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PROBLEM IDENTIFICATION & ALTERNATIVE SOLUTIONS

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CONTRACT FOR LANDSCAPE VISUAL RESOURCE PLAN
Spook Hill Flood Retarding Structure
 Mesa, Arizona

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 2801 W. Durango
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February 4, 1976

Prepared for
 United States Department of Agriculture
 Soil Conservation Service
 Room 6029 Federal Building
 Phoenix, Arizona 85025

Prepared by
 A. Wayne Smith & Associates
 2120 South Rural Road
 Tempe, Arizona 85282

FLOOD CONTROL DISTRICT
 OF
 MARICOPA COUNTY
 3325 W. DURANGO
 PHOENIX, ARIZONA 85009





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PHOENIX, ARIZONA 85009



February 4, 1976

Mr. Paul Monville, Design Engineer
Soil Conservation Service
Federal Bldg., Room 6433
230 North 1st Avenue
Phoenix, Arizona 85025

Dear Mr. Monville:

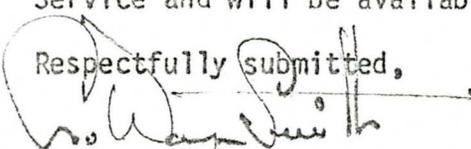
Submitted with this letter is the report "Problem Identification and Alternative Solutions" which pertains to the landscape and use design phase of the Spook Hill Flood Retarding Structure part of the Buckhorn-Mesa Watershed Project.

Prepared by A. Wayne Smith & Associates, under contract with the Soil Conservation Service, this study has focused on the following major objectives:

1. To record and describe the basic visual resources within the study area;
2. To analyze these visual resources in order to assess the overall visual impact which will be created by the construction of the the Spook Hill dike;
3. To sample public opinion concerning this project in an attempt to evaluate the alternative use proposals as they affect public interest and;
4. To prepare a minimum of three alternative landscape and use solutions for the Spook Hill Project area and to include cost summaries for each.

The consultants appreciate this opportunity to work with the Soil Conservation Service and will be available for any desired assistance as the project develops.

Respectfully submitted,


A. Wayne Smith
Landscape Architect

clb

TABLE OF CONTENTS

Page No.

CHAPTER 1 --- VISUAL RESOURCE DATA

1-13

CHAPTER 2 --- ANALYSIS OF VISUAL DATA

15-19

CHAPTER 3 --- PUBLIC INTEREST AND OPINIONS

20-21

CHAPTER 4 --- CITY AND COUNTY PARKS

22-23

CHAPTER 5 --- ZONES OF DEVELOPMENT

24-32

CHAPTER 6 --- DEVELOPMENTAL SYSTEMS

33-37

CHAPTER 7 --- SOLUTION AND ALTERNATIVES

38-44

APPENDIX

Functional Combinations of Developmental Systems

45-78

Usery Mountain Semi-Regional Park Master Plan

79-80

Maricopa County Hiking and Riding Trails Map

81-82

Park and Trail Systems Map

83

Maricopa County Parks Letter

84-85

Concept Drawings

86-91

Supplemental, Pre-conceptual Use Drawings

92-94

BIBLIOGRAPHY

95

CHAPTER 1

VISUAL RESOURCE DATA

Visual resources were documented by multi-frame, panoramic views. The photos include the Spook Hill Floodway and Flood Retarding Structure right-of-way areas. The visual tour begins in the north and continues to the south and southeast. The last panoramic views provide a general summary. See key on each photo page for orientation.

Photo One

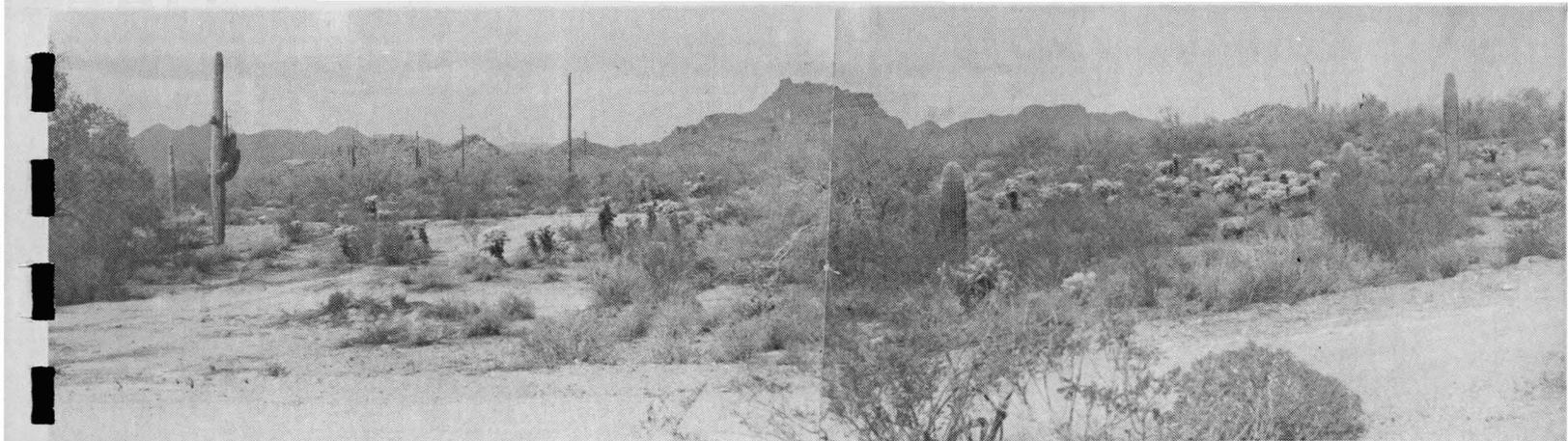
This is a view looking northward along the 250' wide, floodway right-of-way from the Red Mountain Ranch road. The area is typified by larger wash forms created by Spook Hill to the east of this site. In this arid climate, a higher density of natural plant material is supported along the banks of washes. Note the high density of understory and canopy in the photograph. A paloverde and saguaro are located on a wash running right to left, parallel to the foreground roadway. Stands of Jumping Chain Cholla are visible on the right. A Teddy Bear Cholla is just in view on the far right. The rugged and irregular terrain of Mount McDowell is depicted in the center background.

Photo Two

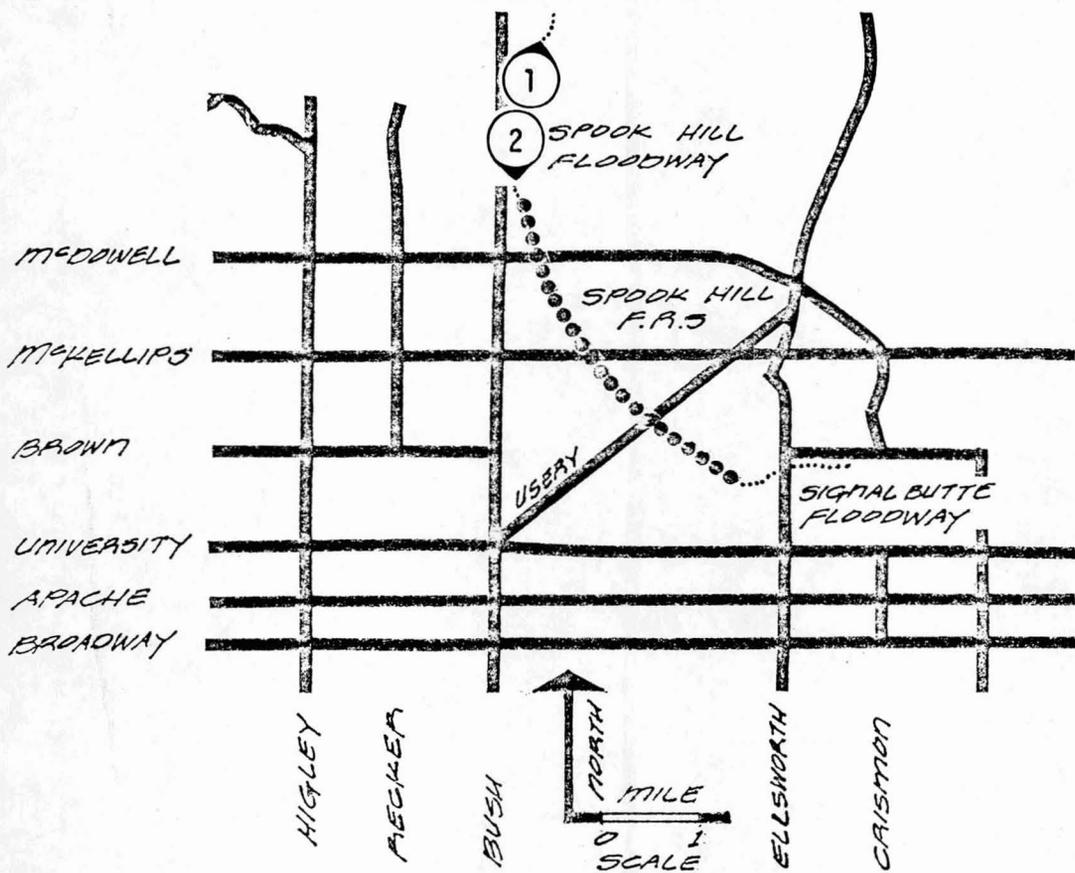
This view is from the same area as Photo One, except the view is southward along the right-of-way. Note the sandy wash in the foreground and high density of creosote bush in the background.

