards should be made in accordance with the guidelines outlined by the Utah Geological and Mineral Survey (Association of Engineering Geologists,1987). Fault locations, the nature of deformation, and the history of fault ruptures are utilized to asses the risk for potential areas.

Due to the nature of geologic hazards, and the data available, it must be emphasized that this information should be field checked and verified before any conclusions can be reached. Development within these zones should be analyzed by qualified geologists on a site-specific basis to determine actual hazard levels. It is important to understand that the geologic hazards map by no means depicts "absolutes". The areas delineated are only estimates and are meant to illustrate *potential hazards*. As geologic information for the area becomes more complete and verified, current updates of the actual hazard locations and classification will be necessary.

Design Guidelines:

It is recommended for public health, safety, and welfare that all development including housing, sewer, and utilities be located outside of geologic hazard zones. It is especially critical that public facilities (hospitals, schools, fire and police stations) be located outside these hazardous areas. As of yet, there are not specific regulations dealing with geologic hazards in Grand County. Models from other communities may be followed to produce appropriate design and planning guidelines as development pressures encroach upon the surrounding cliff areas. A good source of information regarding these possibilities is a review of engineering geology in local governments (McCalpin,1985).

Mitigation:

Due to the unpredictable and severe nature of natural hazards, mitigation is not a recommended strategy. If it is argue that a development can be placed safely within a hazard zone, then careful analysis of available mitigation techniques should be undertaken. In some instances rockfall, talus, and slumping hazards can be reduced through stabilization methods including bolting, retaining walls, crib dams, or detention structures (McCalpin, 1989). However, these methods have limitations and must be legitimated by credible sources and maintained properly to be effective. It is further suggested that development requests in any hazard area be dealt with on a case-by-case basis, and to make development contingent on successful mitigation or avoidance of known hazards (McCalpin, 1985).

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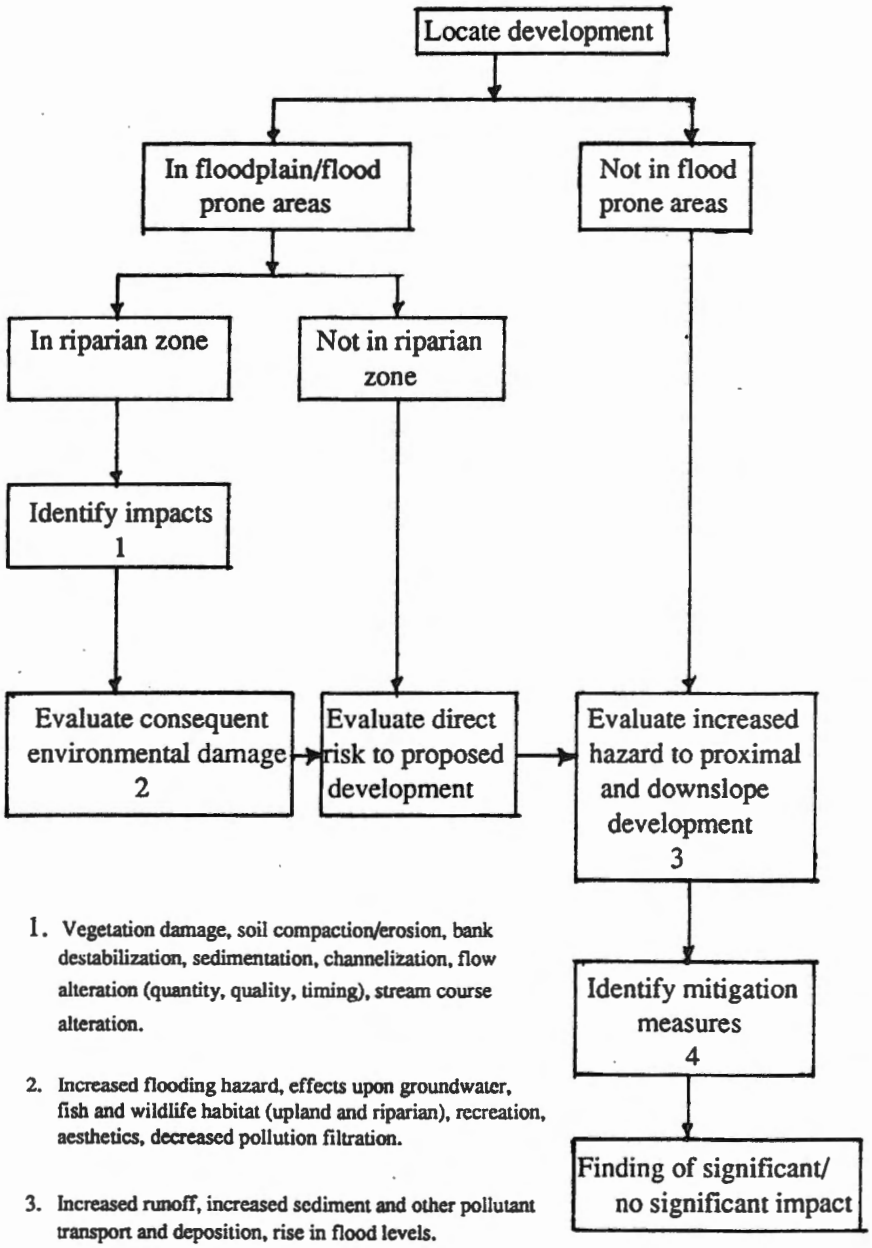
FLOOD HAZARD (map 8)

Objectives:

- To minimize flood hazard to new developments.
- To minimize cumulative flood hazard to existing developments.
- To minimize erosion and sedimentation effects due to flooding.
- To prevent deterioration of streamcourses and riparian areas .

FLOODING HAZARD MODEL



1. Vegetation damage, soil compaction/erosion, bank destabilization, sedimentation, channelization, flow alteration (quantity, quality, timing), stream course alteration.

2. Increased flooding hazard, effects upon groundwater, fish and wildlife habitat (upland and riparian), recreation, aesthetics, decreased pollution filtration.

3. Increased runoff, increased sediment and other pollutant transport and deposition, rise in flood levels.

4. Construction BMPs, retention basins, greenways, etc.

CIRCULATION

WALKWAYS

Objectives:

1. Provide safe and secure pedestrian circulation facilities.
2. Provide pedestrian facilities in response to potential demand.
3. Create a pleasant pedestrian-scaled environment with elements of visual attraction.
4. Pedestrian facilities need to address the handicapped.

Design Guidelines:

1. The basic walkway system should provide a continuous unbroken circulation network. The network should be complete, clear and legible for pedestrians to reach their destination.

2. Walkways should provide safe, short crossings of roadways. Walkways should also be free of obstructions that would pose safety hazards. Steps along the walk should be avoided.

3. Walking surfaces must be smooth and level. They must have adequate width to handle the expected volume.

4. Recreational paths generally tend to be less direct, but more scenic in character.

5. Planted buffer strips should separate walkways from major roadways.

6. Walkways should have a slope gradient equal to or less than 3 percent.

7. Crosswalks are best located at street intersections with traffic signal controls. Middle block crossings should be avoided.

8. Street furniture such as mail boxes, trash receptacles, and newspaper racks should be clustered adjacent to the sidewalk so as not to impede pedestrian traffic.

BIKEWAYS

Objectives:

1. A bikeway system should provide direct routes between primary traffic origins and destinations. The system should be continuous.

2. Safety considerations include minimizing potential conflicts between bikes, pedestrians and vehicular circulation.

3. Bicycle parking areas should be designated and located to be both convenient and adequately sized. Bicycle storage should not impede pedestrian flow.

Design Guidelines:

1. Bicycle paths that must share a right-of-way with either moving motor vehicles or pedestrians, should be identified by signs or graphics stenciled on the pavement.

2. Desirable grades are under 5 percent, although grades up to 10 percent are acceptable if under 50 feet in length.

ROADS

Objectives:

1. A clearly structured and consistent circulation system can provide coherence to the city. If visually reinforced, the system can simplify driver decisions, decrease motorist confusion, and provide a level of visual continuity and cohesiveness.

2. New roads should relate to the natural contours of the land in order to minimize grading and disruption of the natural environment. Buffers and other techniques can be used to visually integrate roads with the land use areas that they serve.

3. The clarity of a circulation system promotes safety for its users. Intersection details, sight lines and traffic control devices are all important safety related considerations.

4. The design and detailing of roads should facilitate cleaning, and other associated maintenance and repair operations. If plantings are used on shoulders and medians, they should be of appropriate low maintenance plant materials.

Design Guidelines:

Primary roads

1. Continuous through-traffic relatively flat, straight, or large radii curvilinear to handle moderate to high traffic speeds.
2. Alignments form the boundary of different land uses rather than bisect an area.
3. Controlled access and appropriate traffic signal controls.
4. Appropriate street lighting, signing and planting that reinforce the moderate to high speeds.

Secondary roads

1. Alignments that follow topography and land use patterns.
2. Direct access to abutting property.
3. Generally have sidewalks on both sides.
4. Appropriate street lighting, signing, and planting.

Tertiary roads

1. Relatively short, smaller radii curvilinear alignments in keeping with topography and land use.
2. Generally located off secondary roads.
3. Alignments to discourage high speeds and through traffic.
4. Sidewalks may be limited to one side.
5. Street lighting provided at intersections.

AIR QUALITY

Objective:

Pollution control requires cooperation of all segments of society including business and industry, the environmental community and the government. The objective of this model is to aid in the planning process for the city of Moab planning board to determine if a proposed activity will have any adverse affects on the air quality in and around the Moab region. Certain aspects of the model are provided in an attempt to give the planning board flexibility in making planning decisions.

Observation:

The most obvious sign of poor air quality is impaired visibility due to fine particulate matter and associated water droplets. High ozone concentrations are frequently accompanied by poor visibility. Suspended particulate matter 10 micrometers (millionths of a meter) or less in diameter is referred to as PM10. These finer sized particles are a potential cause of significant health effects, since they can more easily penetrate the defenses of the human respiratory system.

Areas with a combination of poor atmospheric ventilation, frequent sunshine and bordering mountain barriers, have a high air pollution potential and should take precautions through proper planning to reduce the risks.

Studies at UCLA and USC indicate that residents of more polluted areas with these factors experience decreases in lung function when compared to residents of cleaner areas. These areas are large Urban areas like Los Angeles and Denver, for example. Research at the Statewide Air Pollution Research Center in Riverside CA, show that agriculture suffers also from air pollution. Tens of millions of dollars are spent annually by residents to clean and replace articles damaged by air pollution in the South Coast Air Basin alone, (CA.). Emissions come from nearly all human activities. Large industrial sources have been controlled to a great extent and many traditional smokestack industries do not locate in the regions where air pollution is a potential factor. Even though new automobiles produce far less pollutants than in previous years, mobile sources still represent roughly 60% of emissions nationwide.

Sources of Air Pollutants:

Air pollutant emissions are generated by a wide variety of human activities and a useful way to categorize them is by the activity that creates them.

Categories

- Passenger Vehicles- automobiles.
- Freight Vehicles - light, medium, and heavy-duty truck operations.
- Residential/Recreational - home product use, painting, home heating, recreational vehicle use, and utility equipment use.
- Other Mobile/Farming - boats, ships, aircraft, railroad, construction equipment, and agricultural operations.
- Manufacturing - heavy and light industrial operations including solvent uses.
- Petroleum Production/Marketing - oil field operations, refining, storage, transport and dispensing.
- Electric Power Production - electricity generation including co-generation.
- Service/Commerce/Other - services industry commercial operations, waste disposal, and a variety of miscellaneous sources.

AVAILABLE CONTROL STRATEGIES

Activity Category /Key Control Approaches

Passenger Vehicles

Improved Inspection/Maintenance
Expanded certification procedures
Tightened vehicle emission standards
Use of methanol and electric-powered vehicles
Trip reduction programs
Traffic flow improvements

Freight Vehicles

Use of newer, less polluting engines
Institution of inspection/maintenance programs
Use of methanol or other clean fuels
Transportation system management
Stricter diesel fuel standards

Residential/Recreational

Reductions in use of photochemically reactive consumer solvents
Controls on off-road vehicles
Controls on powered equipment

Use of water-borne paints and coatings

Other Mobile/Farming

Changed farming practices

Controls on construction equipment

Controls on aircraft, ships, and trains

Manufacturing

Clean fuel substitution

Expanded controls on degreasing operations

Controls on type or use of surface coatings

Elimination of exemptions

Petroleum Production and Marketing

Electrification of oil production

Stricter controls on operations

Substitution of gasoline vehicles with clean-fuel vehicles

Lowering of gasoline volatility

Electric Power Production

Selective catalytic reduction (SCR)

Process Modification

Alternative methods of production

Greater use of out-of-region production

Service/Commerce/Other Substitution of electric motors

Controls on restaurant charbroiling

Use of dry-to-dry cleaning machines

Eliminating exemptions

Controls on large bakery ovens

* Some of these approaches will require involvement or action by the Environmental Protection Agency of State and Local Agencies.

IMPROVING THE VISUAL QUALITY OF MOAB-GENERAL GUIDELINES

I. BACKGROUND

A brief historical look at Moab's development gives clues to today's planning issues.

A. HISTORICAL DEVELOPMENT of the town circulation and land use

1. The location was chosen partially because of the Colorado River crossing, the availability of water and farmland, and, probably, the striking visual setting of the red canyon walls.

2. The town pattern became strongly visible with the granting of Government land patents in the 1880's and 90's and the Mormon settlers who laid out the town grid typical of many other Utah settlements. The downtown business and civic district was the core of the community.

3. Remnant open space is a result of historical ranching, farming and flood control.

4. Moab grew in spurts with the economic boom/bust cycle based on natural resource consumptive industries typical of western towns. Development typically occurred during the fast growth period without regard to proper siting or architectural character. Other development was built during the slow economic period as funds were available but still without regard to relating the structures to the site or surrounding uses. One of the results has been a visual continuous chaotic scene stretching out along the 'strip'. Another result is that, functionally, the town configuration has forced the use of the auto to accomplish local daily tasks.The effect of this 'strip' on Moab is the loss of identity and utility of the core downtown area.

B. EMERGING VISUAL PLANNING ISSUES

1. Moab is continuing to be influenced by the strip and random development along it. The consequences of this development pattern include buildings and land use that exist as individual entities which have little relationship to their neighbors.

2. The Central Business District (CBD) is strongly influenced visually by wide, cluttered streetscapes, vacant lots, empty buildings and the heavy traffic. It is located in the original town grid (approximately from First North to Third South, and First West to Second East) along the main through route, now state highway 191. The CBD is being abandoned with the commercial strip developing to the north and south. Abandonment of the downtown area should be reversed in order to gain back a core

identity of Moab while providing for the local citizens needs, new development and tourism.

3. Moab needs a more recognizable, comfortable and safe circulation system that works better for pedestrian and bicycle traffic. The highway of Main Street should visually be altered to invite visitors to stop in downtown and at other sites in Moab.

4. Moab needs the visual recognition of its entry/exit points which contributes to the overall image of town.

5. Development nodes (or clusters) along Main Street, such as the Central Business District, need to be distinctly recognized. They can be developed to be visually identifiable through the integration of commercial land use, open space and accompanying streetscapes.

6. Moab needs to enhance its visual natural features and protect them from degradation.

C. OTHER CONSIDERATIONS (not related to quality of site planning itself)

1. The need of a city planner for guidance and coordination, and fund raising.

2. The need of funding for planning, maintenance and improvements.

3. The need of a stabilizing the local economy which affects the local industry and job market.

II. GENERAL GUIDELINES

The visual quality of Moab cannot be fundamentally changed by a limited cosmetic approach to aesthetic considerations.

A. ENHANCE EXISTING ASSETS

The overall physical image of Moab can be significantly improved by enhancing its existing environmental assets. These assets include the surrounding natural beauty which contains a major National Park complex and BLM administered public lands, the La Sal mountains dominating the southeast views from town, the Colorado River and the creek systems running through town, the red rock walls creating enclosure and coherence to the valley, an 'oasis' from the surrounding desert environment for people and wildlife, a diverse human population and their historical imprint.

B. EMPLOY PRACTICAL HIGH QUALITY DESIGN

The visual quality of Moab can be vastly improved, with modest cost, by a few simple improvement programs such as tree planting and a coordinated signing system. At the same time, when major investments in new facilities are contemplated, their design should contribute to the overall image and attractiveness of Moab. This can be accomplished within reasonable budgetary constraints by sensitive, practical, high quality design which does not necessarily cost more, either in terms of design fees or construction costs, than an inefficient or poorly executed design solution.

C. UTILIZE SOUND SITE PLANNING AND DESIGN PRINCIPLES

1. Site Analysis as the Foundation of Site Planning and Design: Careful consideration of natural and man-made site conditions is the foundation of both master planning and site planning design. Essential site features which should be considered include topography, vegetation, drainage, views, climate, availability of infrastructure, and functional and aesthetic relationships to the other site structures.

2. Development of an Overall Conceptual Framework: Sound site planning cannot be achieved on a site-by-site or ad hoc basis where individual development is allowed while neglecting the effect on the community as a whole. These issues must be based on a master plan which is properly conceived to allow each problem to be resolved as a part of a total concept. This conceptual framework starts with land use planning based on not only functional requirements, but also on careful consideration of the ecological, physical and visual character of Moab, on future growth flexibility, on development of a circulation system which serves but does not dominate the setting, and on the perception and continuity of physical form of the built environment.