Photo Three

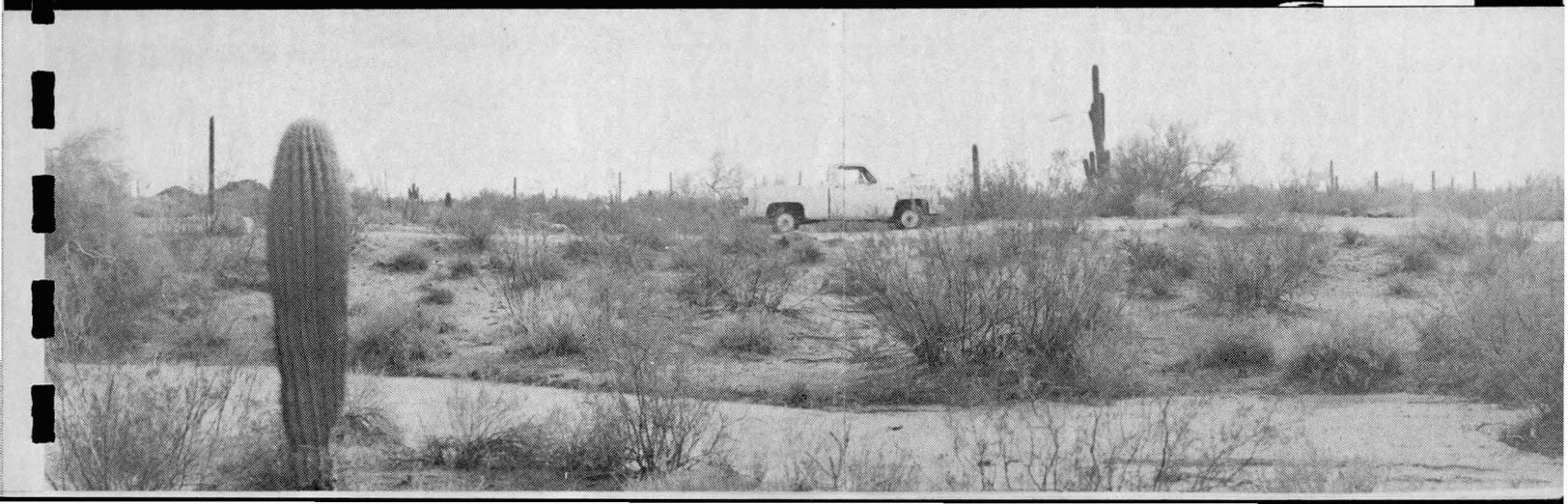
The view is from Bush Highway looking southeast. Located 1,000 feet in the background will be the terminating end of the flood retarding structure. On the right side of the photo, the structure will be viewed at a location 25' above the observer and will be located 500' in the background. On the left side of the photo and 1,000'



1



2



in the background, the existing grade rises to an elevation equal to the crest of the dam. Note that the area is still one characterized by wash formations and dense foliage.

Photo Four

The view is again from Bush Highway looking due east. The emergency spillway would be facing the observer and be 500' in the background. The top of the dam would be 20' above the observer with the top of the concrete spillway being 13' above the observer. From the roadway an area of vertical concrete about 6' in height and 260' in width should be visible. Other than these, an earthen ramp on each side of the spillway, each with a 20' wide crown plus 2:1 slopes to existing grades, would be in view.

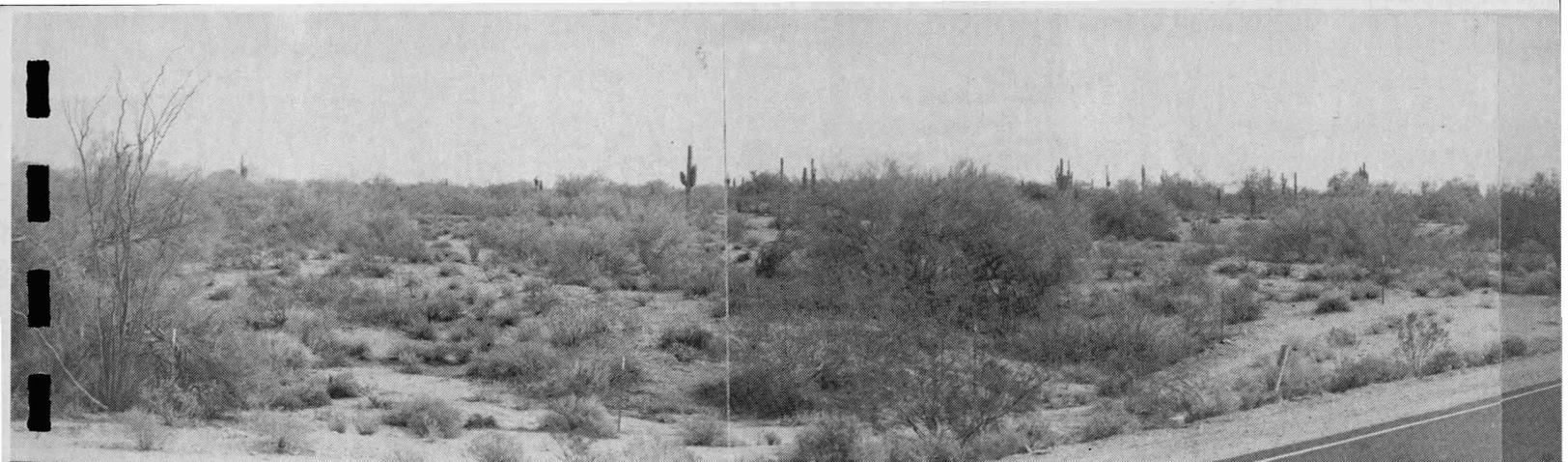
The existing landscape canopy in this specific location is reduced in density in comparison with areas to the north.

Photo Five

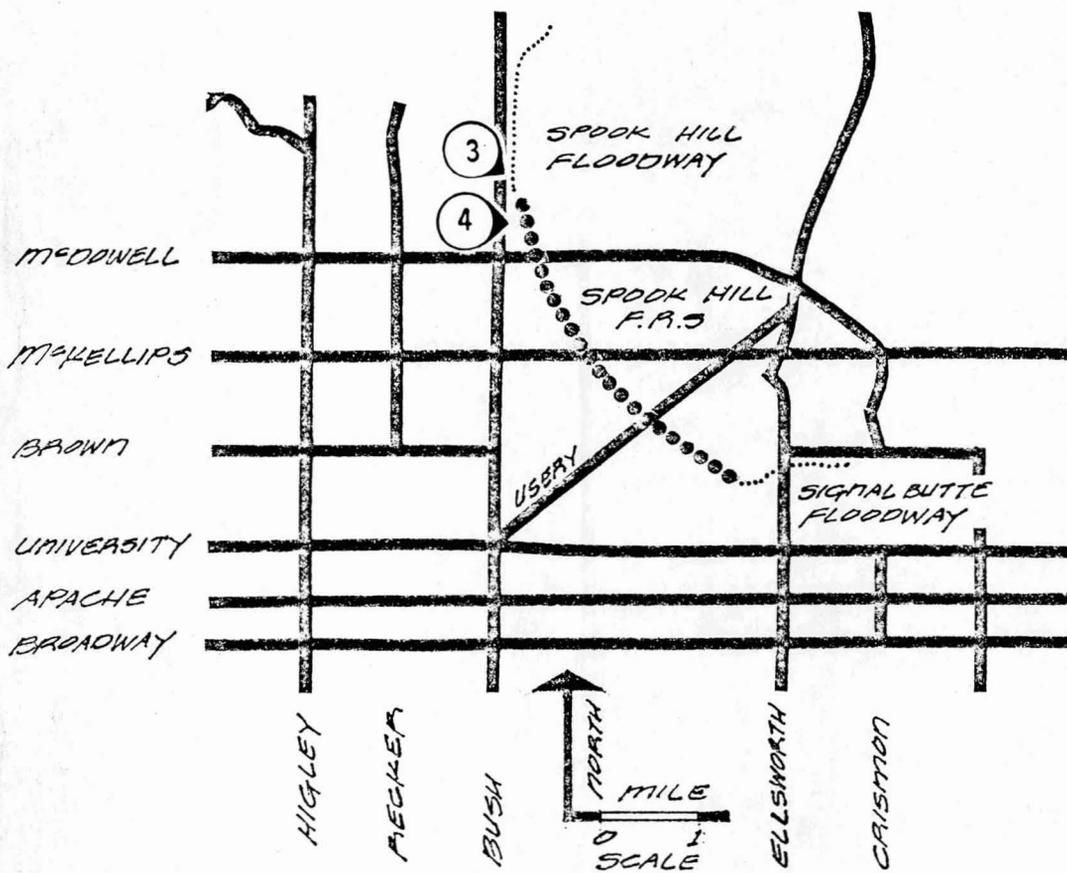
This view is looking eastward along McDowell Road towards the F.R.S. right-of-way. The structure shall be 20' above the existing grade at this point. Note the white truck for scale; the black form next to the truck represents the height of the dam when viewed from downstream. The rugged formation of the Utery Mountains is visible in the background. Note the height of canopy adjacent to the black form.

Photo Six

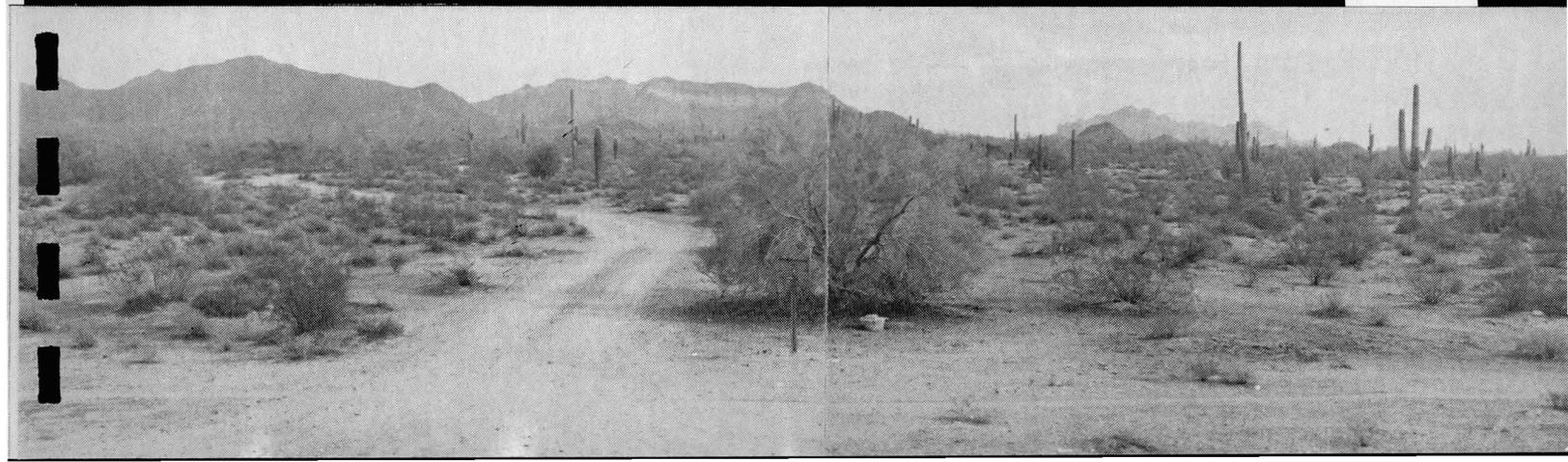
This photo is similar to Photo Five except it is illustrating the area west to downstream along McDowell Road. It represents the upstream view of the structure. Note again the canopy height next to the black form. A ramp over the structure will be provided for this roadway.



3

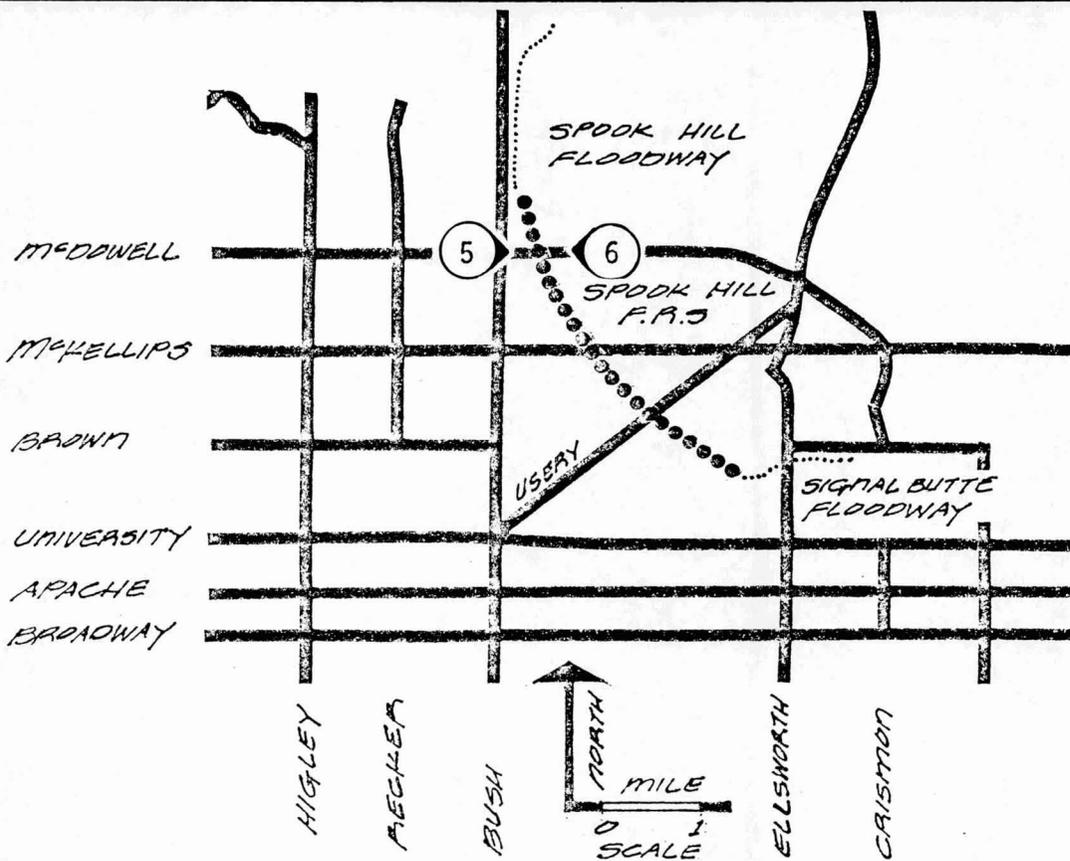


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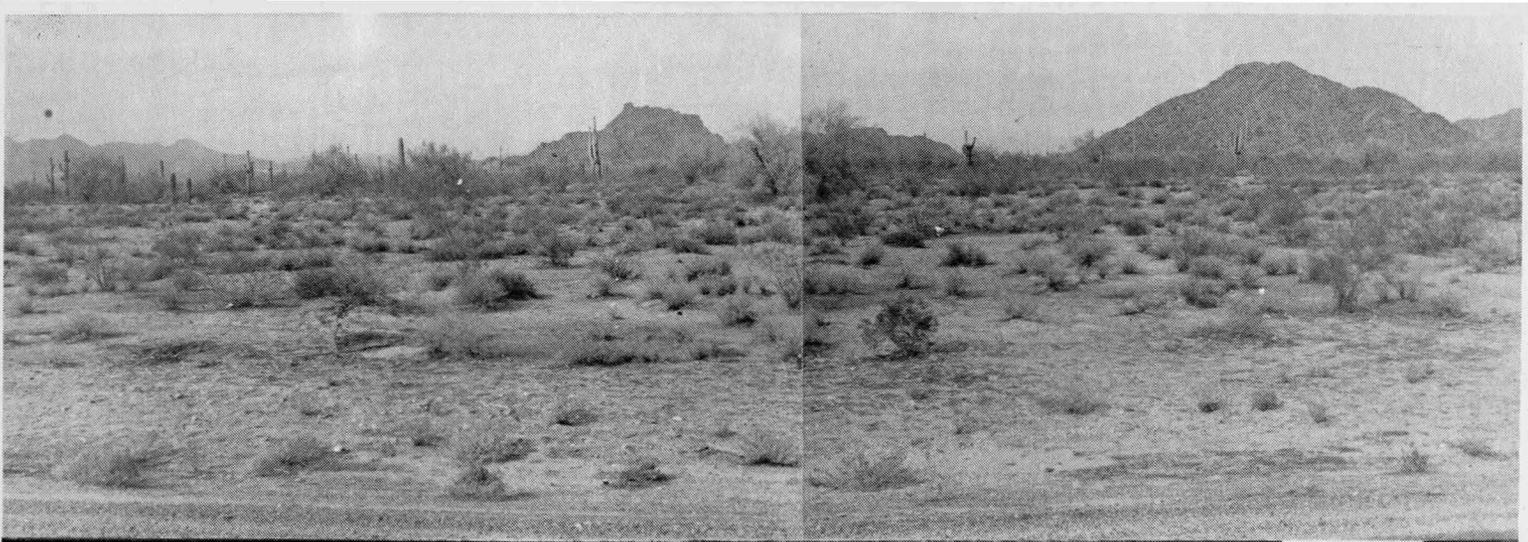