3. Integration and Coordination of Site Components: The design and detailing of site components, including paving, plant materials, street furniture, lighting and signing, should be developed as a consistent system related functionally and aesthetically to such organizing elements as the circulation system, land use and activity centers. The coordination and orderly development of these component systems add greatly to establishing an improved image and more functional environment.

4. Energy Conservation: Energy conservation objectives and site planning and design activities interface both at the master planning policy level as

well as in the design and siting of individual facilities. Land use and transportation master planning should strive to minimize necessary auto trips by locating related activities together and developing a balanced transportation system which encourages pedestrian and bike as attractive alternatives to the auto. Building orientation, massing and detailing, as well as the interrelationship to adjacent buildings and planting, all have implications on site design to reduce energy consumption. The necessities of energy conservation require new criteria affecting building design decisions, and changes in previous concepts of building form and site relationships.

III. RELATIONSHIP TO THE MASTER PLANNING PROCESS

Master planning generally focus on existing physical conditions, future community requirements, and proposed land use and circulation. If the visual quality of Moab is to be improved, design procedures as well as guidelines must be incorporated into the Moab master planning process. It is at the master planning level that there is an appropriate overview directed at ensuring overall coordination and compatibility among individual community needs. Formulation of a Moab design guide as part of the master planning process is the proposed mechanism to guide improvement of the visual quality of Moab. It would provide visual design guidelines and criteria consistent with master planning objectives. It would sit side by side with other environmental models (ie. water quality, geologic hazards, circulation, etc.) and at the same time incorporate their elements for a sound site plan.

ARCHITECTURE-VISUAL CRITERIA

The image of Moab is largely determined by the design character and siting of its built environment. The objectives of the site planning and architectural design process must go beyond the need to satisfy the functional requirements of a building. It should strive to achieve an ordered sense of place; a comfortable, attractive and functional setting for its intended activities. The following observations and guidelines are general in nature. They are intended to give the reader an idea of what to consider when evaluating or designing a proposed plan. An architect should be consulted for specific project development within these guidelines. The University of Utah Architecture Department has expressed interest in providing their expertise. This would be a great opportunity for Moab to be exposed to architectural design possibilities.

A. OBSERVATIONS

1. The resulting degeneration of the downtown has produced vacant buildings, vacant lots, little activity and generally nondescript city blocks visually little different in character from the rest of the strip.

2. There is little or no coordination between buildings and their site development components such as lighting, street furniture and signing.

3. Often the architecture of the newer buildings is inconsistent with the older development. There is also no prevailing style of architecture, however there are some compatible styles due to form, color, texture, etc. The fact that the architectural character of Moab is varied is not bad, but the town lacks a unifying element on two scales: within identifiable nodes and within the town itself.

4. The buildings or areas of historic significance architecturally are important in that they provide a sense of heritage. In some cases, the integrity of the the building or area has been damaged by either insensitive design modifications or introduction of incompatible elements into the area.

5. There is little attraction to the central business district; economically socially and aesthetically there is little for the local resident or tourist. The local citizen is not attracted to the central business district which has only a few relevant businesses and little social opportunities. Currently and potentially, an important community economic source is tourism. Yet, those that are travelling through towns have a difficult time identifying the Central Business District and they continue to drive, stopping only for groceries and gas. If they are staying in a hotel, there is

little to draw them out for an evening after dinner. The city loses the opportunity of having them stop in the downtown area for site-seeing and buying local goods.

6. The highway compounds the problem because of the truck traffic particularly during the warmer tourist seasons. The visitor tends to be pushed through town by traffic without a visual cue as to where to stop or turn to gain relief from the hustle and bustle and to take time to look at what Moab has to offer.

7. Many of the newer subdivisions have expanded to the south into the foothills where there is little visual relationship to the sites. They detract from the view of the cliff from the valley since neither materials or design allow them to blend in. Other developments on the valley floor do not reflect the regional character.

8. Many buildings have been designed and sited with little regard to climatic conditions. Instead, there has been a tendency to rely on the mechanical and electrical systems of a building to overcome climatic conditions. Proper building orientation, building design and planting design can conserve energy as well as provide the pedestrian protection and comfort from inclement weather, temperature extremes and intense sun glare.

9. Functional uses of buildings must be related such as clustering commercial, entertainment, public services, etc. creating identifiable nodes. In addition, depending on the use and importance of a structure, there is a choice of blending it into its surroundings or allowing it to stand out.

B. OBJECTIVES

1. Develop Coherent Architectural Character Guidelines: Moab has been developed over a long period of time. Often, a new building or subdivision has been located without regard to the prevailing character of the town. Many factors contribute to perpetuating a coherent architectural character including scale, materials, color, massing, form, proportions, spatial relationships and supporting site components. A consistent and coherent architectural character fosters a "sense of order" and a "sense of place" within a town or a district of the town. It is an important visual attribute to be carefully guarded and perpetuated by future development. An architect is an important source of information in drawing up guidelines for enhancement and future development.

2. Adapt Building Designs to Natural Site Conditions:

a. Physiographic Features-Respecting and using the natural environment to advantage requires careful consideration of site conditions such as

topography, vegetation, tree cover, climate and views. The careful preservation, accentuation or studied alteration of natural site features enables new development to blend in with their natural setting. Furthermore, such practices minimize plant replacement costs and negative environmental impacts of construction as well as future site maintenance problems. The destruction of the natural environment by the all too frequent development process of gross clearing, regrading to a "workable" profile, channelization of natural site drainage and then replanting should and can be avoided or minimized.

b. Climate-proper consideration should be given to prevailing winds, solar orientation and micro-climate conditions. Building orientation as related to solar and wind conditions, building form in terms of shape, massing, fenestration and color, and planting can all be used to modify the adverse effects of climate. This will help to conserve energy through reduced dependence on a building's mechanical and electrical systems and to provide for pedestrian comfort and convenience.

c. Relate Buildings to the Cultural and Physical Setting- The most noticeable problem is the lack of distinction along the strip. The town lacks a distinct entrance point and therefore one can drive through without locating where the town actually begins and ends or where the central business district is located. The interface of conflicting land uses such as industrial, commercial or residential also causes problems when they are not separated by a road or buffer. Construction of a building occurs either as a new subdivision, industrial park or fitting a new building into an existing district. In either case, successful site planning and design requires dealing with many more factors than simply dropping he building into the center of a vacant site. Essential considerations include the organization of the site access; the separation of auto, pedestrian and service traffic; the functional and visual organization of the space between buildings; the establishment of compatible scale and architectural character between buildings; and the relationship of buildings to natural site features.

d. Preserve Historic Buildings and Areas- Recognition and preservation of Moab's historical areas and architecture are important aspects of the community and help foster and instill a sense of heritage among the citizens. In addition, these buildings provide an element of visual interest and variety. Maintaining an appropriate setting for these historic buildings is essential in preserving their visual integrity. These buildings are not necessarily limited to historic display and can be successfully adapted to functional uses.

C. DESIGN GUIDELINES

1. Establishing and Implementing Architectural Guidelines: Moab needs to develop its own architectural guidelines to promote a coherent architectural character that provides visual order, clarity, interest and human scale within the town and the districts as points of reference. These architectural guidelines should be specific enough to assure basic harmony and coordination of architecture, yet flexible enough to promote variety and visual interest. The following guidelines are general in nature. A full architectural survey by an architect is recommended if Moab wants to pursue this approach further. The purpose here is to suggest ways that the town can evaluate project proposals on a basic visual level that reflects the unique site environment and the surrounding context.

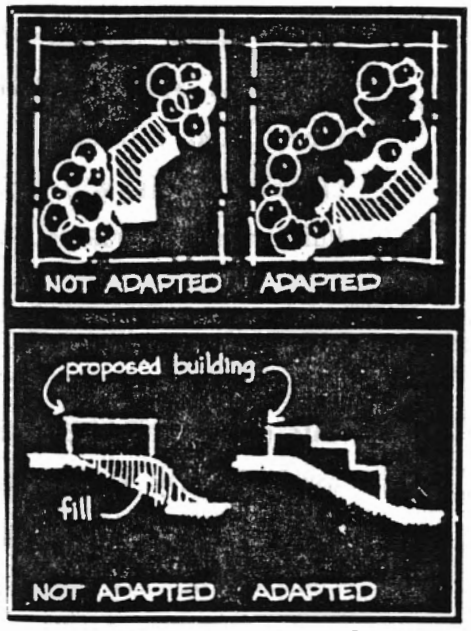


fig 10

2. Adapt Building to Natural Site Features: The site planning and design of buildings should relate harmoniously to the landscape character and climatic conditions.

a. Landscape Character- Apply the following principles to minimize adverse impacts on the existing site. These are things that the developer must consider prior to formulation of a site development concept. (fig. 10)

••Natural site features such as mature trees and vegetation, terrain, topographic features and scenic views and vistas should be preserved, enhanced and used advantageously.

••Expansive building types and parking requirements should be built on relatively flat terrain. Generally, these are site areas with less than 6% slope gradients. (fig. 11)

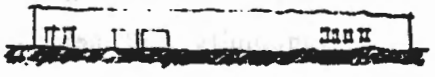


fig. 11

••Residential or other less expansive building types that can adapt to the sloping terrain should use moderately sloping (6 to 15% slope gradient) areas. (fig. 12)

fig.12

••Avoid development in steeper slope (greater than 15% slope gradient) areas where adverse environmental impacts and development costs begin to escalate dramatically.

••Avoid development in natural drainage ways and flood plains; land uses for flood plain areas should be limited to open space preserves and outdoor recreation facilities (see Environmental Criteria for Flood Hazard).

••All slopes should be vegetated or stabilized to minimize erosion and sedimentation. The use of native plant materials and water conservation planting techniques are recommended (see Environmental Criteria for Vegetation and Surface Water Systems, Chap. III).

b. Climate-Site and design buildings in response to the local climate to provide a comfortable setting for outdoor activities and to conserve energy by lessening the demands on the heating and air conditioning systems of a building. Moab is located in a cold desert or temperate climate. (see Climate Data, Appendix C.) The frequent sunny days play an important role in the warmer months as well as the winter. Buildings must balance the effects of seasonal thermal variations, promoting both winter warming and summer cooling in terms of seasonal solar orientation and prevailing wind pattern.

fig 13.

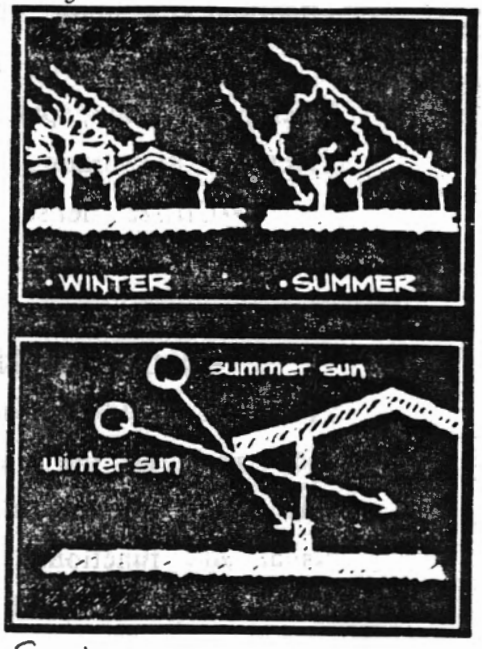


Fig 14

••Use deciduous trees to the east and west that allow penetration of warming winter sun but shade from the hot summer sun. (fig. 13)

••Utilize roof overhangs that shield window areas on south facing walls from the higher summer suns but admit the lower winter sun. (fig. 14)

••On the higher buildings, sun shades can be used to control summer sun; horizontal sunshades over south facing windows, eggcrate type sunshades over east and

west facing windows, and vertical fins on north facing windows are most effective.

••Use medium colored surfaces on exterior walls to balance the need for summer reflection and winter absorption of solar radiation; use light colored roofs to reflect the summer sun; use dark absorbent colors only in recessed places protected from summer sun.

••Use steeply pitched roofs on the winter windward side to deflect winter winds and reduce the exposed roof area directly facing winter winds. (fig. 15)

••Protect building walls exposed to winter winds with evergreens, earth berms or mounds, fences, walls or outbuildings such as garages or storage sheds. (fig. 16)

••In appropriate buildings that will not be air conditioned, encourage cross ventilation and roof ventilation by prevailing summer breezes for cooling during the hot summer months. This can be accomplished in terms of building orientation and window placement, roof and gable ventilation and planting based upon prevailing summer breezes. (fig. 17)

••Minimize paved areas and maximize planted ground covers to promote humidity and reduce solar reflection and glare. (fig. 18)

••Incorporate summer water features in site development concepts to maximize humidity and cooling effects of evaporation from water. (fig. 19)

••Utilize dense overhead planting to provide shade, slow evaporation and hold humidity near ground level. (fig. 20)

3. <u>Relate Building to the Cultural and Physical Setting:</u> Buildings that are in a cluster and are creating a node such as the central business district, an industrial park or a residential subdivision should have a strong visual and functional relationship. The design process of establishing compatible relationships between buildings may entail either integrating a new building into existing

fig 15

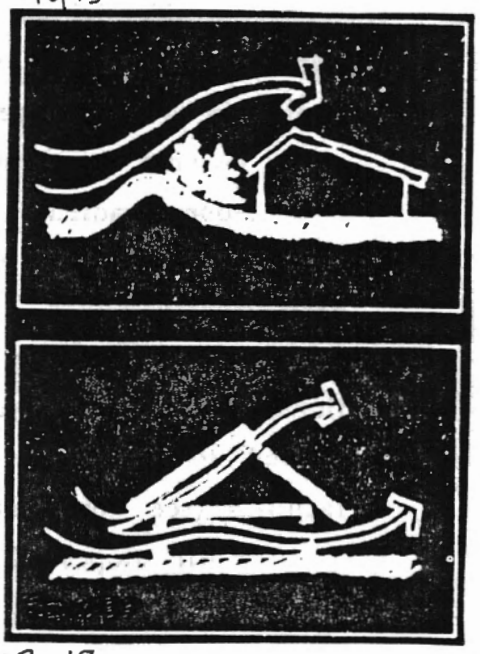


fig 17

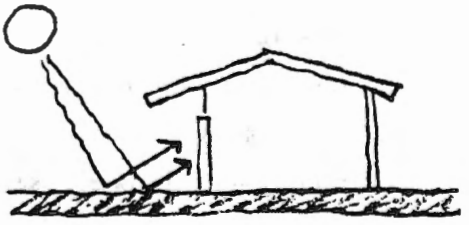


fig 18

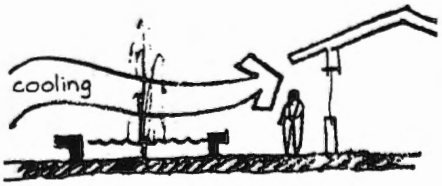


fig. 19

buildings or designing a totally new group of buildings. The general location, massing and orientation of new buildings should be formulated in response to their program requirements and desired relationship to other buildings, site circulation systems, parking, open space, natural site features and climate. Buildings are related compatibly in groups by means of site design that sensitively interrelates building forms and massing, open space between buildings, site circulation systems and site edges.

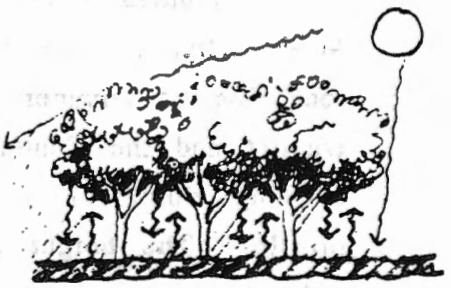


fig 20

a. Massing- The massing of a building refers to its overall bulk, or volume of spaces which the building encloses. When massing a new building, the size and proportion of its exterior envelope and elevations should be designed to relate compatibly with adjacent structures and natural landscape features. A large building can be made to relate to existing smaller buildings and talus slope background, for example, by dividing its mass into smaller components to create a building elevation that is more compatible or complimentary in terms of its size and proportions, to the adjacent structures and natural features. This is accomplished by manipulating the configuration of the floor plan and/or building height to break down the mass of the building into smaller elements. (fig. 21)

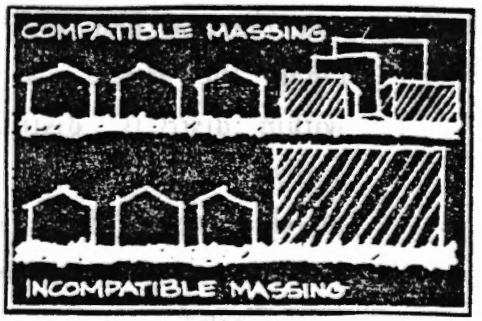


fig. 21

b. Form- A building's form is an articulation of its basic massing and is characterized by shape and silhouette. The size and proportion of a building's elevation and its roof are the primary form-giving characteristics that are important in relating a new building to its setting. In terms of their basic form, new buildings should be contemporary architectural expressions that adhere to and are evocative of the prevailing architectural forms of local natural features and adjacent buildings. Similar forms should be employed not only to relate new buildings to adjacent structures but

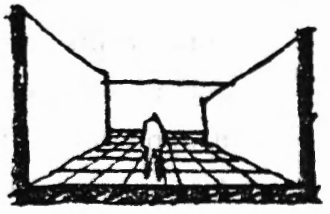
also to contribute to the overall architectural coherence of Moab. (fig. 22) An example may be the use of a horizontal roof line on commercial buildings in the Central Business District and the Commercial strip in order to relate to the existing dominant architecture and the horizontal cliff profile. The height should be limited to two stories in order to maintain the cliff views and relate to the one and two story structures already in place.

fig 22

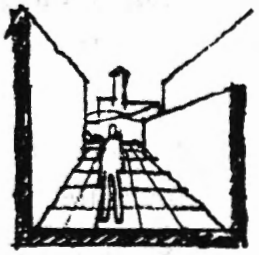
c. Open Space-Open space is an outdoor room, visually created between vertical structures such as buildings, plantings and natural features. It varies in size and function and which is determined by the elements that create the space. Open space serves to relate buildings within districts, districts within Moab, and Moab to the surrounding natural setting. They also provide visual and physical relief from the hard built environment. There are certain elements that give open space form:

••Enclosure-Buildings and plantings are used as elements of spatial enclosure to visually define and contain outdoor space. The degree of enclosure that is conveyed is determined by the type and number of containing sides that define the space, their distance apart and their height. The nature and extent of enclosure can be used to orient or direct people, to create a distinct sense of place or to create a transitional space between the built and the natural environment (fig. 23)

fig 23



SENSE OF PLACE



SENSE OF ORIENTATION

fig 24

••Scale- The scale or size of an outdoor space is defined by buildings and planting to reinforce its intended use and desired character. Large outdoor spaces between buildings, especially symmetrical ones, tend to be formal and ceremonial in character, while smaller spaces convey a more personal and intimate setting. (fig. 24)

••Spatial Sequence- A variety of outdoor spaces, created by the variations in their volume and sense of enclosure, provide a more interesting visual experience and identifiable hierarchy of spaces within Moab. An

ordered sequence of outdoor spaces can provide a valuable sense of orientation, while discontinuous or maze-like sequences may be confusing and disorienting. (fig. 25) A spatial sequence is experienced while moving. Depending on the speed and conveyance of the movement, different experiences occur. A suitable sequence for a faster moving auto, for instance will be much larger scale than that of a pedestrian.

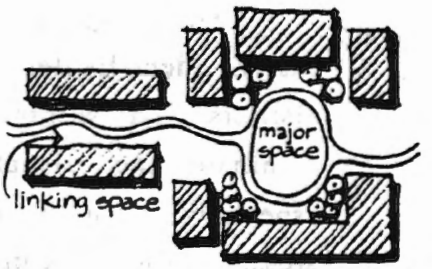


fig25

••View Framing- The grouping of buildings can frame views, orient people to building entrances, or accentuate a key building, landmark or dramatic view. These views created by the arrangement of buildings and open space are important aspects of the visual quality of the environment that can be employed not only for visual interest but to provide a sense of orientation for people in Moab. (fig. 26)

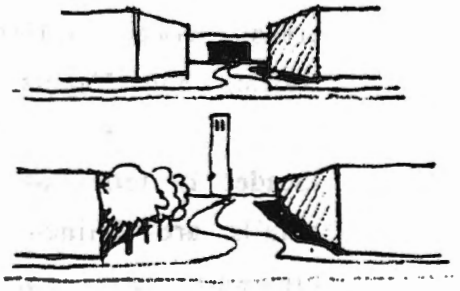


fig26

d. Circulation and Parking-A coordinated circulation system and parking relates districts to the town and a clearer visual image of Moab.

••A balanced and coordinated system to serve Moab includes walkways, bikeways and vehicles

••A pedestrian or bicycle system should provide a comfortable climate, orientation and visual quality and variety while providing access to residential areas, commercial areas, the work place, entertainment and the open space system with minimal vehicle conflicts

••A vehicle system should provide clear orientation and access to residential areas, commercial areas, the work place, entertainment, recreation, ingress and egress from town and minimal conflicts with through traffic and the pedestrian/bicycle system (see Circulation Criteria)

••Service entrances and loading docks should be located off-street and out-of-sight of main roads and building entrances. Appropriate buffers should be used. (see Buffers)

••Parking should be attractive, convenient and easily identifiable. It should be coordinated within districts and within the town. It should not however dominate the visual setting of the districts or town especially from main roads and primary public viewing areas. Proper location and buffering should be employed. (fig. 27) (see Buffers and Circulation)

fig 27

••Site Edges- Buffers should be used appropriately and consistently between off street parking and main roadways, between pedestrian and vehicular-oriented areas, between different districts or land use areas. (see Buffers and Vegetation Environmental Criteria)

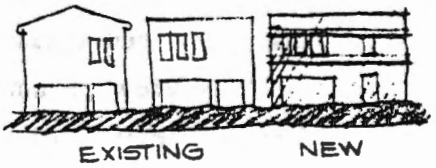
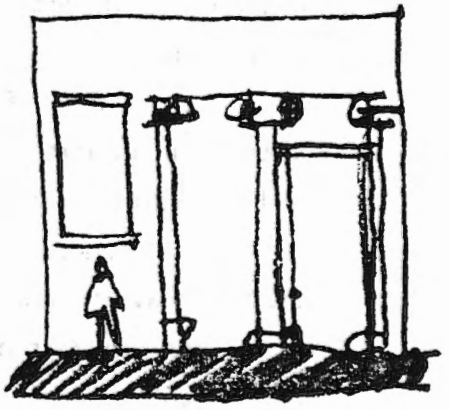


fig 28

e. Architectural Fenestration-Building facades in terms of window and door openings and related details are defined as architectural fenestration. Design elements that can create a compatible fenestration treatment include scale, materials, color and rhythm.

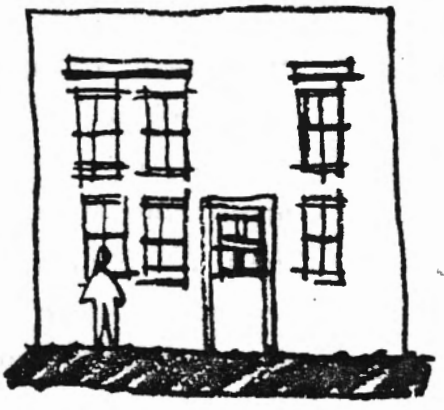
••Scale-The proportion and detail of a buildings fenestration should relate to the scale of the adjacent buildings and open space. Scale is conveyed by the fenestration of the building facade , where doorways, windows and other details enable people to gage its relative size and character in relationship to the size of the human body.



MONUMENTAL

-When relating a new building to its setting, it is important that its design conveys a sense of scale that is compatible with adjacent buildings. This can be accomplished by fenestration that is similarly sized and proportioned in terms of floor heights, window openings and strength of details. (fig. 28)

-Larger building facades with over-sized fenestration elements tend to create a more monumental scale while smaller buildings with more finely detailed fenestrations tend to create a more human scale. (fig. 29)



HUMAN

fig 29

-Blank wall treatments tend not to convey scale, while building elevations with detailed fenestrations

created by windows and relief, accentuated by shadow lines or color, convey a strong sense of scale. (fig. 30)

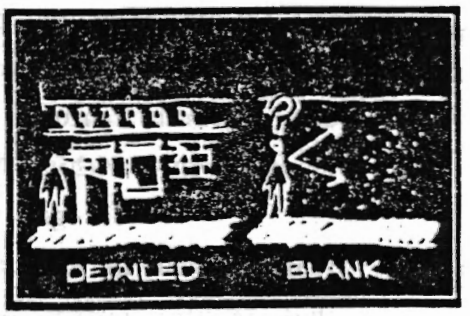


fig30

••Materials-Exterior building materials should provide a cohesive and consistent architectural character. If existing buildings have an architectural style worthy of merit, all future new construction should be compatible to that style. Local materials should be used.

-Types of materials selected should be chosen for its, thermal qualities, reflectively and durability. In Moab, this may include a medium red/brown stone material.

-A cluttered cosmetic application of a number of different materials of a facade should be avoided. Materials should be used consistently on all facades of a building.

-Materials should be selected based upon their appropriateness to the building type, climatic conditions, the architectural design and landscape character of Moab. For instance, in town, a school may be built with a medium tone brick while a residence may be a white wood frame structure. However, a residence built in an area of visual sensitivity (see Visual Quality, map #10) may be wood frame with a horizontal character and matching the color of the surrounding rock.

-Materials distinctive to an established architectural character worthy of merit should be adhered to consistently. Deviations from established materials should not be allowed without good reason. However, and historic style should not be imitated where it is inconsistent with functional requirements and construction economies. The use of similar materials, complementary colors and compatibly scaled building can successfully relate new buildings to an historic style or setting.

••Color-Buildings are related through compatible and complimentary colors. Color is closely linked to the

appropriate selection of exterior building materials and is a critical design element in relating adjacent buildings and natural features and creating a compatible visual environment within Moab.

-In general, colors should be integral rather than applied to exterior building materials. Avoid surfaces that require costly periodic repainting.

-Colors should be selected on the basis of the desired appearance and attractiveness of the building, its compatibility with adjacent building colors, the architectural and natural landscape character of Moab.

-Colors should be also carefully selected for their ability to modify climatic conditions. Generally, light colored building exteriors tend to reflect solar radiation and promote heat loss, but increase glare; dark colored exteriors tend to absorb solar radiation, promote heat gain and reduce glare. Medium tones that reflect the landscape colors are suggested for Moab because they are light enough to reflect the summer sun yet allows some solar absorption in the winter.

-Strong, loud colors should generally be avoided and used only for special identification purposes; where they are employed they should not dominate or overpower the visual character of the setting.

••Rhythm-The visual rhythm created by a fenestration design compatibly relates buildings within a district and the town as a whole. Rhythm is determined also by the natural features such as the redrock cliffs.

-Rhythm refers to to the visual pattern or sequence of solids and voids that is created by structural expression, fenestration and shadow lines along a building facade as well as the sequence of building masses and open space between buildings. The pattern of this rhythm may be either uniform or varied as well as vertical or horizontal. (fig. 31)

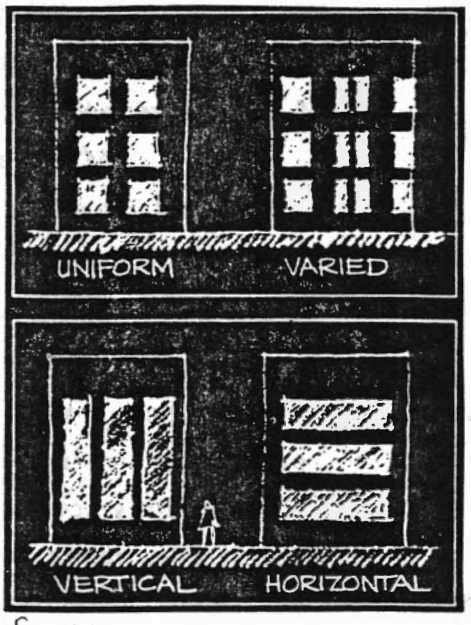


fig31

-The visual rhythm established by worthy existing buildings should be recognized and utilized as a design tool to integrate a new building with its surroundings.

4. Preserve Historical Buildings or Areas: The visual integrity of historically noteworthy buildings and areas in Moab should be maintained and preserved. There are three categories that should be preserved

a. Historical Architecture-Buildings noteworthy from an architectural point of view and are examples of a particular style or period.

b. Historical Places- Buildings and areas that are noteworthy from an historical point of view because of a significant event in local history.

c. Other Historical Buildings-Buildings that are less noteworthy from either an architectural or historical point of view, but are still usable and functionable building that also provides visual interest and a sense of heritage to Moab.

STREETSCAPE ACTIVITIES-VISUAL CRITERIA

I. ROADS

A. OBSERVATIONS

1. There is visual clutter from signing, overhead utilities, cars parked along roads and lack of consistent vegetation.

2. The hierarchy is not clear due to similar width of all streets.

3. There is a lack of clear indication of side street locations.

4. There is a lack of clear indication where town sites and services are located.

5. There is a feeling of being pushed along in downtown traffic without the indication where to turn and how to get there if you knew.

6. There is a lack of indication of entering and exiting the city, the central business district or other nodes of activity.

7. There is a lack of clear understanding where visitors may park to get information and stretch their legs.

8. There is a lack of separation of large parking lots from the streetscape.

B. OBJECTIVES

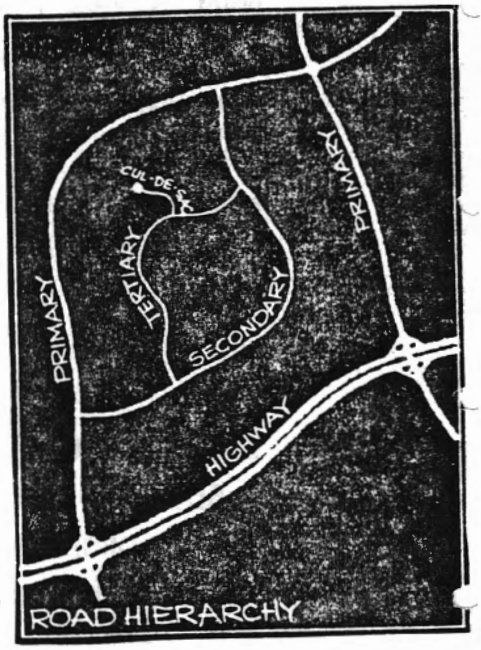
1. To coordinate the design of streetscape elements in order to minimize clutter and provide an attractive roadway in keeping with its intended function and hierarchy in the overall network. (fig. 32)

2. To provide guidance for visitors to services and sites of interest.

3. To provide a clear image of the town through emphasizing hierarchy and highlighting nodes of activities.

4. To visually separate the streetscape from the parking areas in order to provide relief from large paved ground surfaces.

C. DESIGN GUIDELINES



1. Planting: Consider planting as one of the simplest and most efficient means of improving the visual quality of Moab's streetscape. Planting should be used to define the road hierarchy. Furthermore, planting should be used to screen headlight glare and to reduce the visual impact of adjacent surface parking lots and overhead utilities. (see Vegetation Environmental Criteria)

2. Lighting: Street lighting should be effectively used not only for public safety and security but also to strengthen the comprehension of the road hierarchy by varying the height, spacing and intensity of illuminaires according to the type of road. (see p. 47)

3. Signing: Create a unified, coordinated and consistent streetscape signing system that provides direction and information in an effective and attractive manner. (see p. 45)

4. Utilities: Bury utilities wherever possible to avoid their unsightliness and cluttering of the streetscape. The burial of existing utilities should be associated with the construction of new structures and the renovation or demolition of existing structures. Where overhead utilities are unavoidable, use trees and

topographic features to minimize their visual impact. (see p. 53)

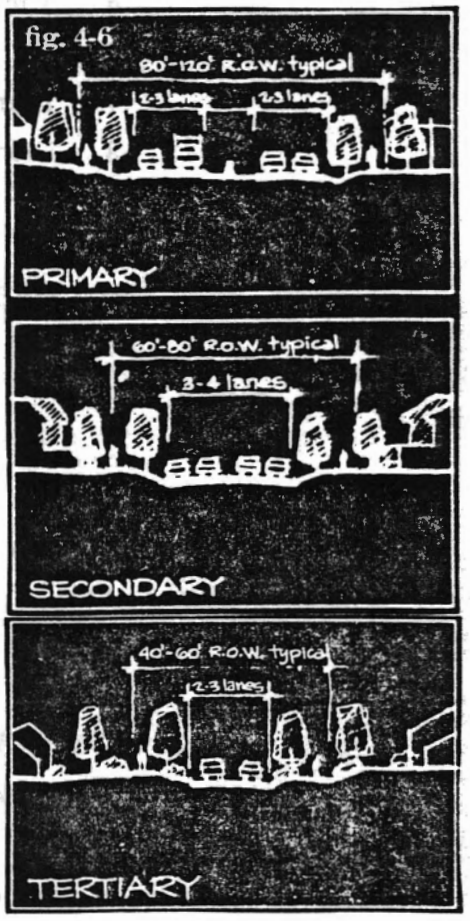
5. Street Furniture: Use a Coordinated and unified design of functional street furniture along the streetscape, employing multi-use clustering of elements wherever possible to reduce clutter. (see p. 50)

6. Paving: Use special paving to differentiate between pedestrian and vehicular areas, articulate areas of pedestrian and vehicular conflicts and indicate direction or controls in the circulation network. Paving designs such as at crosswalks should be consistent in design and application.

7. Curbs and Gutters: Use consistent design and application within districts

8. Medians: Use medians to safely separate of channel traffic, to reinforce the circulation hierarchy of the road and to provide safety islands for pedestrians at wide street crossings; provide appropriate plantings of medians to visually reinforce the road hierarchy and minimize maintenance. Avoid paving the surface or using turf requiring mowing and watering. Local colored rock or gravel may have the least maintenance requirements and be the most visually compatible.

fig. 4-6



II. PEDESTRIAN WALKWAYS

A. OBSERVATIONS

1. The lack of sidewalks and the highly visible front yard clutter discourages recreational walking.

2. The traffic creates a mental barrier to crossing the street especially in the Central Business District.

3. There are few stores within walking distance of the Central Business District especially with the shops open only during typical business hours.