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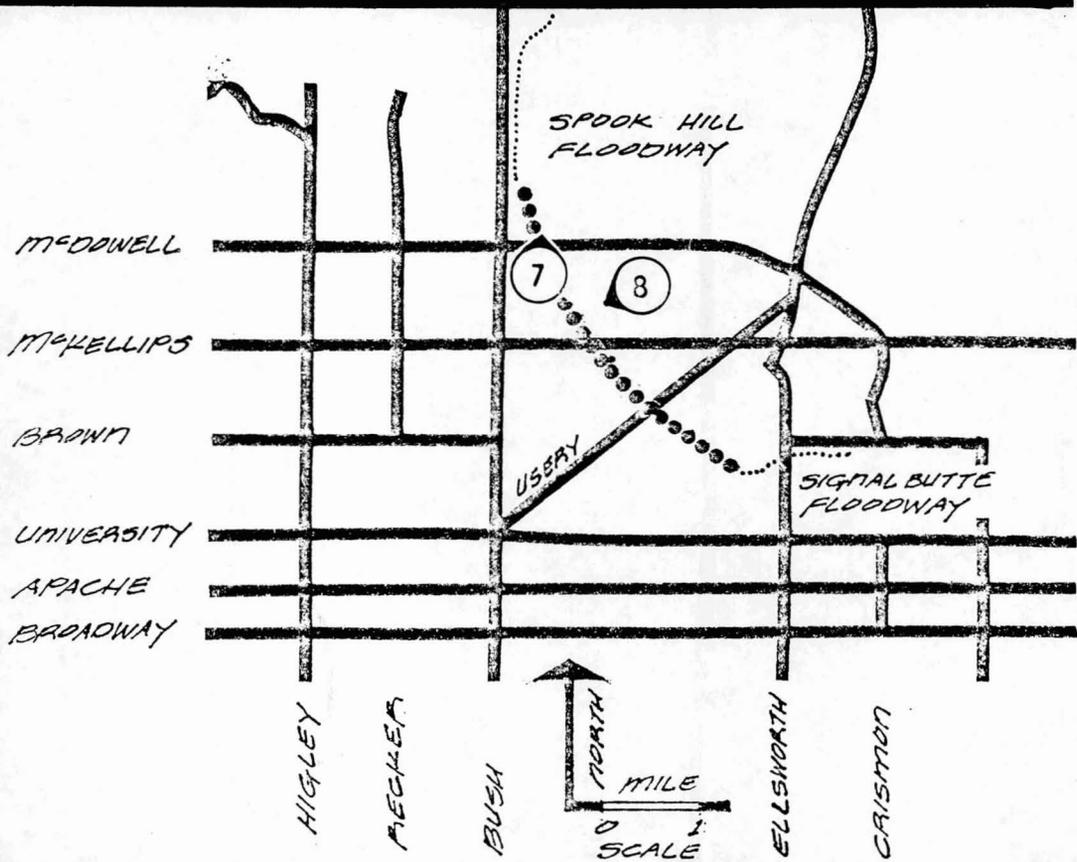


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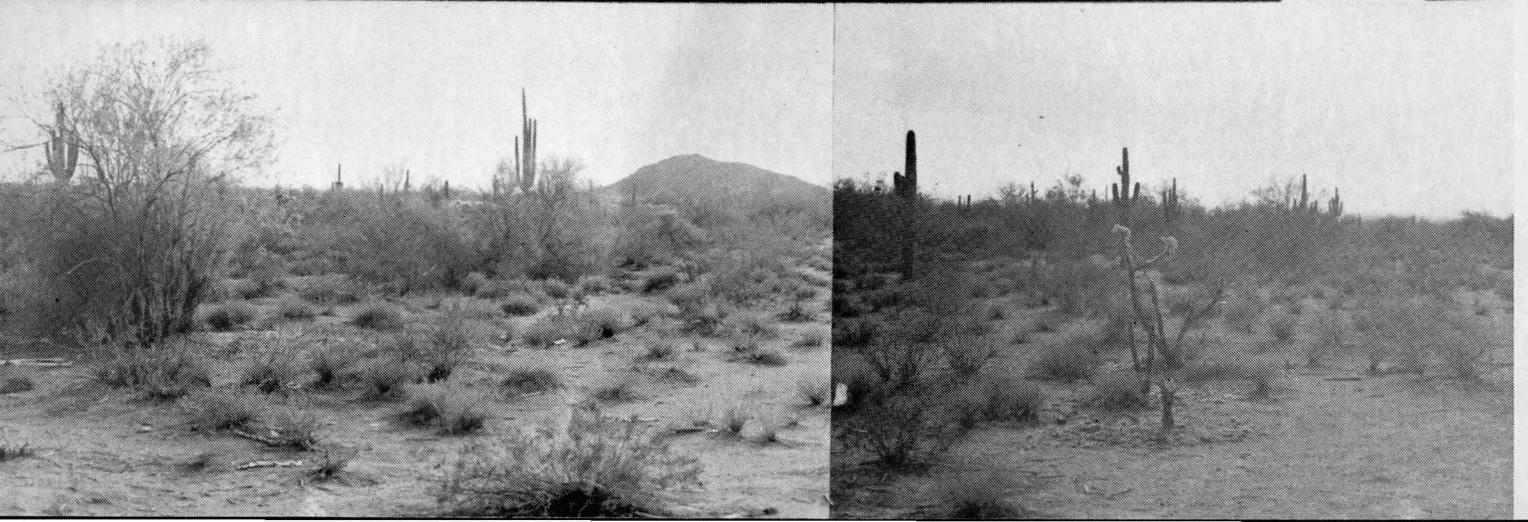


Photo Seven

This is a view northward from McDowell Road along the dam right-of-way. At this point the flood retarding structure right-of-way is approximately 900' wide.

Photo Eight

Here the view is from an existing subdivision looking to the southwest at the distant structure right-of-way. Note the existing heavy vegetation.

Photo Nine

The roadway in the photo is McKellips. Note the white truck which is on the structure right-of-way. The black form represents the height of the structure at this point when viewed from downstream. The Usery Mountains are in the background. These mountains again represent the typical type of irregular skylines visible in this desert area.