4. There is little relief from the climatic elements and glare off the pavement.

5. The original street grid system with its accompanying wide streets create visual monotony for the pedestrian.

6. The clutter of the streetscape elements detract from the scenic views of the cliffs and mountains.

7. There is lack of a sense of safety crossing the streets downtown.

8. There is no place to walk that is away from the road system and vehicles.

B. OBJECTIVES

1. To visually connect pedestrian system for ease of orientation and safety.

2. To provide variety of walkways including away from traffic.

3. To provide coordinated access to commercial, and public facilities.

4. To provide environmental relief from hard surface glare and reflected heat.

5. To highlight views and structures of interest.

C. DESIGN GUIDELINES

A pedestrian walkway system should have five essential characteristics: continuity, safety, comfort, convenience and delight. They are all reflected in the visual character of the system.

1. Continuity: The basic walkway system should provide a continuous, unbroken network. The network should be complete, clear and legible for pedestrians to reach their destination, whether the pathway is curved or straight. (see p. 45 ,sign)

2. Safety: Walkways should provide safe, short crossing of roadways. Walkways in locations away from streets should be integrated into the area development plan to enable casual visual surveillance of the path for safety. (fig. 33)

3. Comfort: Protection from hot sun, cold winds and rain is desirable and can be provided by either plant materials or structures. Separation from vehicular traffic, areas of noxious fumes or abrasive noise is essential for comfort as well as health and safety. Intermittent comfort features such as benches

fig 33

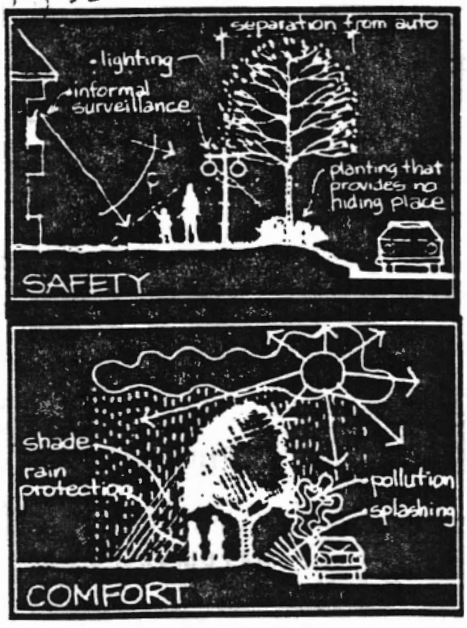
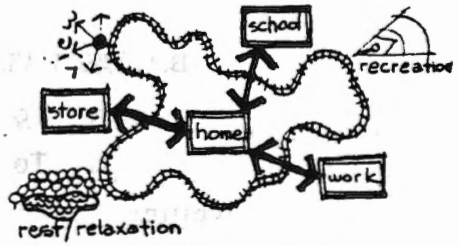


fig 34

and drinking fountains further promote pedestrian comfort and visual invitation. (fig. 34)(see p. 50 Street Furnishings and Plazas)

4. Convenience: Street Furniture-Walkways should be coordinated with street furniture such as seating, trash receptacles, drinking fountains, lighting, etc to accommodate pedestrian needs. These site furnishings should generally be located in distinct rest areas adjacent to the walkway for pedestrian enjoyment and relaxation (fig. 35) (see p. 50 Site Furnishings and Plazas)



CONVENIENCE & DELIGHT

fig35

5. Delight: Pathways can provide unexpected vistas, new discoveries and visual experiences that are more varied and exciting than those provided by vehicle travel. The pedestrian circulation system should be designed to provide visual delight to encourage pedestrian use and enjoyment of the network. Within Moab this may mean softening the streets with plantings and medians, create inviting off the street areas, developing the creek system for pedestrians and use street furniture appropriately. (see p. 50 Site Furnishings and Plazas)

III. BIKEWAYS

A. OBSERVATIONS

1. There is a lack of bike facilities, ie. bike racks, rest stops, water fountains.

2. There is lack of a sense of safety crossing Main street, and it is hard to avoid when travelling north and south.

3. There is a lack of connected circulation to outlying trails and roads.

4. There is a lack of a route away from vehicles.

5. There is little relief from the climatic elements and glare off the pavement.

6. The original street grid system with its accompanying wide streets create visual monotony for the bicyclist.

7. The clutter of the streetscape elements detract from scenic views of the cliffs and mountains.

8. There are few stores within comfortable biking distance of downtown on safe roads.

B. OBJECTIVES

1. To increase facilities (see p. 50Street Furnishings)

2. To visually enhance Main Street in order to make crossing and travelling safer.

3. To connect routes to include out of town connections- Slick Rock Trail, River Road, etc. (see Circulation Environmental Criteria)

4. To provide a route away from vehicles: Mill Creek, Pack Creek, Kane Creek bike route. (see Circulation Environmental Criteria)

5. To provide safe routes to commercial areas (see Circulation Environmental Criteria)

6. To reduce street clutter by plantings and improved signing (see p. Streetscape Components)

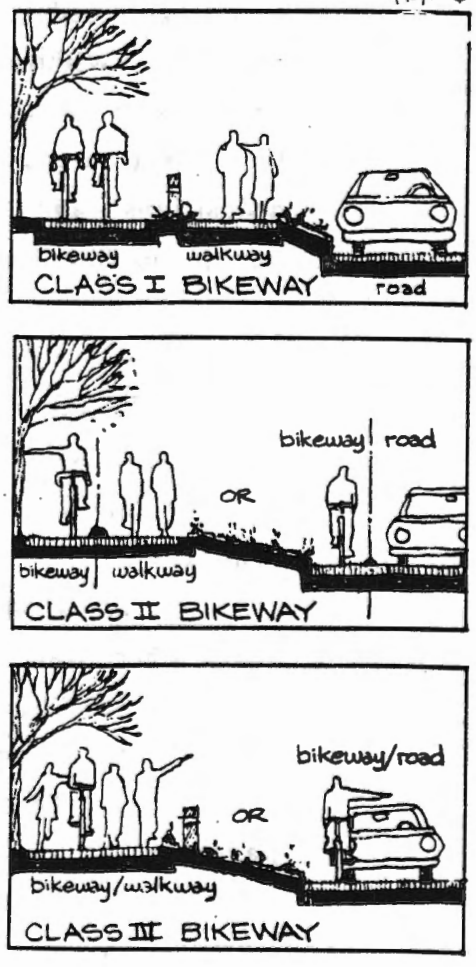
C. GUIDELINES

A bikeway system is similar to a pedestrian system in that it should have five essential characteristics: continuity, safety, comfort, convenience and delight. They are all reflected in the visual character of the system.

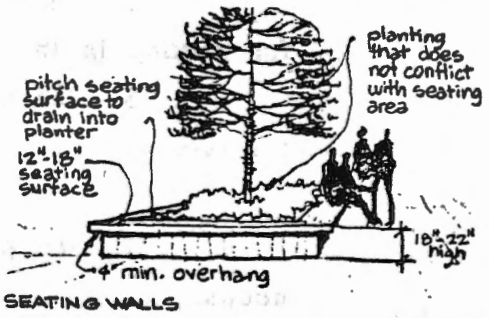
1. Continuity: The bikeway system should provide a continuous, unbroken network. The network should be complete, clear and legible for bicyclist to reach their destination, whether the pathway is curved or straight. (see p. 45 Signing)

2. Safety: Bikeways should provide safe, short crossing of roadways. Bikeways in locations away from streets should be integrated into the area development plan to enable casual visual surveillance of the path for safety. (fig.36)

fig.36



3. Comfort: Protection from hot sun, cold winds and rain is desirable and can be provided by plant materials. Separation from vehicular traffic, areas of noxious fumes or abrasive noise is essential for comfort as well as health and safety. Intermittent comfort features such as benches and drinking fountains further promote bicyclist comfort and visual invitation. (fig. 37)(see p. 50 Street Furnishings and Plazas)



SEATING WALLS
fig 37

4. Convenience: Street Furniture-Bikeways should be coordinated with street furniture such as Bicycle racks, seating, trash receptacles, drinking fountains, lighting, etc. to accommodate bicyclists needs. These site furnishings should generally be located in distinct rest areas adjacent to the walkway for pedestrian and bicyclists enjoyment and relaxation (fig. 38) (see p. 43,50 Site Furnishings and Plazas)

SEATING WALL
fig 38

5. Delight: Pathways can provide unexpected vistas, new discoveries and visual experiences that are more varied and exciting than those provided by vehicle travel. The bicycle circulation system should be designed to provide visual delight to encourage bicyclists use and enjoyment of the network. Within Moab this may mean softening the streets with plantings and medians, create inviting off the street areas, developing the creek system for bicyclists and use street furniture appropriately. (see p. 50 Site Furnishings and Plazas)

IV. PLAZAS AND COURTYARDS

A. OBSERVATIONS

1. There is a lack of downtown social spaces for tourists and local citizens although there are many open space lots with potential for this use.

2. There is a lack of visual variation from buildings and vacant lots used for parking in the Commercial or Civic areas.

3. There is a lack of centralized convenient information station for tourists.

B. OBJECTIVES

1. To provide appropriate plaza design for local citizen and tourist needs.

2. To provide a visual enhancement of the Commercial and Civic areas.

3. To design with low cost maintenance in mind.

C. GUIDELINES

1. Potential Uses: Depending on the program, the potential uses must be considered. That may be as an entrance way, a social setting, a passive or active recreation site, or solely for visual delight.

2. Site Design Considerations:

a. Site Feasibility-Consider user needs and potential volume of pedestrian activity. Consider the activity which will determine the design and maintenance requirements.

b. Site Setting-Plazas should be designed appropriately to their setting. A thorough site analysis should be conducted prior to design and include the following: Spatial Analysis, Topography, Micro-Climate, Circulation and Views.

c. Spatial Organization-The manipulation of space is a major design tool. To successfully organize and alter a space relative to its surrounding environment, several elements of spatial organization must be considered including: Building/Space Relationship, Scale, Orientation and Spatial Articulation.

3. Materials and Details: Use materials, details and furnishings to create an appropriate plaza character, to reinforce its spatial and functional design concepts, to relate it compatibly with adjacent buildings and minimize maintenance requirements.

a. Paving-Use it to separate pedestrian and vehicular activities, choose the appropriate material in color, durability, design and cost. Minimize paving in favor of plantings to reduce reflected solar radiation and air temperature and enhance shade and air cooling.

b. Plant Materials-Use plant materials in plazas to define spaces, modify climate and provide scale and aesthetic elements. A variety of plant materials can be used. Deciduous trees are ideal to provide shade during the hot summer months and permit warming sunlight to penetrate the space in the cooler months. (fig. 39)

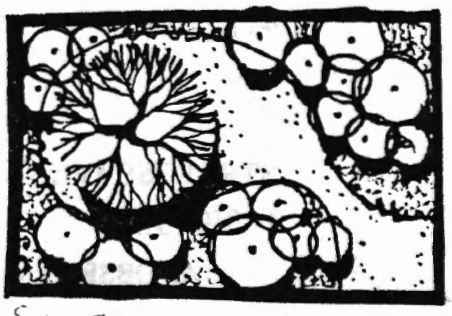


fig 39

c. Water Features-Pools and fountains can provide a desirable aesthetic and functional element. Use basins, pools and fountains for socialization and a visual focal point. Water features temper the microclimate in the space by cooling and raising the humidity. The movement on the water creates a pleasant sound, visual delight and increases the temperature alterations. The fountain should be designed for winter also when there is no water flowing.

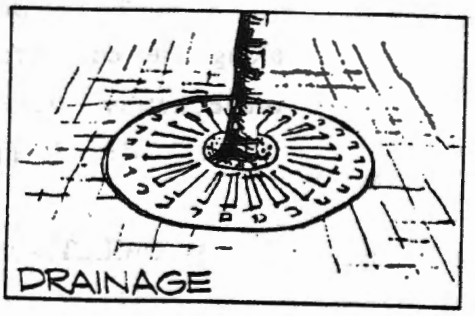


fig40

d. Drainage-Plazas typically have increased runoff because of the amount of paved area. The drainage system should be incorporated into the paving pattern and details. In many cases, runoff can be used to water plant materials. (fig. 40)

fig41

e. Steps and Ramps need to be incorporated into the design if there is a level change, particularly ramps to provide access for the handicapped.

f. Lighting is an important element for safety and pleasure. It can provide general illumination, accent or mood, depending on the desired effect. Lighting standards are important in providing scale, defining space and adding visual interest (see p. 47Lighting). (fig. 41)

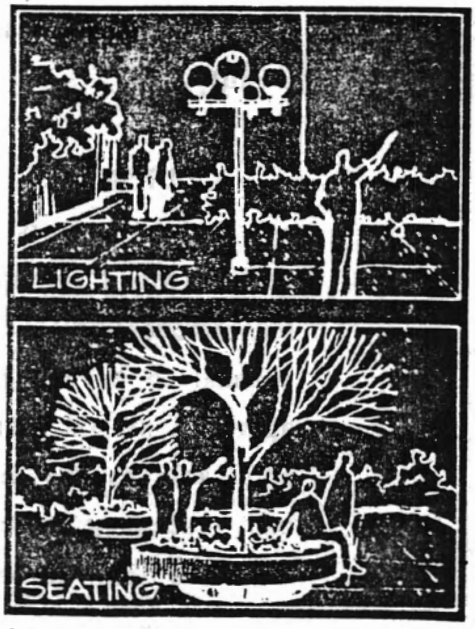


fig42

g. Benches and Seating are important functional components as well as sculptural. They can be individual elements or incorporated into the design of planters and walls. Those with backs are generally

more comfortable (see p. 50 Site Furnishings). (fig. 42)

STREETSCAPE COMPONENTS

I. SIGNING

A. OBSERVATIONS

1. Current signing practices contribute to disorienting visual clutter downtown, and the entrances into town (see Visual Quality map #10).
2. The clutter contributes to the lack of distinction between districts or activity nodes.
3. Tall, signing is inappropriate in some cases.
4. Night lighted signs are inappropriately garish in some instances along the commercial strip whereas downtown store fronts and streets are inadequately lighted.
5. Inappropriate setback and location of large scale signing.

B. OBJECTIVES

1. To reduce visual clutter and allow aesthetics to play a part in advertising and directional signs.
2. Target an appropriate scale, color and materials and setback.
3. Have the City of Moab install their own sign scheme for direction and aesthetics.
4. To pass a Sign Regulation Ordinance for the City of Moab and Grand County.

C. DESIGN GUIDELINES:

1. It is recommended that a sign regulation ordinance be adopted by the City of Moab and the Grand County. The following is taken from a recommendation in *Downtown Improvement Manual for Iowa Cities, 1978.* It is not unusual to have a sign ordinance in place. It provides direction and a citizens' approved set of aesthetic criteria to be followed. This ordinance should be applicable to the entire city (or county). Furthermore, the particular sign design and placement criteria should be appropriate for each area and should harmonize with the total downtown concept. Sign control measures should generally provide the following:

a. Prohibit overhanging or projecting signs, except for signs of limited size suspended under a canopy or arcade;

b. Limitations on the size and area of coverage in proportion to the building facade;

c. Limitations on flashing signs and colored lights that would compete with essential traffic regulation signals or create a gaudy or garish visual appearance;

d. Prohibition of billboards mounted on the sides or roof of buildings;

e. Limitations on the height and placement of pylon or free standing signs (the recommended height limitation for any sign is 35' or no taller than the tallest building in the district and placement equivalent to building setbacks, see Visual Quality, map #10);

f. Prohibition of pennants, flags, banners or paper signs *not essential* for the identification of the business and liable to cause litter or deteriorate when subjected to wind and rain;

g. Prohibition of public right-of-way for private signs;

h. Permit and design review procedures for all new signs.

In addition, it would be desirable to have a consensus of letter styles, sizes, colors, and materials by the downtown area to create a total appearance of design harmony.

The City of Moab should provide coordinated signing to enhance its image. This includes directional signing to tourist sites and the use of pennants, banners, etc. by the city in the downtown area to add a festive touch or welcome. However, weather must be taken into account in proper design, materials, placement, maintenance and replacement. Poorly displayed signs create a negative image. The city should encourage the use of light in store front display windows downtown. This will provide interest for visitors in the evening and advertises merchandise effectively.

It should be kept in mind that change will not come over night. The ordinance will affect new and replaced signs. However, once in place and enforced, the image of Moab as a town to visit and do business in will be enhanced.

II. LIGHTING

A. OBSERVATIONS

1. There is adequate lighting in the Central Business District for the state highway but it does not enhance the downtown image as a place to enjoy as a pedestrian.

2. The downtown merchants are not highlighted and they are competing with bright advertising along the commercial strip.

B. OBJECTIVES

1. Express the Appropriate Image, Character and Scale: Lighting should relate to the functions and scale of activities it serves. Lighting design should vary with the volume and type of traffic and with the visual character of development. Street and pedestrian lighting should be coordinated with other elements of the streetscape such as signing, landscape planting, paving materials, trash containers and other street furniture.