Photo Ten

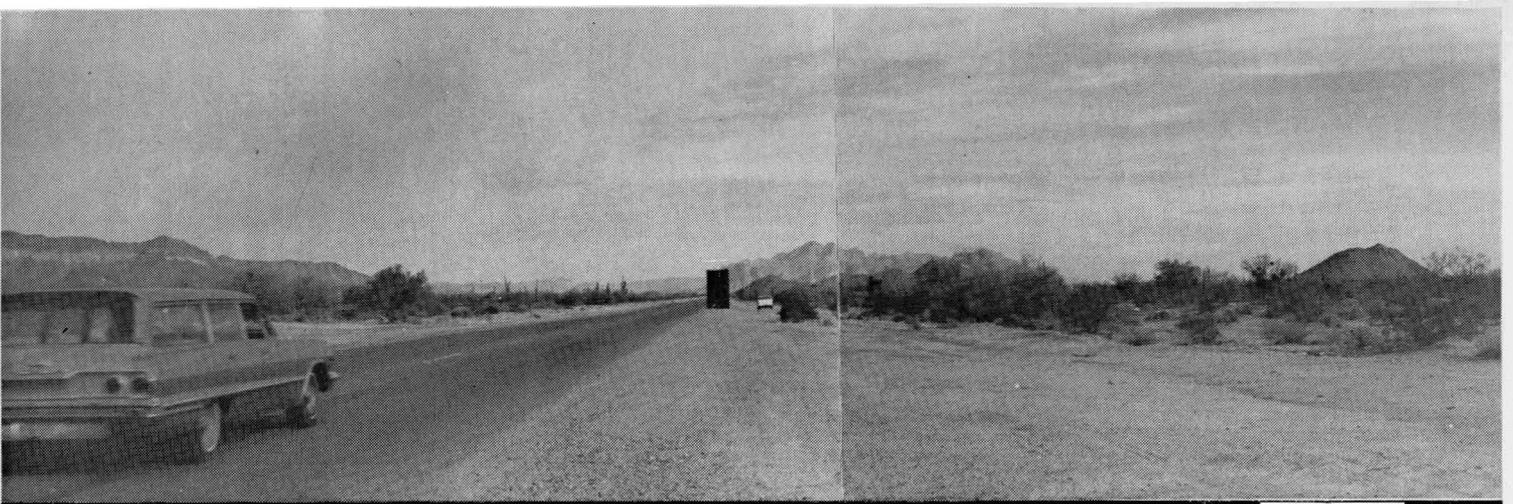
This photo is similar to Photo Nine but in a westward direction representing an upstream view along McKellips. A ramp will be provided for this roadway over the dam structure.

Photo Eleven

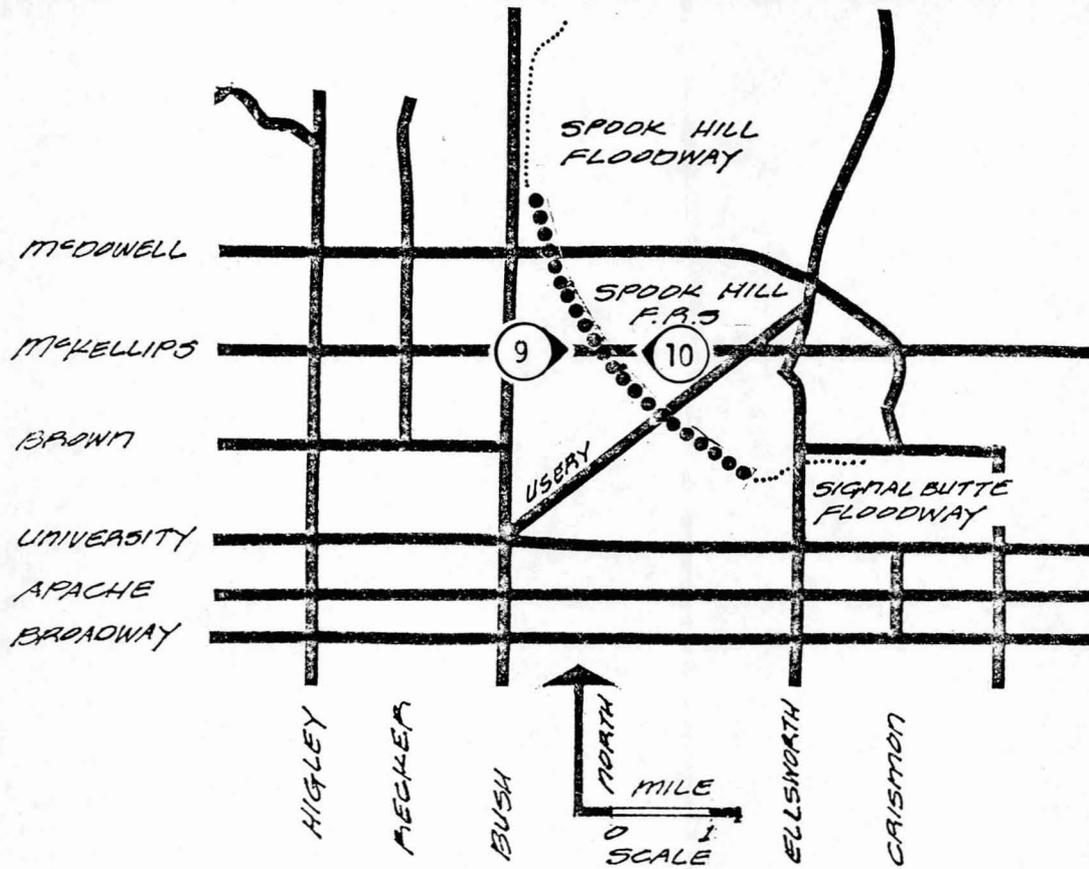
This photo is taken from the center of the structure as it crosses Usery Pass Road. The view is northeastward towards the Usery Mountains. This roadway will be abandoned with a direct view of the dam resulting.

Photo Twelve

This view was obtained from the same location as in Photo Eleven. The direction is to the northwest along the right-of-way. The water storage tank on the right is on the upstream edge of the 110' right-of-way. Note the ironwood tree in the foreground right, next to a major wash formation. A Blue Paloverde is in the left foreground with major understory consisting of creosote bush and bursage.