2. Convey a Sense of Organization

3. Promote Safety and Security for Nighttime Activities

4. Minimize Operational Maintenance and Repair Costs

C. DESIGN GUIDELINES

1. Basic Types of Lighting Fixtures:

a. Low Level Lighting-fixtures mounted at heights below eye level,used for special pedestrian walkway areas such as at stairways or along secondary pathways, characterized by very finite light patterns with low wattage capabilities, light sources are either incandescent or fluorescent, simple maintenance requirements but are susceptible to vandalism. (fig. 43)

b. Walkway and Plaza Lighting-fixtures mounted at average heights between 12 and 15 feet, used to light primary pedestrian walkways and plazas, potential multiple uses because of a large variety of fixtures and light patterns, typically incandescent or mercury vapor. They are susceptible to vandalism. (fig. 44)

fig.43

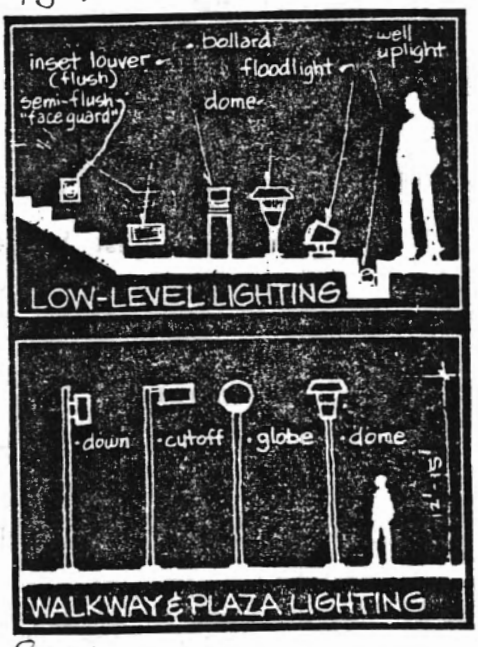
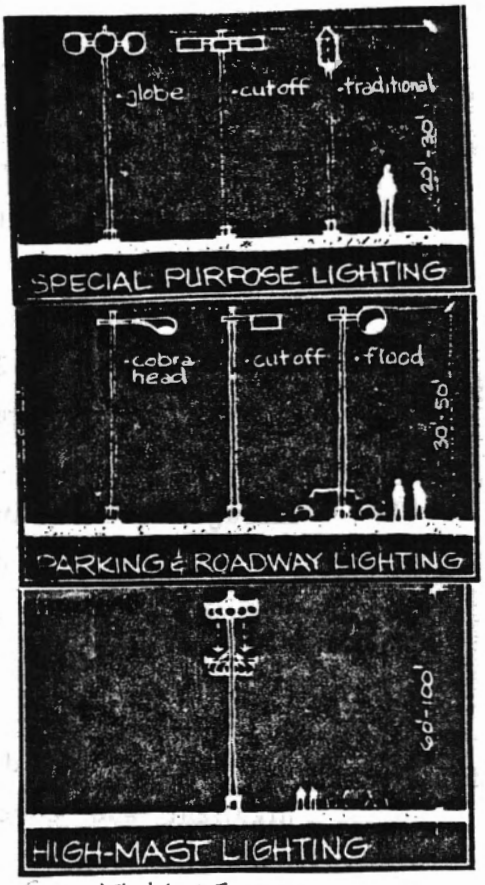


fig 44

c. Special Purpose Lighting-fixtures mounted at an average height of 20 to 30 feet, used in recreational, commercial, residential and industrial applications, metal halide or mercury vapor, maintained by gantry. (fig. 45)

d. Parking and Roadway Lighting-fixtures mounted between 30 to 50 feet, typically used in large recreational areas, parking lots and roadway applications, mercury vapor or high pressure sodium, fixtures are maintained by gantry. (fig. 46)

e. High Mast Lighting-fixtures mounted at an average height of between 60 to 100 feet, used for large area lighting of parking lots, recreational areas and highway interchanges, mercury vapor or high pressure sodium, fixtures must be lowered on the pole for maintenance. (fig. 47)



figs 45, 46, 47.

2. Visual Elements of Lighting Design: There are a number of variables to be considered in the technical design of exterior lighting including the level of illumination, luminaire location and type of luminaire. It is not the intent of this section to provide a comprehensive methodology or set of standards for the design of exterior lighting. Rather, the intent is to deal with those elements of lighting design that affects the visual quality of the environment. Therefore, discussion here is limited to visual considerations in selecting a lighting source and standard or pole.

a. Selection of Light Source

•High Pressure Sodium-high efficacy, roadways and protective lighting systems, used on major streets.

•Metal Halide-use in people gathering areas, ie. churches, theaters, auditoriums and shopping centers, good color rendition and not psychologically offensive.

•Color-Corrected Mercury Vapor-least efficient source of light of the high intensity lamps, use in residential where lower levels are desirable

•Incandescent-used in pedestrian areas, warm color-strengthening character, low efficiency and short life span.

b. Selection of Light Pole

•Types-Creosoted wood, Painted steel, Concrete, Aluminum, Weathered and Decorative Wood, Weathered Steel.

•General Selection Guidelines- Standards or poles should be selected based upon their functional and aesthetic appropriateness.

1) Generally concrete and aluminum poles are the most attractive and practical systems for poles up to 50 feet in height.

2) Weathered steel poles should only be used for high mast type lighting in areas where no pedestrian contact occurs.

3) The pole system selected should be used consistently throughout the Moab.

4) Different pole types can be used for different systems, ie., they should relate harmoniously, especially in areas where they may interface.

Besides the public lighting the private lighting should be considered. Downtown store fronts should be encouraged to display their windows in low lighting to highlight and encourage pedestrian activity.

III. STREET FURNISHINGS

A. OBSERVATIONS

1. Furnishings are located improperly.
2. They are not present or do not reflect the pedestrians needs.
3. There is no coordination or reflection of architecture or the character of Moab.

B. OBJECTIVES

1. Provide site furnishings appropriate to their intended function.
2. Establish a coordinated system of site furnishings, based upon an overall design scheme that harmoniously relates furnishings to the architectural character and the setting of Moab and other site furnishing in terms of their scale, materials and details.
3. Consolidate and simplify the design of site furnishings. Site furnishings should neither clutter nor dominate the visual character of Moab. Wherever possible, they should be grouped to be multi-functional.
4. Incorporate adequate provisions for the handicapped.

C. DESIGN GUIDELINES

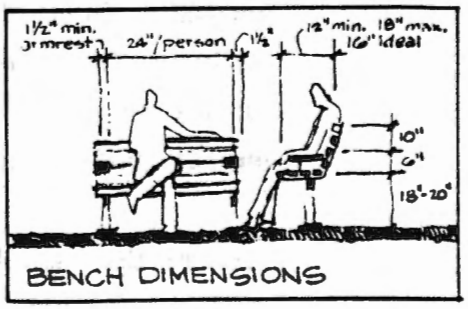
1. Benches, Seating and Tables:

a. Location-Locate seating oriented to user needs or waiting and resting adjacent to paved walkways, entry-ways, and plazas, near the tops and bottoms of major stairs and ramps, and other areas of anticipated need and use. Locate seating oriented to user needs of socializing, relaxing and eating in less formal spaces with a pleasant setting and view that are conducive for their intended purpose.

b. Space Requirements-Seats should be set back 2'-0" form adjacent sidewalks to provide ample leg room and not to impede or obstruct pedestrian traffic. A space of 4'-0 should be provided at the end of benches to enable strollers and wheelchairs to be parked. A space of 5'-0" should be provided between the front edge of the seat and any stationary obstacle such as water fountain, trash receptacle or sign post.

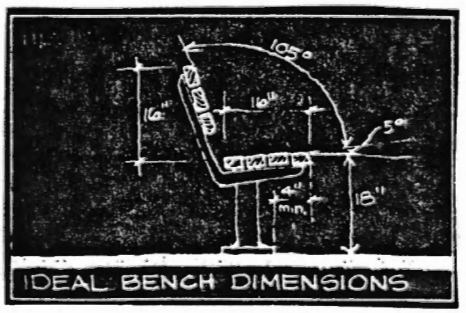
c. Specifications-Especially where longer-termed sitting occurs, seats should be designed with back supports, contoured seats and arm rests for comfort in sitting and support in getting up and down. (fig. 49) Seat height should be 18"-20" form the ground and be uniform and level. (fig. 50) Seat depth should be 12" minimum to 18" maximum (16" ideal) and be pitched back at an angle of 0-5 degrees to the horizon. Seat width should be 24" per person. Back rests should be 15"-18" high (16" ideal) and at a n angle of 90-110 degrees to the seat (105 ideal). Arm rests should be 6" high from the seat and be a minimum width of 1 1/2"

d. Materials-The seat surfaces should be pitched or slotted to shed water. Seats should be



BENCH DIMENSIONS

fig 49



IDEAL BENCH DIMENSIONS

fig 50.

constructed to support a minimum of 250 pounds for each person they are designed to accommodate. Seat surfaces should be smooth and constructed of materials that do not tend to either retain heat or cold, or splinter. Redwood, alerce, and vertical grained tank stock douglas fir are recommended wood seating surfaces. Seats should have no sharp edges or protruding hardware. All wood should be nonsplintering and have rounded edges, all metal rustproof, all mounting hardware should be concealed, recessed or plugged. Seating in areas subject to vandalism should be selected with care for firm anchoring to the ground and durable materials.

2. Seating Walls:

a. Specifications-Seat height should be 28"-22". Seat depth should be 12" minimum and 18" maximum. Seating surface should be pitched 1/8" per 12" to allow surface water to drain back into the planting bed. Seating surface should ideally have a 4" overhang from the planter wall for heel space and facilitate rising from a seating position. Provide 2' 0" for leg space in front of the seat edge in order not to impede pedestrian traffic.

b. Materials-Use dull and light colored materials for seating surfaces that will be in direct sunlight to keep them cooler. Use dark colors in shaded areas only. Vegetation near sitting walls should not conflict with pedestrians or people sitting; avoid species that are invasive, injurious of that shed excessive or staining debris.

3. Tables:

a. Specifications-Table height should be 30"-33", depth should be 28" minimum if utilized from one side only (36" if utilized from both sides). Table length should be 24" per person. Leg space under tables should be 18". A minimum of 9" should be provided between the seat top and the bottom edge of the table top. Stationary picnic table benches should not have back rests.

b. Materials-Table tops should be smooth surfaced with no recesses that might hold water or food particles. All edges and corners should have rounded, eased or chamfered edges; all hardware should be concealed, recesses or plugged.

c. Provisions for the handicapped-A clear space of 29" from the ground to the underside of the table at one end of the table for wheel chair position; a minimum of 18" from the end of the table top to the nearest support leg. A clear width of 34" to accommodate wheelchair and provisions should be made for hard-surfaced paved access.

3. Outdoor Drinking Fountains: Drinking fountains should be generally located along walkways and hard-surfaced paved area that are easily accessible. Because of Moab's climate this is a particularly nice service of the town to provide either downtown or in plazas or parks.

4. Trash and Garbage Receptacles: Trash receptacles should be attractive sidewalk furnishings of a consistent design throughout Moab. Combine trash receptacles with other site furnishings to create consolidated, multi-purpose facilities where possible. They should be highly visible and immediately available for effective litter control. Locate receptacles conveniently and strategically along sidewalks, near major walkway intersections, building entrances, benches, vending machines areas and recreational and picnic areas. Locate to the side of walkways so as not to impede pedestrian traffic or create safety hazards. Trash receptacles should be of the proper size and distribution to provide adequate capacity which depends on rate of trash accumulation and frequency of collection. Consider weather protection, odor containment, and desired insect-proofing when selecting unit. They should be sufficiently strong and stable to withstand Moab's winds and animals seeking food. Trash deposit opening should be approximately 3'-0" above the ground.

5. Kiosks: Kiosks can be used as information and notice centers, especially along high use pedestrian and visitor traffic areas. Locate where they are highly visible and in an area with sufficient hard surfaced paved area to accommodate users and pedestrian traffic. They should be designed to fulfill their intended function while blending compatibly with their setting. The form, scale, and materials should relate harmoniously to the architectural character of Moab and to the other street furnishings.

6. Other Site Furnishings to Consider: Bicycle racks, telephone booths, vending machines, fencing , walls, bollards, flag poles, memorials and plaques.

IV. UTILITIES

A. OBSERVATIONS

1. Overhead utilities create clutter and visual screen of the cliff and mountain views.

2. Trees located below utility lines are subject to frequent pruning and become unsightly shape and costly to maintain.

B. OBJECTIVES

Minimize visual impact of the utilities. Past emphasis has been concerned almost solely with cost and efficiency. That has lead to designs that are often unsightly and detract from the appearance of Moab. These detrimental effects can be ameliorated through appropriate location, screening and detailing of utility systems.

C. DESIGN GUIDELINES FOR POWER AND TELEPHONE

Unsightly overhead utilities should be relocated underground wherever possible; where not possible, the negative visual impact of these facilities should be minimized by location, alignment, design and screening.

1. Appearance:

a. Overhead Transmission Lines-These should be compatible with the land form and land use pattern of Moab; they should be screened from major viewing points by plant material and topographic features to minimize their silhouette and long views of the system; and they should have a simple and transparent design character.

•Street Trees. Use appropriate pruning practices. Anticipate problems when installing new streetscape to avoid conflicts of utility design and street tree type and location.

•Land Use. Overhead transmission lines should be aligned along the edges of land use areas to avoid dividing an area and creating gaps or unusable areas; alignments should avoid scenic areas. (fig.51)

•Landform. Overhead transmission lines should conform to natural landforms which should be utilized to screen them from public view; roads should be crossed obliquely father than at right angles; avoid alignments along the crests or steep grades that expose facilities to view.

•View Screening. Minimize long views and silhouette views of overhead transmission lines from along major roads and other public viewing areas. Jog

the alignment at road crossings and plant native ground covers, shrubs and low growing trees to blend in with the surrounding landscape.

b. Distribution Lines-Power distribution lines should preferably be located underground; if overhead, they should be located out of view from the main public visibility areas or screened to be as unobtrusive as possible.

•Underground. Use underground distribution lines wherever possible, especially along major roads and silhouette exposure areas such as street crossings and building feeder service.

•Overhead. Avoid alignments along major public circulation ways and, instead, use minor streets, alleyways of placements related to vegetation and topography that screen views and minimize their visual impact. Use trees to provide a backdrop to minimize the silhouette of facilities against the sky. Reduce the length of visible segments by interrupting views with trees or offsetting the location behind trees and topographic features where long views of the lines along the road would otherwise occur. Use poles and line attachments which have a simple design and whose color, materials and general appearance blend harmoniously with their surroundings. Minimize the number of poles and pole height while also making poles multifunctional, ie., power, telephone, street lighting, etc.

c. Substations and Transformers-They should be located and designed to minimize their visual impact and be compatible with the character of their setting. Substations are best located in industrial use areas rather than in major public circulation areas. Substations and transformers should be screened from public view by means of plant materials, topography and enclosure walls.

2. Environmental Impact: Minimize negative environmental impacts in the clearance and construction of facilities. Select route alignments that will maximize preservation of the natural landscape and conserve natural resources. Avoid steep slope areas with high erosion potential and areas of water, marshlands or wildlife concentration. Also promote joint-use or common utility line easements to reduce the number of individual system rights-of-way. Clear only vegetation that physically threatens the transmission lines and avoid use of spray defoliants. Employ adequate erosion and sediment control practices to minimize soil erosion during construction.

REFERENCES

Office of the Chief of Engineers, US Army. 1983. Installation Design, Government Printing Office. 157pp.

BUFFERS

Buffers are the most effective method of dealing with conflicting land uses. A buffer is a type of cushion that can soften the impact of to contrasting elements. Three types of buffers are discussed here. They include, visual, physical and sound buffers. The use of buffers can enhance land use function, pleasure and safety of a piece of real estate, all of these can translate into direct economic gain.

SOUND BUFFERS

Some general information about designing sound buffers is that sound generally travels more easily up then down. Another good tip is that although plant material is quite useful as a visual and physical sound buffer it is not an effective sound buffer. When designing sound buffers the most effective way to deal with sound is to force it over the activity area. (see figure 52)

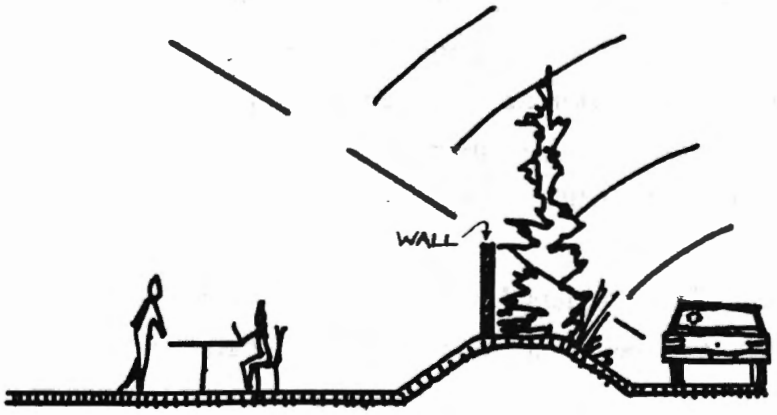


FIG. 52

Another very effective solution is to mask the sound with a more attractive sound. Falling water is probably the most widely used for this purpose and the most effective. A small fountain of waterfall promotes a relaxed environment while masking undesired sounds.

Land use activities considered sensitive to excessive noise include:
Residential areas
Hospital and Medical facilities
Education facilities
Recreation facilities
Religious facilities
City and Community facilities

Libraries

Child Care facilities

PHYSICAL BUFFERS

The buffer most closely associated with health and safety are the physical buffers. These can be used to direct traffic along desired paths, control wind and minimize conflicts between contrasting activities. An example of how contrasting activities might be buffered is shown in figure 53.

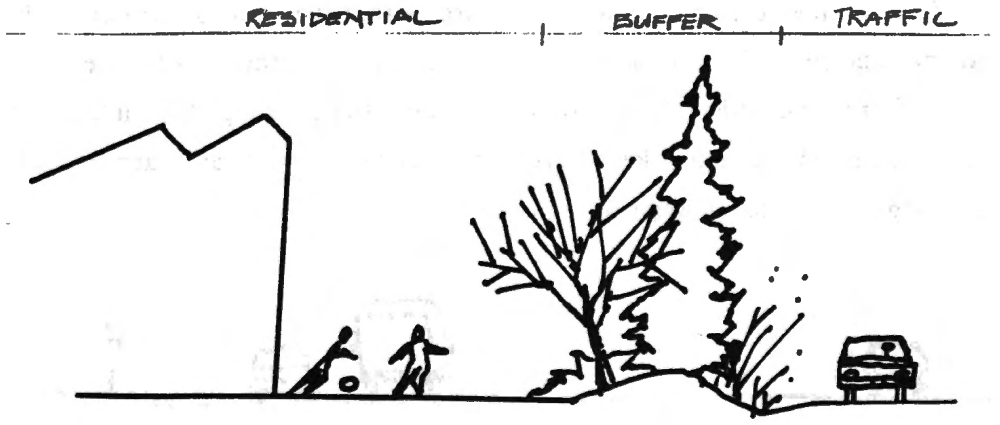


FIG. 53

VISUAL BUFFERS

The most common use for the buffer is for visual modifications. Buffers are frequently used to soften the the visual impact of areas or to change the sale of areas to make them inviting places for the pedestrian. An example of a buffer used to soften the impact of the sea of parking is shown below.(figure 54) These type of buffers are particularly effective for providing visual relief around roads walks and parking areas.

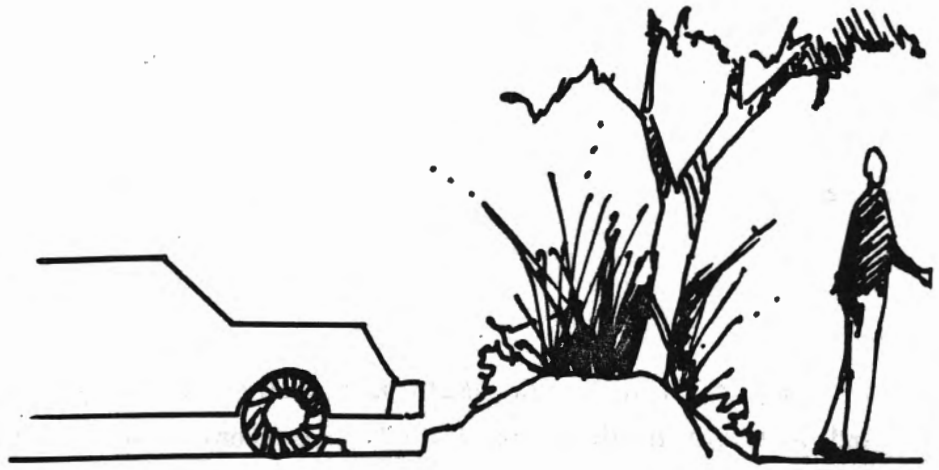


FIG. 54

As mentioned earlier buffers also help bring the scale of a large street or building down to the point where a pedestrian would feel comfortable in participating in pedestrian activities like walking and shopping along the street. For example, where large street widths are common pedestrians feel on display, unprotected. By adding a buffer of trees the canopy creates a more attractive micro climate while providing implied protection. By placing trees in islands on the road it encourages pedestrians to move from one side of the street to the other, tieing the activity of the city together. (see figure 55) Much like a river the street serves as barrier and these islands create a bridge for the pedestrian.

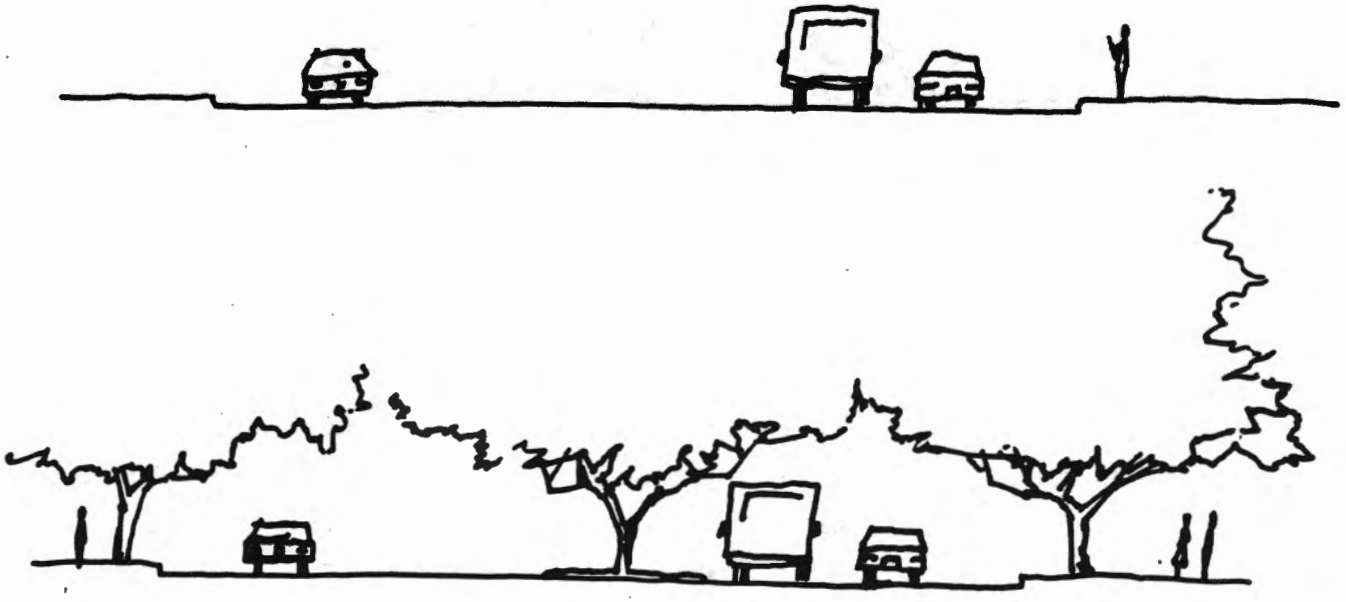


FIG. 55

This type of scale adjustment is particularly attractive in residential areas where less people are present on the street at any given time thus compounding the feeling of

openness and loss of privacy. Encouraging people to get out and interact on the street level will always improve the living atmosphere of the city.

APPENDIX C
DATA

These maps were primarily transposed and then updated from the information gathered in the 1986 USU study of Spanish Valley. Additional sources are listed on the maps and throughout the document

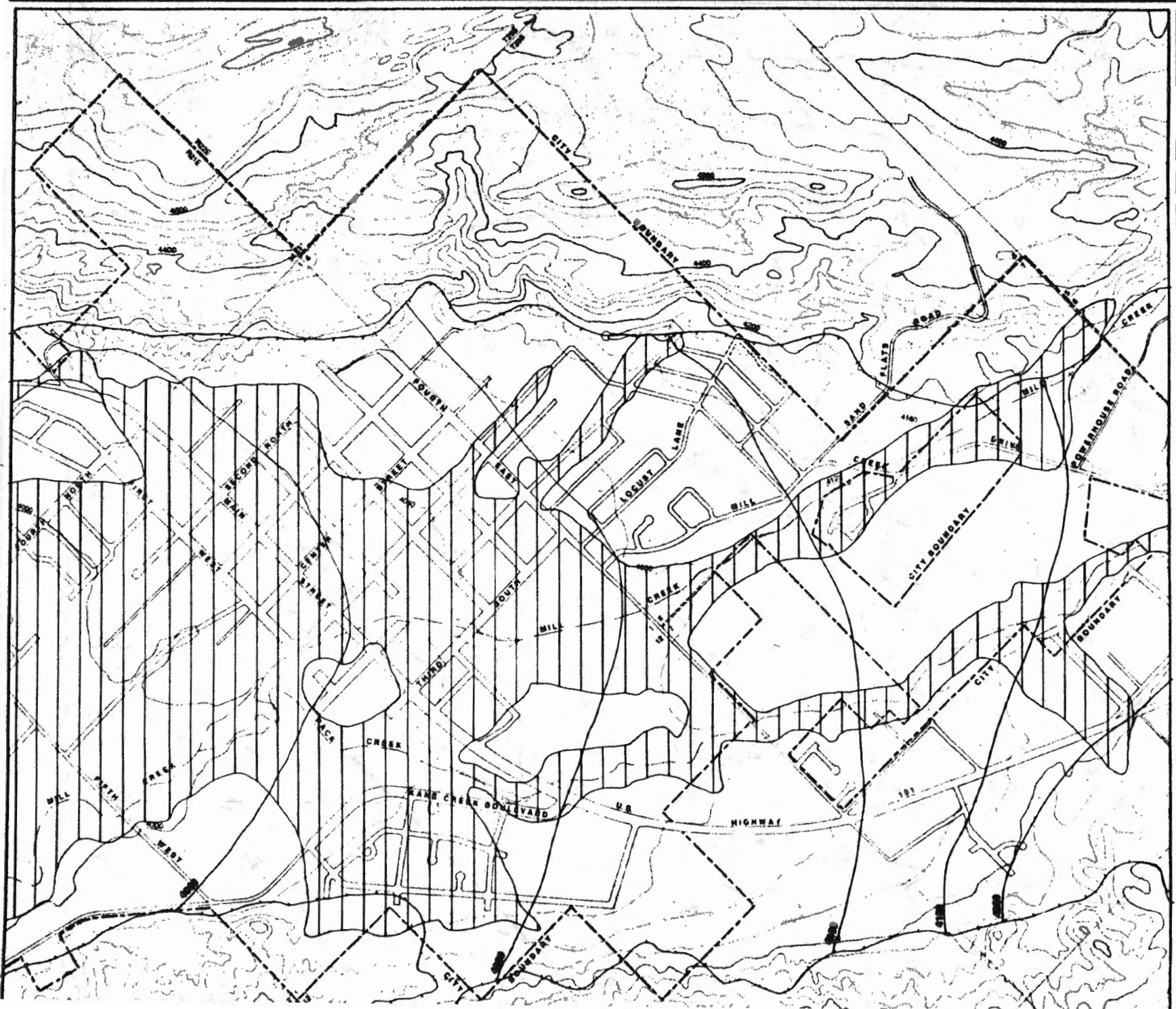
APPENDIX C

DATA MAPS:

17. Base Map
18. Hydrology
19. Soils Types
20. Soils Permeability
21. Depth to Bedrock
22. Geology
23. Slope
24. Vegetation
25. Zoning
26. Circulation and Parking

DOCUMENTATION:

Climate



MOAB UTAH

HYDROLOGY

100 YEAR FLOODPLAIN

AQUIFER PERIMETER

AQUIFER CONTOUR (ALTITUDE OF AQUIFER'S UPPER SURFACE)

SOURCE: U.S. DEPT. HOUSING AND URBAN DEVELOPMENT 1980, 1981

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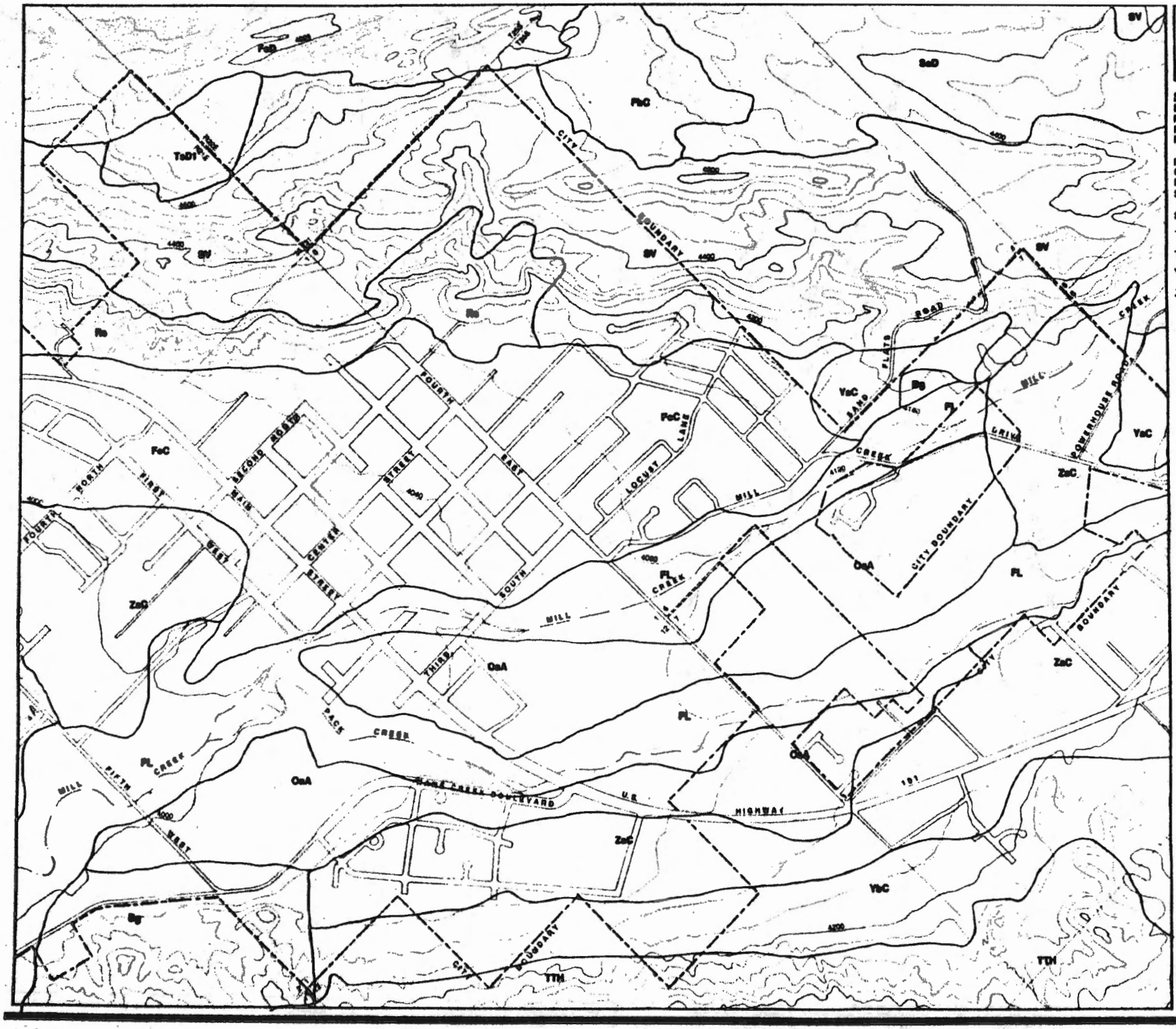
MICHAEL WARNER
GARY WEINER
CLAYTON TRAPP
ROBERT PIKE
JOHN GARDENIER
KATHLYN COLLINS

CONTOUR INTERVAL 40 FEET

0 1/4 1/2 MILES

0 500 1000 FEET


MOAB
SOIL TYPE
Bg BADLAND
FbC MIDO LOAMY FINE SAND
FeC SHEPPARD FINE SAND
FL SODIC-USTIFLUVENTS COMPLEX
FsD ROCK OUTCROP
OsA JOCITY LOAM
Rs ROCK OUTCROP
SaD MOENKOPIE - ROCK OUTCROP COMPLEX
SV ROCK OUTCROP - MOENKOPIE COMPLEX
TsD1 RIZNO, DRY-ROCK OUTCROP COMPLEX
TTH WARM-ROCK OUTCROP COMPLEX
YaC NEPALTO GRAVELLY SANDY LOAM
ZaC THOROUGHFARE FINE SANDY LOAM
CITY BOUNDARY
MILL CREEK
PL CREEK
HIGHWAY 191
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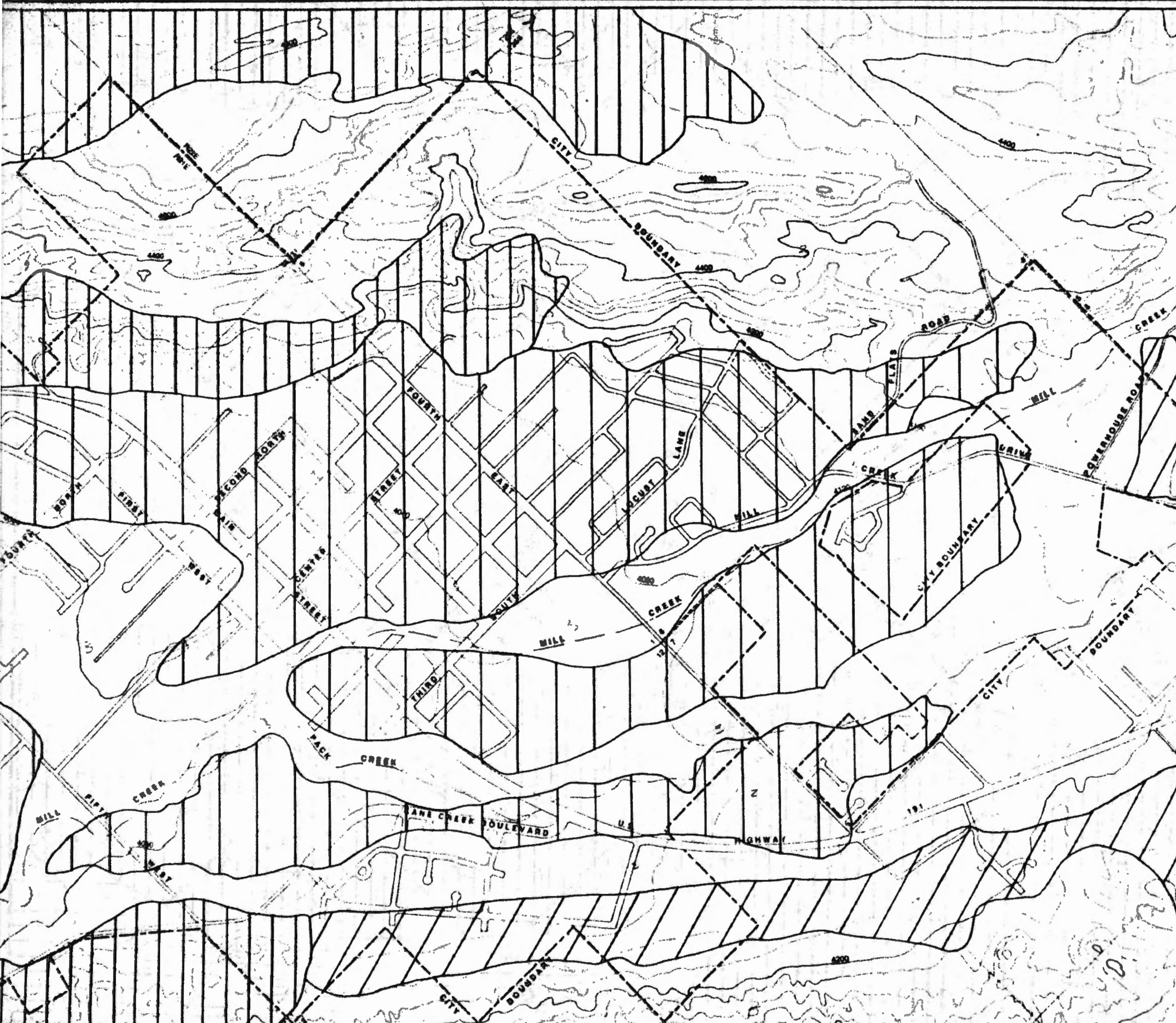
CONTOUR INTERVAL 40 FEET
MILES
FEET