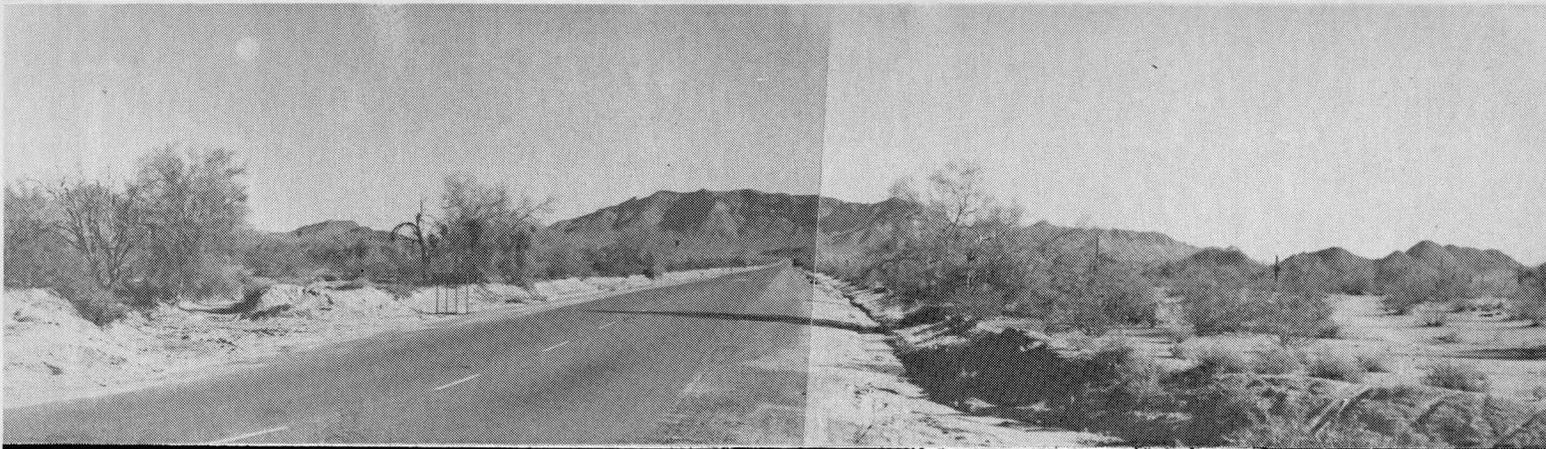


9

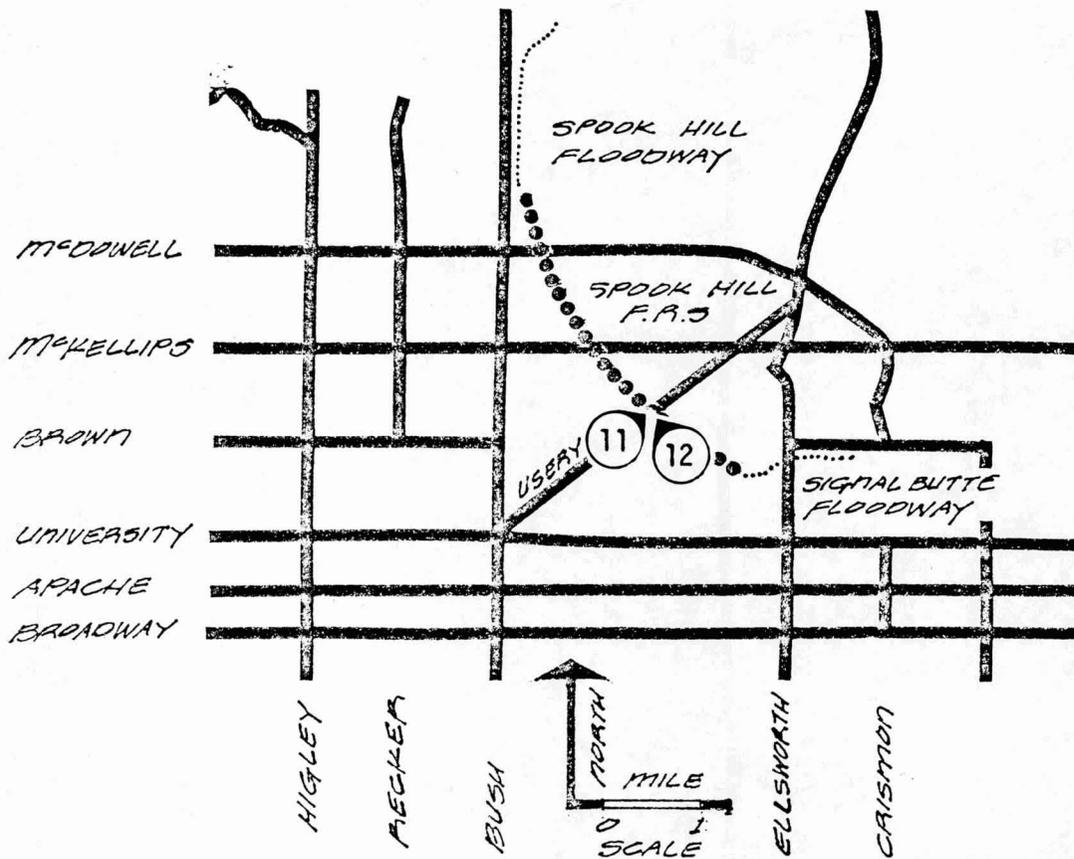


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11



12



Photo Thirteen

This view point is from the residential areas along University Drive looking due north. The end of the structure will be in the center of the photo and extend to the left. The structure will be located in the background, about three-quarters of the way to the foothill in mid-picture. The Jumping Cholla cactus is prominent in the area. Also predominant along this area right-of-way are desert species, including creosote, paloverde and saguaro.

Photo Fourteen

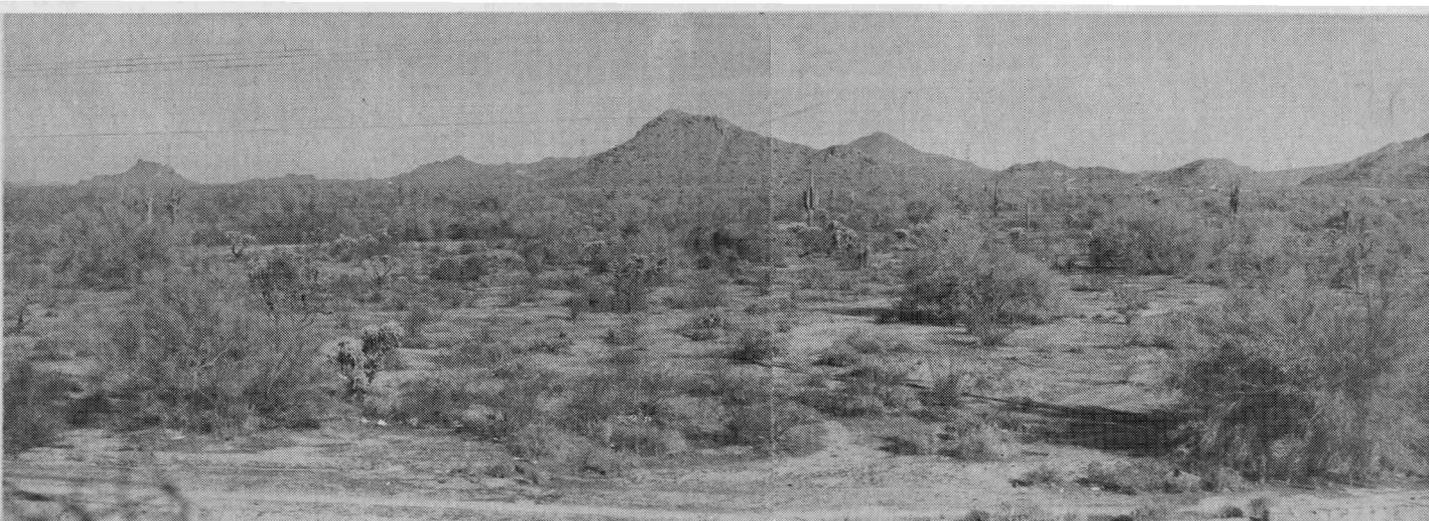
This is a view to the southwest from an existing subdivision. The structure should end at mid-picture and extend to the right disappearing around the foothill. Note predominant plant material is as mentioned in the above photo, except it is established in higher densities at the toe of the foothill. The close-up view of the foothill depicts the coarse, rugged texture of these steep slopes.

Photo Fifteen

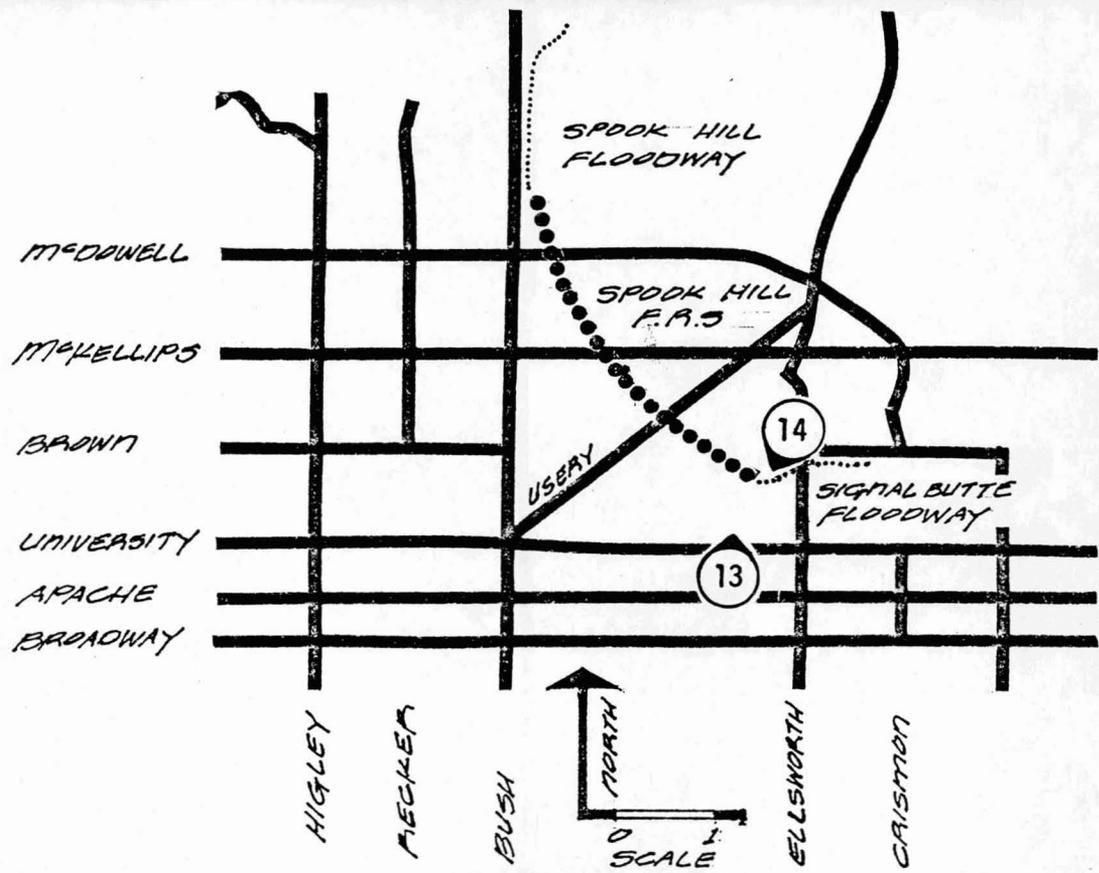
This panoramic view was taken with the center being southward. The dashed line depicts the Spook Hill F.R.S. Right-of-Way. The roadway on the right extending to the center of the photo is Bush Highway. The major portion is characterized by a broad sheet flood plain framed by irregular, rugged foothill forms. As may be seen in this photo, the landscape canopy of the area is of low density, following minor to major washes in the area. A major wash for this area may be characterized as small and shallow, but well defined. About fifteen of these washes are crossed in the five miles of combined rights-of-way.

Photo Sixteen

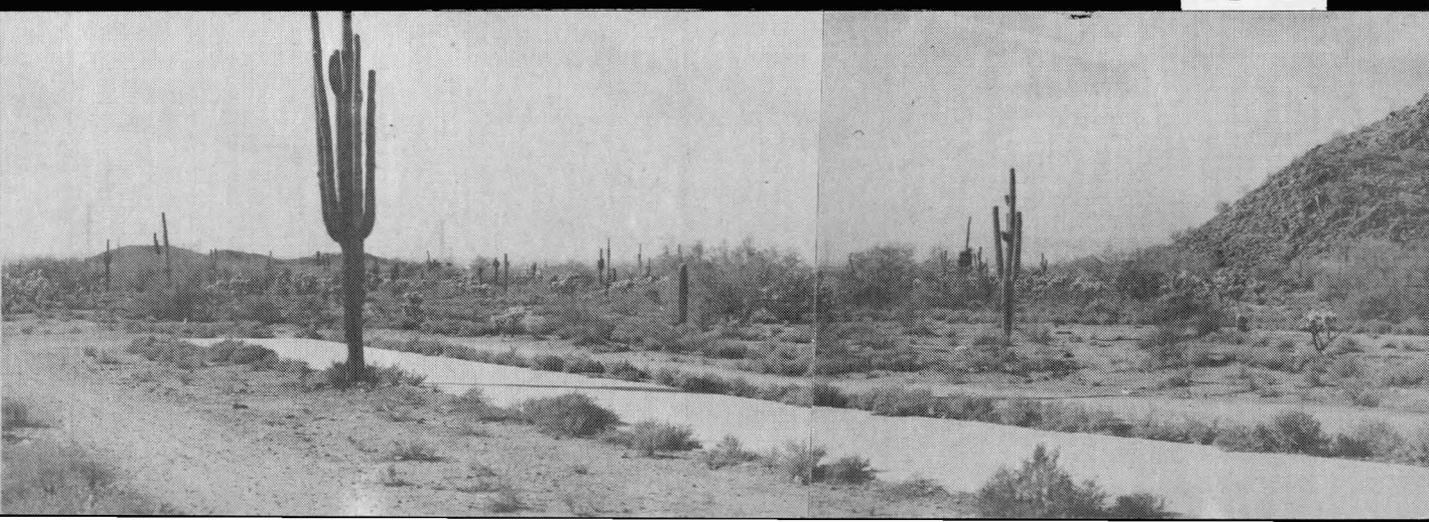
This panoramic photo sequence was taken from an upstream foothill with the view centering in a southwestern direction. Double Knolls may be seen in the background, just south of University Drive. The dashed line depicts the right-of-way for the

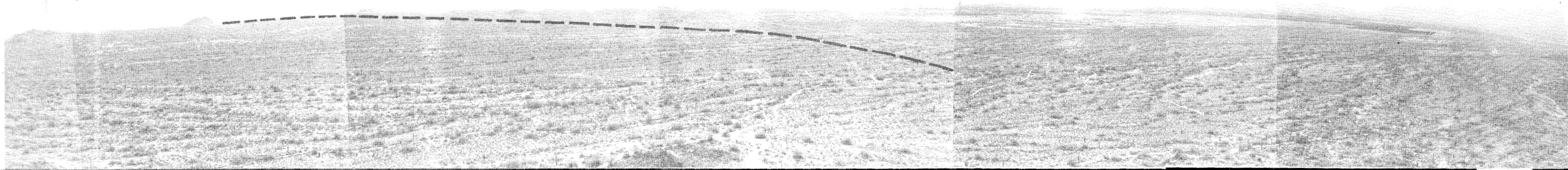


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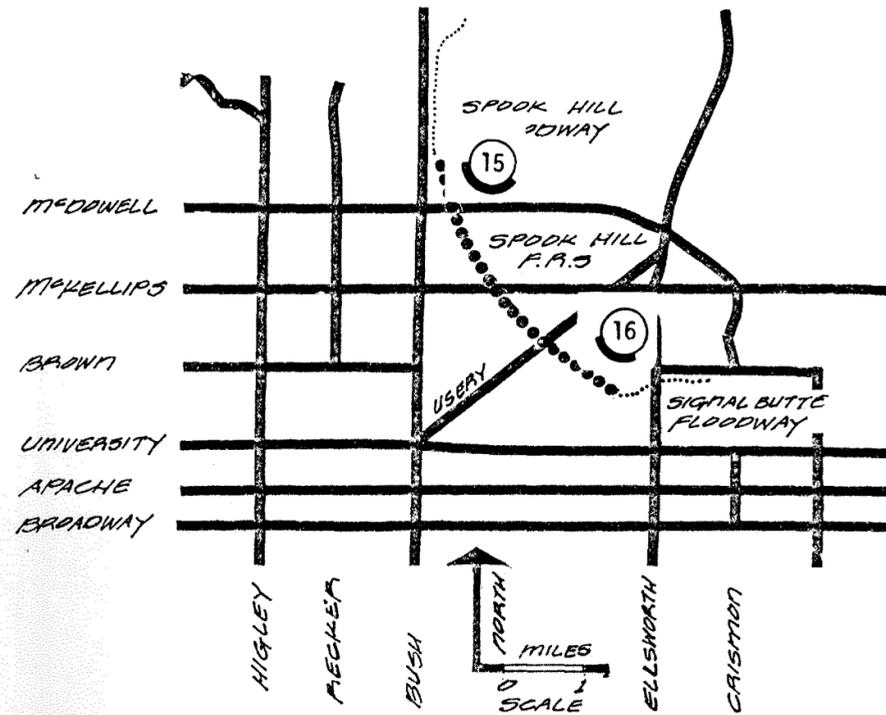


14

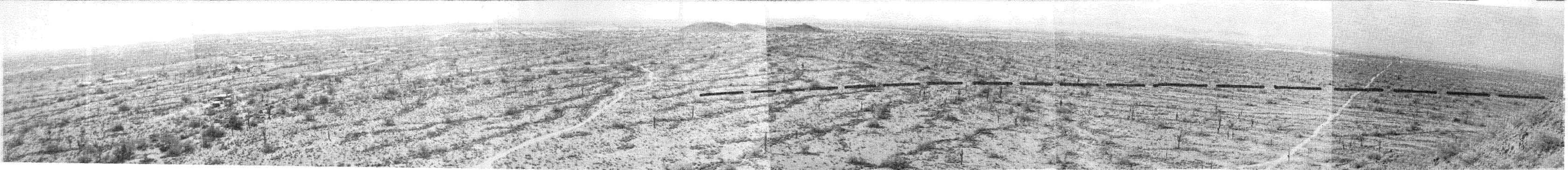




15



16



flood diversion structure. On the right of the picture, the end of Brown Road is visible. Again, the geography is one of a broad alluvial flood plain.

Landscape canopy includes foothill paloverde and velvet mesquite. Understory includes creosote, ocotillo, triangle-leaf bursage, and brittle bush. Cacti include saguaro, cholla, barrel, and hedge hog species. The ground plain is a golden beige color typical of decomposed granite. The sandy gravel surface covers sandy silt and silt deposits.

Note the residential development which is in view. This is not the only existing residential development near the right-of-way. There are five (total) areas. This view typifies the type and densities of these existing pockets of development.

CHAPTER 2

ANALYSIS OF VISUAL DATA

I. Opportunities

The route of the Spook Hill F.R.S. and Floodway Rights-of-way are planned for an area located in the rural central Arizona basin and range province. The area is presently being developed for residential use by the expanding population of eastern Mesa. The design of the existing residential development is one which respects and retains the natural character as much as possible. The residential landscapes retain and reinforce existing, native plant material. Housing architecture represents the developed territorial style. The resulting circumstance is the opportunity to revegetate a construction zone, with native plant material. In this area, use of native plant material will be compatible with the existing and predicted developmental character of the area. The advantage is even greater when the cost of maintenance of the imported vegetation is considered in comparison to the cost of domestic plant materials.

There are major specific areas which will not require disruption in any form by construction. One area lies upstream of the flood retarding structure along the right-of-way. It is 500' wide and would provide an excellent buffer. Another lies between the floodway and the flood retarding structure. This belt is about 80' wide.

Cacti and ocotillo in excavation areas may be salvaged for transplanting.

The 21' average height of the structure may be screened mainly by trees planted at the toe of the dam as a more inexpensive approach. Native trees generally reach heights of 15'+ without continuous supplemental irrigation. With supplemental irrigation, many species show rapid growth with lush foliage creating an effective screen.