MOAB

UTAH

SOILS PERMEABILITY

- ROCK OUTCROP: NO PERMEABILITY
- MODERATELY SLOW: 0.2-0.6 INCHES/HOUR
- MODERATELY RAPID: 2.0-6.0 INCHES/HOUR
- RAPID: 20 INCHES/HOUR



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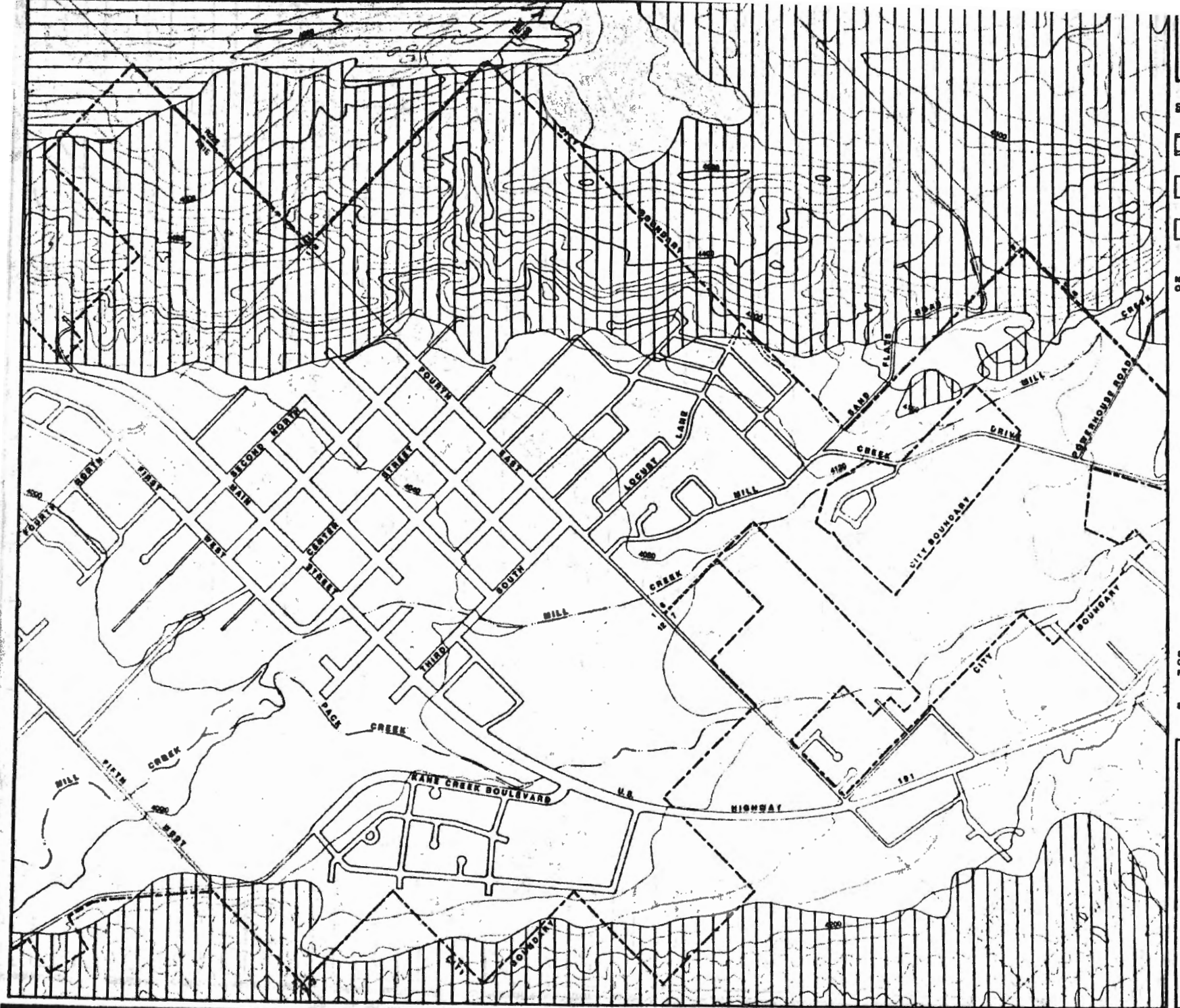
CHRIS HARTMAN — CLAYTON TRAMP
MICHAEL FERRARA
MICHAEL WARNER

CONTOUR INTERVAL 40 FEET

0 1/4 MILES

0 500 1000 FEET

20


MOAB
UTAH
SOILS: DEPTH TO BEDROCK
0 - 20 INCHES
20 - 60 INCHES
GREATER THAN 60 INCHES
NOTE: NO DATA AVAILABLE FOR THE AREA NORTH OF THE COLORADO RIVER
SOURCE: U.S. SOIL CONSERVATION SERVICE. CANYONLANDS AREA, UTAH SOIL SURVEY PRELIMINARY REPORT, 1988.
SOURCE: (BASE MAP) U.S.G.S. TOPO MAPS 1985 (1:24,000)
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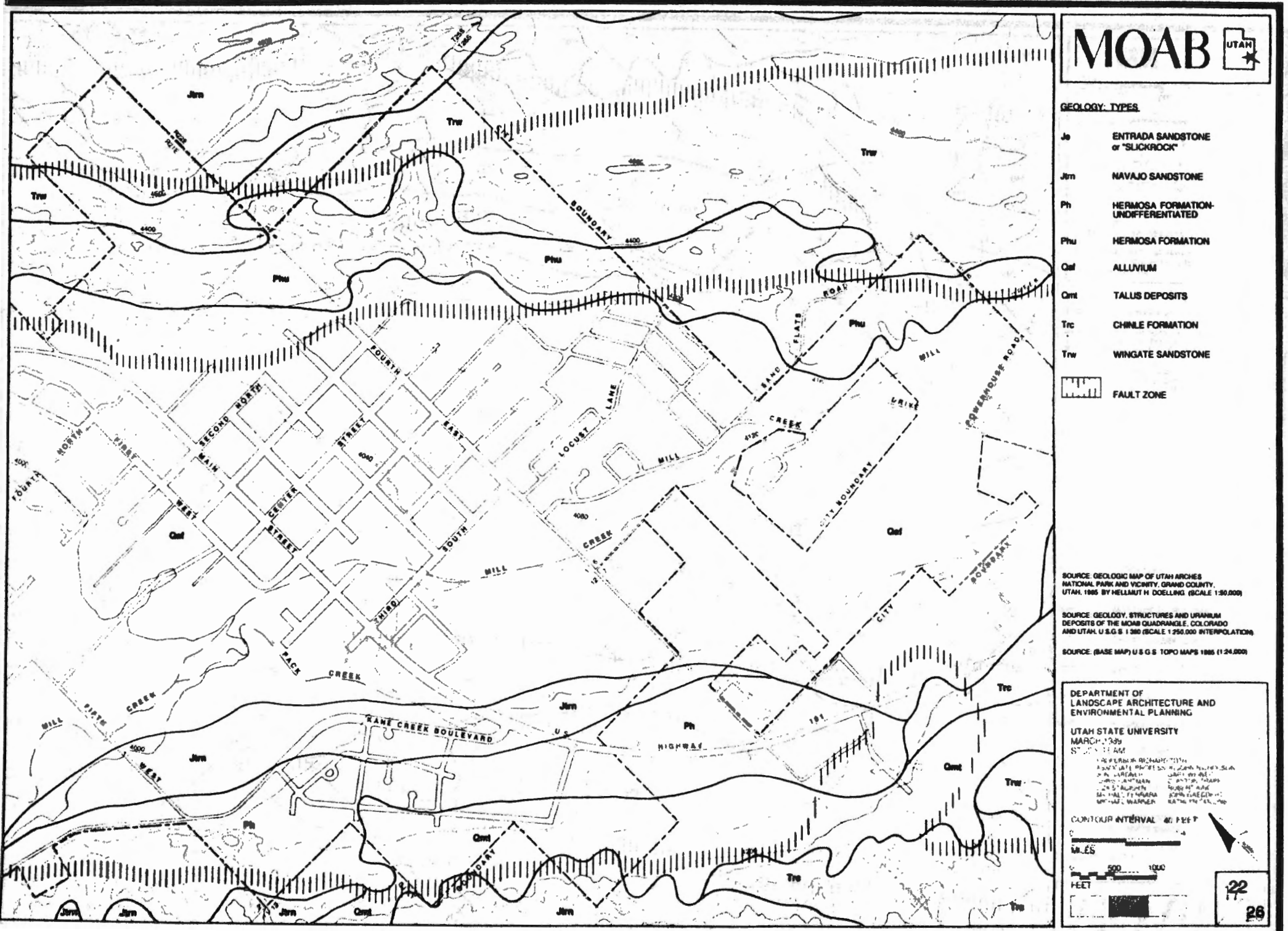
GARY WEAVER
CHRIS HARTMAN
CAROLINA TRAUT
LIZA STACKMAN
ROBERT [illegible]
MICHAEL FERRARA
[illegible]
MICHAEL WARMER
[illegible]
CONTOUR INTERVAL 40 FEET
0 1/4 1/2
MILES
0 500 1000
FEET
21
26
FOURTH NORTH
FIRST WEST
SECOND NORTH
MAIN STREET
CENTER STREET
EAST
FOURTH
SOUTH
THIRD
LOCUST LANE
MILL CREEK
MILL
SAND FLATS ROAD
COPPER
WILLOW CREEK
POWERHOUSE ROAD
CITY BOUNDARY
PACK CREEK
KANE CREEK BOULEVARD
U.S. HIGHWAY 191
5000
4800
4600
4400
4200
4000


MOAB
UTAH
GEOLOGY: TYPES
Je ENTRADA SANDSTONE or "SLICKROCK"
Jnn NAVAJO SANDSTONE
Ph HERMOSA FORMATION-UNDIFFERENTIATED
Phu HERMOSA FORMATION
Qal ALLUVIUM
Qmt TALUS DEPOSITS
Trc CHINLE FORMATION
Trw WINGATE SANDSTONE
FAULT ZONE
SOURCE: GEOLOGIC MAP OF UTAH ARCHES NATIONAL PARK AND VICINITY, GRAND COUNTY, UTAH, 1985 BY HELLMUT H. DOELLING (SCALE 1:50,000)
SOURCE: GEOLOGY, STRUCTURES AND URANIUM DEPOSITS OF THE MOAB QUADRANGLE, COLORADO AND UTAH, U.S.G.S. I 380 (SCALE 1:250,000 INTERPOLATION)
SOURCE: (BASE MAP) U.S.G.S. TOPO MAPS 1985 (1:24,000)
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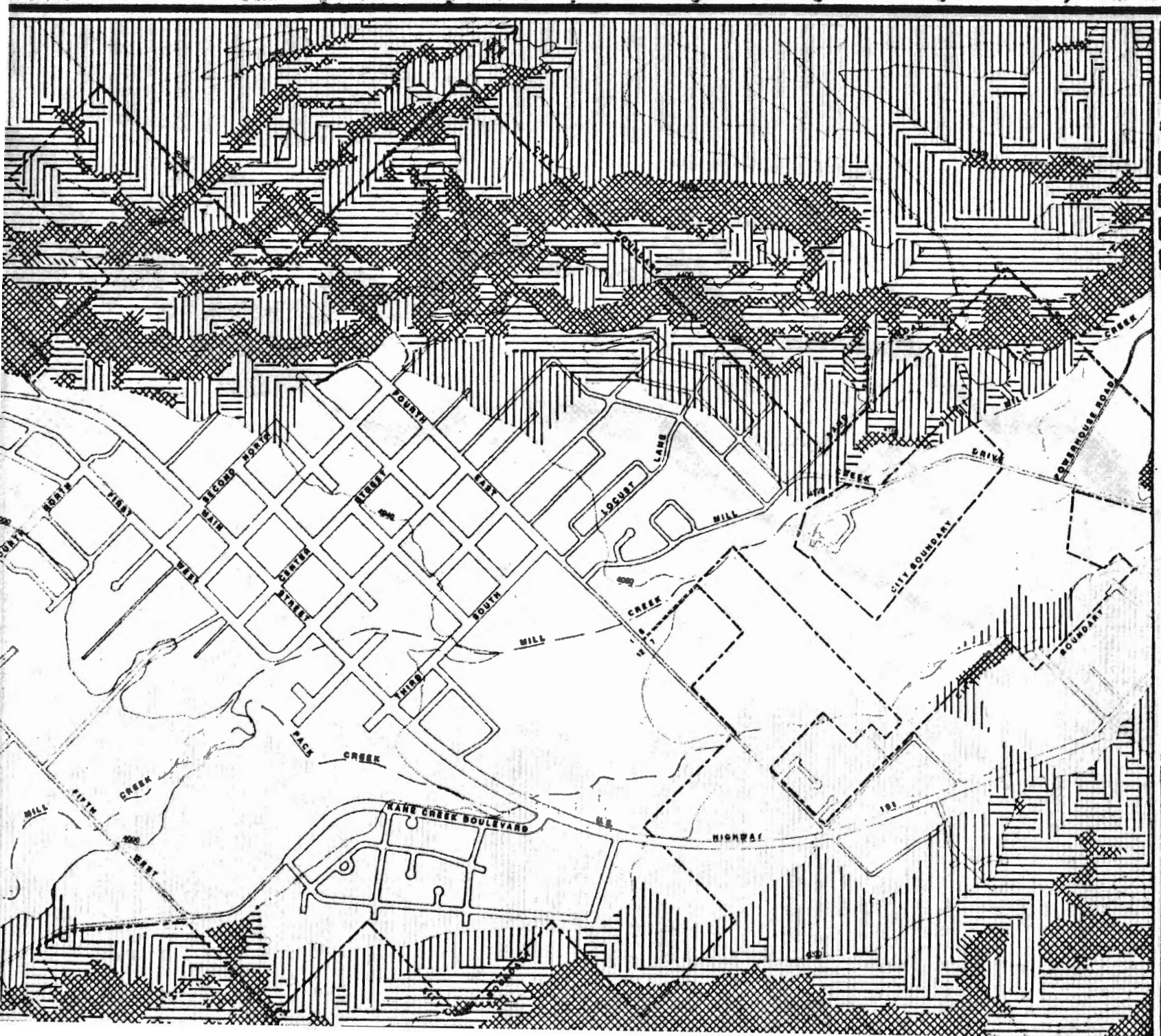
UTAH STATE UNIVERSITY
CONTOUR INTERVAL 40 FEET
MILES
FEET
22
26


MOAB
UTAH
SLOPE
0-5%
5-15%
15-25%
25% -OVER
SOURCE: USGS QUAD
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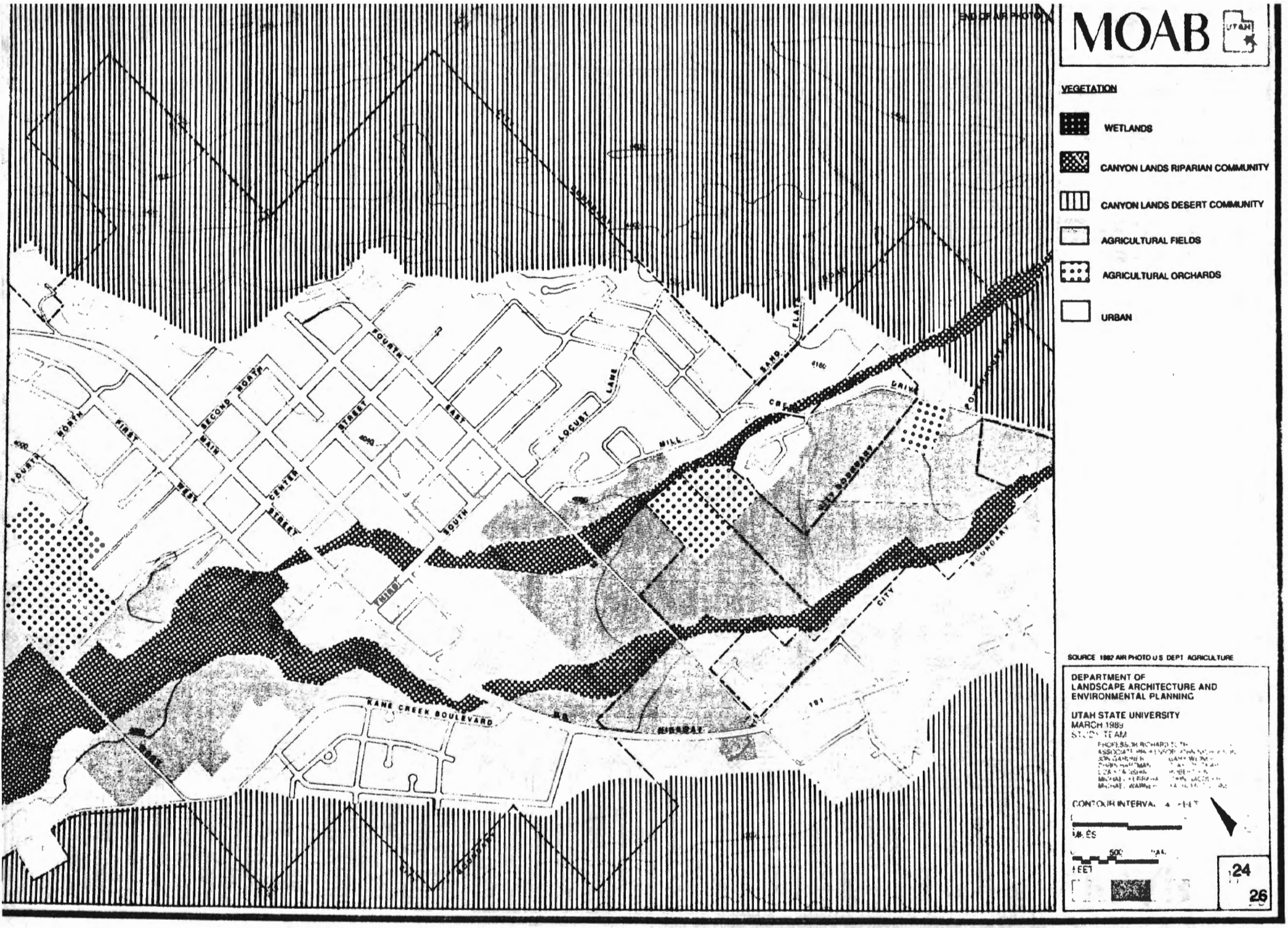
MICHAEL FUHRMANN
MICHAEL WARNER
CONTOUR INTERVAL 40 FEET
MILES
FEET
23
26
MAIN STREET
CENTER STREET
FIRST WEST
SECOND NORTH
FOURTH EAST
SECOND SOUTH
THIRD SOUTH
LOCUST LANE
MILL CREEK
PACK CREEK
KANE CREEK BOULEVARD
HIGHWAY
191
CITY BOUNDARY
POWERHOUSE ROAD
DRIVE


MOAB
UTAH
VEGETATION
WETLANDS
CANYON LANDS RIPARIAN COMMUNITY
CANYON LANDS DESERT COMMUNITY
AGRICULTURAL FIELDS
AGRICULTURAL ORCHARDS
URBAN
SOURCE 1982 AIR PHOTO U S DEPT AGRICULTURE
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ENVIRONMENTAL PLANNING
UTAH STATE UNIVERSITY
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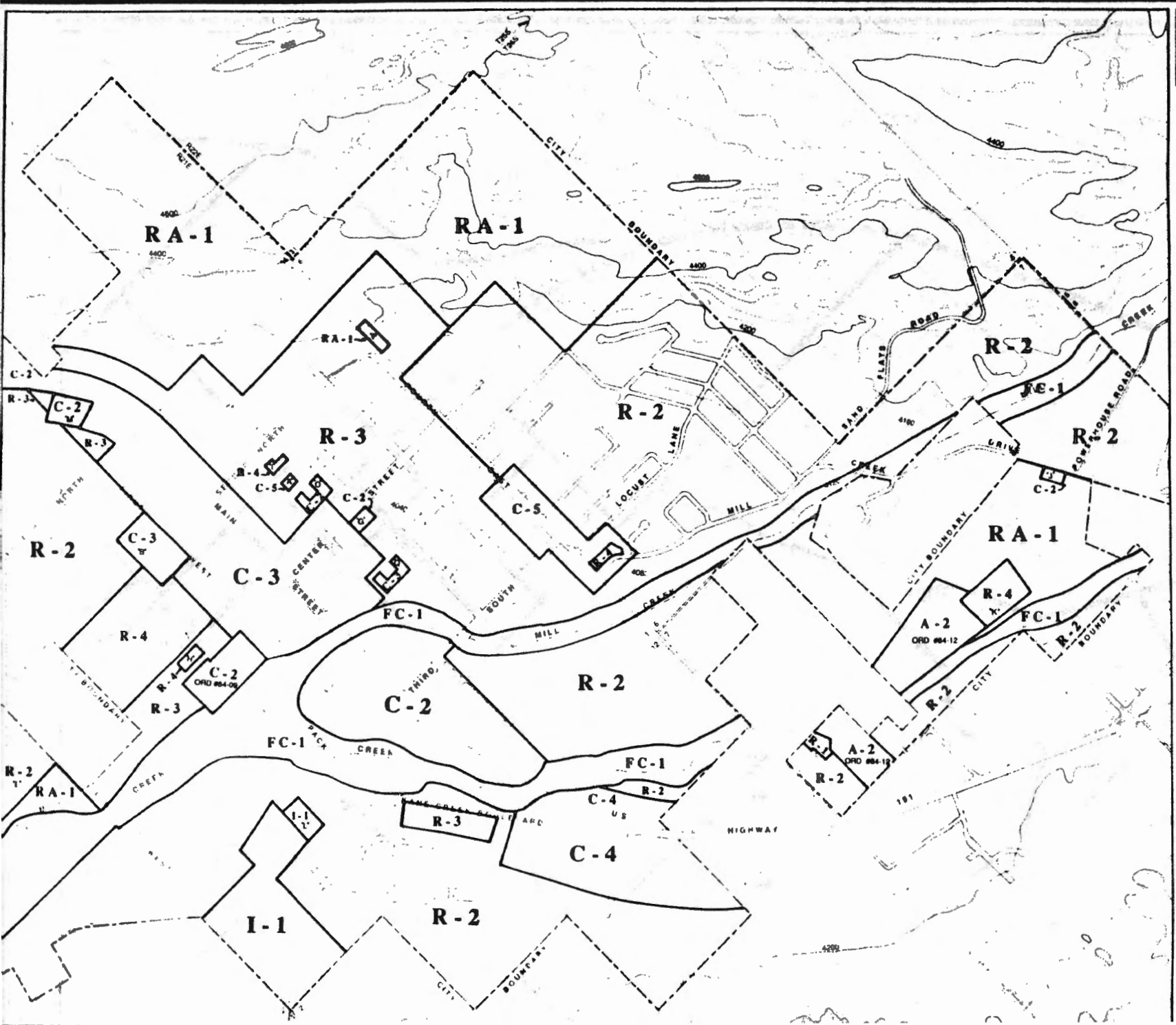
CONTOUR INTERVAL
MILES
FEET
500
24
26
SCALE OF AIR PHOTO
FOURTH
SECOND NORTH
NORTH
KIRBY
MAIN
WEST
CENTER
STREET
EAST
SOUTH
THIRD
LOCUST
LANE
MILL
CREEK
DRIVE
SAND
FLATS
ROAD
BOULDER
MOUNTAIN
CITY
BOUNDARY
KANE CREEK BOULEVARD
U.S.
191
MURRAY
ROAD
CANYON
ROAD



MOAB UTAH

ZONING

RA-1	RESIDENTIAL - AGRICULTURE ZONE
R-1	RESIDENTIAL ZONE
R-2	RESIDENTIAL ZONE
R-3	RESIDENTIAL ZONE
R-4	RESIDENTIAL ZONE
FC-1	FLOOD CHANNEL ZONE
C-2	COMMERCIAL - RESIDENTIAL ZONE
C-3	CENTRAL COMMERCIAL ZONE
C-4	GENERAL COMMERCIAL ZONE
C-5	NEIGHBORHOOD COMMERCIAL ZONE
R&D-1	RESEARCH AND DEVELOPMENT ZONE
I-1	INDUSTRIAL
MH/RV-1	MOBILE HOME/ RECREATIONAL VEHICLES

ADOPTED BY MOAB CITY COUNCIL	APRIL 30,1974
EFFECTIVE	JUNE 30,1974
MAP UPDATED	JULY 5, 1988

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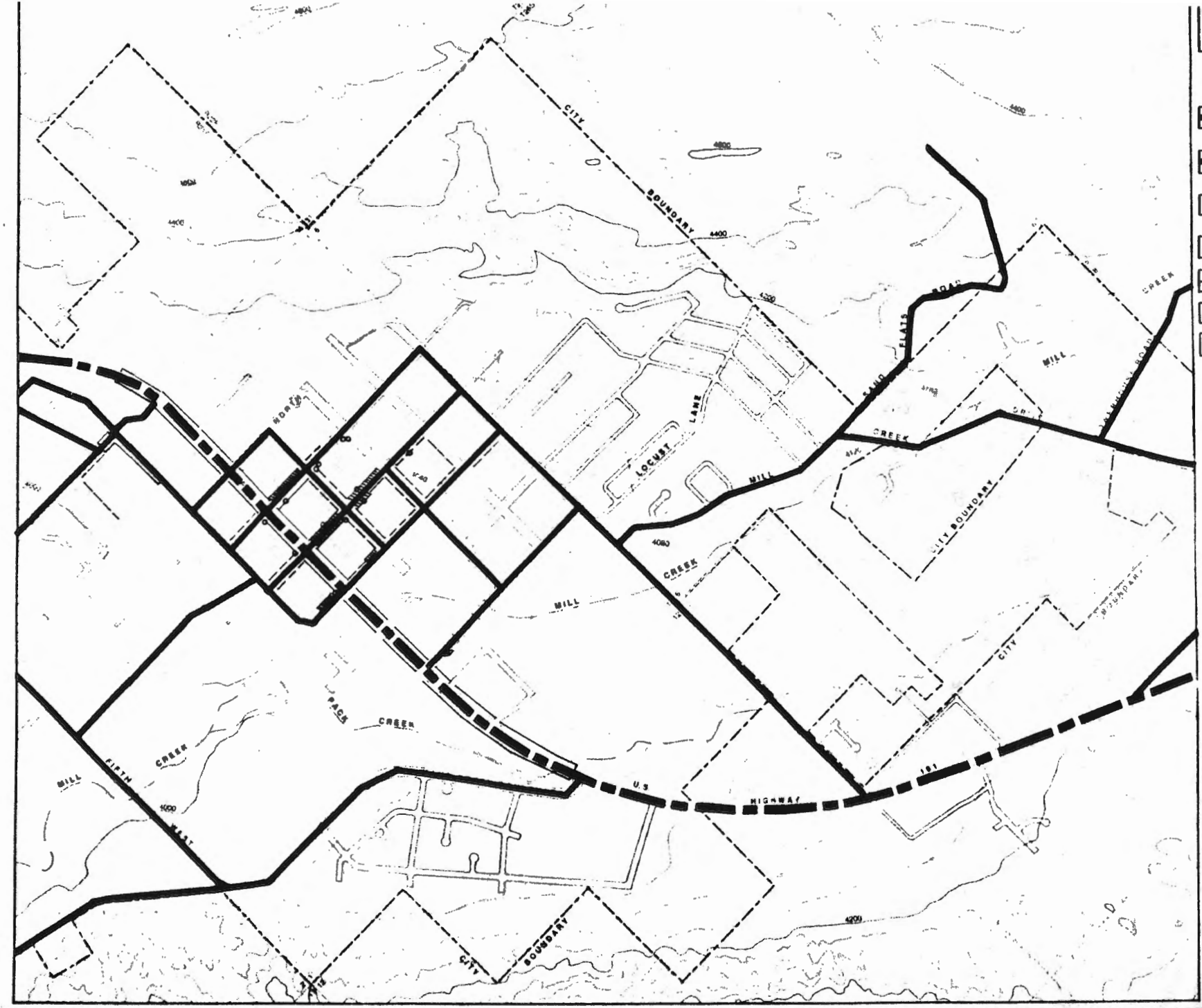
MARCH [illegible]
STUDY AREA

CONTOUR INTERVAL [illegible] FEET

MILES

500 [illegible]
FEET

25
26



MOAB

CIRCULATION AND PARKING

- ARTERIAL
- COLLECTOR
- LOCAL
- PARALLEL (MARKED)
- DESIGNATED ANGLE (UNMARKED)
- ANGLE PARKING (MARKED)
- HANDICAPPED PARKING (UNMARKED)

SOURCE: (BASE MAP) U.S.G.S. TOPO MAPS 1985 (1:24,000)

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ANDERSON, BLANKENSHIP, SMITH

REBEKAH BRADLEY, BRENT BROWN, JEFF

KEN GARDNER

CHRIS HARTMAN

LISA KLEINMAN

MICHAEL WARNER

CONTOUR INTERVAL 40 FEET

MILES

FEET

26

CLIMATE IN THE BUILT ENVIRONMENT

Moab lies in the Upper Colorado River Basin of Southeastern Utah. The climate is due more the the influence of mountain ranges on the movement of air masses than to latitude. The high mountains are comparatively cool and wet, whereas the lower mountains and plateaus are dry and warm. The interior valleys at low elevations, like Moab, are hot and dry in the summer and cold in the winter.

Precipitation

In Moab, precipitation is erratic, occurring in large, localized quantities over short periods. Moab receives an average annual rainfall of 8.40 inches with upwards of 6 inches falling between October to April. The remaining amount falls between May and September. September and October are the wettest months while June and July are the driest. The frost-free period for Moab ranges from 190 to 210 days. Moab also claims to have 313 days of sunshine, the highest amount for the state. (Master Plan 1969)

Humidity and Temperature

Moab is in a cold desert environment. Summers are characterized by hot, dry weather with temperatures ranging in the 90's and occasionally in the 100's, and lows in the 50's and 60's. The winters are cold and dry with temperatures rarely dropping below zero. The average annual temperature is 50 degrees. The highest average temperature is 76 degrees, occurring in July while the lowest average temperature is 26 degrees, occurring in January. The dryness of the desert the air affects the comfort of people and the survival of certain plants. The open water and vegetation along the riparian areas of the streams and the Colorado River and its wetlands (see Vegetation) contribute cooling moisture to the air through evapotranspiration (see the Climate Model,1986). Mill and Pack Creek both pass through the city's incorporated boundary offering direct opportunities to use this beneficial characteristic. Both creeks flow year round and have relatively dense vegetation along their banks. Enhancing the riparian vegetation, providing a circulation corridor for nonmotorized use and linking it to the rest of the city circulation system not only provides a service but improves the image of Moab as an oasis.

The urban environment, with all of the concrete, asphalt, and brick used in municipal circulation systems and building construction, absorb solar radiation

during the daytime and emits it back into the atmosphere at night. One of the results of this change in surface material from the naturally reflective vegetation to absorbtive hard materials is the general decrease of human comfort in the built environment. There is an increase in glare and heat. The change also promotes energy consuming techniques to cool and heat buildings. Preserving and planting vegetation can help to alleviate this problem (see Vegetation Environmental Criteria)

Winds and Storms

Prevailing winds are from the south west. Winter storms are from the north. The Storms can be sudden and fierce accompanied by high winds and driving rain or snow. They often pass quickly but potentially create flash flood conditions in Moab if the event occurred up stream. The cool air generally flows down the creeks and along the Colorado River. The cool air will flow down the canyon walls in the morning before the sun has heated up the valley bottom. In the evening, the direction is reverse and the warm air rises and quickens where there is an obstruction such as the canyon walls and the creek channels. These conditions are generally site specific and require an on site analysis to determine how to guard against or work with it.

As with solar considerations, wind must be taken into account when designing the human environment. Directional screening is important for winter winds. The design elements must also be able to withstand occasional or prolonged high velocities, such as signs and street furnishings (see Appendix B: Signs and Street Furnishings)

References: University of Utah and the Bureau of Community Development, "Grand County Development: A Masterplan for Development," 1979

*The vegetation is also important for the quality of being able to cleanse the air of pollutants. They inhale carbon dioxide and respire oxygen.

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Christine Robbins
Dave Sorrison
Jamie Walker
Kyle Bailey
city office