Granite rocks and boulders will be available from the floodway at the north end of the structure. Quantity has not been established. Even limited amounts may be used for random dispersment on the surface of the structure at ramps to add to the rugged native terrain. This effort has been successfully demonstrated on Granite Reed Flood Retarding Structure #4, by the Bureau of Reclamation.

Revegetation of both canopy and understory will provide animal habitat as an incidental benefit to solving visual problems.

A large quantity of waste, caliche will be excavated during construction. This material may be used for architectural grading or may be used to fill borrow areas. In any case the material must be dressed with topsoil to allow for revegetation. When accurate quantity estimates are made, we will be able to plan for optimum use.

The dam is presently designed with 2:1 slopes on the downstream side and 3:1 on the upstream side. Given the engineered right-of-way for the toe of the slope, it may be possible to undulate the route of the service road at the crest. This would cause the 2:1 and 3:1 slopes to alternate from upstream to downstream creating varying pockets of habitat for plant materials. This would also be an opportunity to vary the harsh, regular, engineered form.

Review of project specifications for similar structures, which in recent years, used desert plant materials in conjunction with construction has provided background knowledge for this project. The opportunity to review related site construction allows the present undertaking to become more than experimental. Examples include the uses of new irrigation systems, availability of native seeds, and very controlled grading which reduces needless loss of difficult to replace vegetation.

II. Problems

There are two fundamental visual problems that the Spook Hill F.R.S. and Floodway create. Since the rights-of-way are located in an area which has existing residential development and is presently being considered for future residential and commercial development, there are a number of people who will be affected by the visual impact of construction of the flood retarding structure. The desert is very sensitive to development from a visual standpoint. Natural or cultivated desert landscape materials do not provide the camouflage typical in the more northern or eastern United States.

The problem is compounded by the fact that the native character of the existing uses has been conscientiously retained as a lifestyle. Another problem is that the uniform contour of the flood retarding structure is at a bold scale, which will be an extremely foreign line in the existing landscape.

There are specific areas of high visual impact in the proposed plan. The two roadway ramps at McKellips and McDowell Roads will result in frequent visual contact with defoliated forms and will include a look out overview of the entire flood retarding structure and bleak borrow areas. There are four existing residential areas which are within 1,500' of the right-of-way. The upper portion of the entire structure shall be visible from both upstream and downstream. Lastly, the northern end of the structure is routed within 500' of the heavily traveled Bush Highway. This stretch of structure also contains a 260' wide, concrete spillway of which about 6' height should be in full view.

III. Complications

The composition of dam topsoil will include highly compacted, coarse granite averaging two and one half feet deep. Beneath this layer is one with equally high compacted fine soils. While this provides for the integrity of the

structure and reduces erosion, it also reduces the quality of plant habitat and will greatly hamper trenching for possible irrigation systems. Topsoil replacement may be required for successful growth.

Dam gradients are designed for 3:1 and 2:1 slopes. In this climate, if vegetation is desired on a slope over 4:1, irrigation would be required on a permanent supplemental basis.

There are only three existing irrigation water sources available. One is at McKellips Road and the eastern flood retarding structure right-of-way.

It is a 6" main with estimated pressures ranging from 40 to 60 psi. Another is located at Usery Pass Road and the eastern flood retarding structure right-of-way. This source is from an adjacent 12" main pipe, deep well, and storage tank with an estimated pressure of Zero psi. The last source is from a 6" main on Ellsworth Road. Pressure on this main is estimated at 45 to 50 psi.

Due to tap root "piping" and possible structure damage, native trees may not be planted on or within 20' of the dam, lines ditches, or pipelines. Planting of trees on slopes would have been the least expensive and most effective way to camouflage the flood retarding structure, however.

In previous years, protesting local residents have been assured that the structure would be totally camouflaged with native plant materials.

Planting of indigenous material, especially on embankments in this region, can only be considered to be at an experimental stage of development.

The area is presently used by off-road vehicles. Such vehicles would be destructive to established plant materials and possible irrigation systems. Neighbors have also expressed concern for dust and noise created by such vehicles, and feel they would be attracted to this right-of-way.

The area would be subject to possible grazing by livestock which would browse on re-establishing plant material. Re-established plant material which is maintained at a level which is much healthier than neighboring materials also becomes susceptible to heavy browsing by uncontrollable rodents. Rodents damage drip irrigation systems and plant materials as a source of water.

CHAPTER 3

PUBLIC INTEREST AND OPINIONS

As part of the visual impact report, it was imperative that the opinions and interests of those people affected by construction of the Spook Hill F.R.S. and Floodway be considered. Several public hearings were held to obtain resident input. Also, the Draft Environmental Impact Statement of the Buckhorn-Mesa Watershed Project was distributed to interested parties.

Early public opposition to the proposed project was intense with the majority of those expressing concern for the maintenance of the natural vegetation and protection of wildlife. Letters written in response to the impact statement were totally against the construction of the dam with the purpose and cost of the plans being questioned. Citizens were not certain as to the scope of the project and were confused about what was to be protected.

A public meeting was held on January 28, 1976 at Fremont Junior High School in Mesa to discuss landscaping needs and to solicit public opinion. Due to some confusion over the newspaper publication of the hearing notice, the announcement of the meeting was not published until the evening paper of that night. Hence, attendance at the hearing was extremely poor, however, those attending were quite concerned with the project's development. They had accepted the fact that it would be constructed and were, therefore, interested in the landscaping techniques, visual impact, plant material destruction and maintenance, as well as specific uses. Again, it was stressed that the natural vegetation be maintained and that the dam be camouflaged as much as possible to avoid visually scarring the desert landscape.

Another area of concern was the one of use by off-road vehicles and the destruction of the site by other uncontrolled uses. It was felt that continuing maintenance and management were essential to the proper appearance of the structure. Additionally, strong support was expressed for the development of active recreational uses in this area integrated with the land use of the flood retarding structure. Residents, tired of the traditional desert picnic sites of this area, were interested in the provision of turfed picnic parks incorporated with the construction. They realized that there were recreational areas in the vicinity, but felt that this site should also provide some benefits for those affected by its placement in the neighborhood. Also, since the Verde River recreational area, where most usually went for outings, has become so congested they were requesting that some site be set aside for use by picnickers. It is felt that there is always a demand for this type of recreation.

The range of authority of the Soil Conservation Service and County Flood Control District was discussed, delineating the fact that their charter would not allow this type of construction or maintenance expenditure. The procedure of use permits for development and maintenance of the rights-of-way was also delineated. This explained that park development would have to be undertaken by City or County authorities after the interest was supported by public opinion.

Public opinion is strong and, as noted in the newspaper article of January 29, 1976, found in the appendix, residents have requested that reassurances be given so that proper maintenance and design of the facility will be guaranteed.

CHAPTER 4

CITY AND COUNTY PARKS

Due to interests expressed by the local residents, City and County Park Officials were contacted to determine the opportunity of park use in the rights-of-way. Although the scope of work is presently dealing with visual aspects and revegetation of the site, any possible future land use would have an impact on the proposals. The efforts at present are to explore this as a visual opportunity so redevelopment may effectively coordinate with future use.

In a conversation with Maurice Bateman of the City of Mesa, it was learned that the City could not enter into development at the site until annexation of the area.

Contact with Robert Milne, Director of Parks for Maricopa County, revealed strong interest in the area. A copy of a letter from Maricopa County Parks to Maricopa County Flood Control is included in the appendix. This letter states the interest of equestrian, pedestrian, and bicycling trail use in the site. Also mentioned is the interest in providing access over the dam and floodway from the proposed C.A.P. trail system.

Also discussed with Mr. Milne was the Utery Mountain Semi-Regional Park. This park is located two miles to the east of this project. This park, which is still in developmental stages, contains 3,000 acres with plans for primitive camping, archery ranges, target ranges, picnicking, horseback riding, golfing, and motocross motorcycling. See the appendix for the masterplan. It is the feeling that these activities would not be duplicated on this site, but that extension uses such as trail systems would be considered for this site. The linear form of our site would best be developed for such a use that would not be forced to be within the right-of-way limits. See the appendix for the proposed trail system addition.

During later stages of work, further contact will be made to consider the immediate opportunities for development and joint funding of recreational facilities.

CHAPTER 5

ZONES OF DEVELOPMENT

The 3.78 mile long Spook Hill Flood Retarding Structure R.O.W. is composed of the following zones. See appendix, drawing sheet 4 for zone orientation.

Zone Description and General Recommended Development

I. Downstream R.O.W. along C.A.P.

- Suggested development to include five strand barbed wire to control access.

II. Downstream toe

- 25' to 40' wide level strip.
- Major tree forms saved.
- Cacti salvaged.
- Understory cultivated into soil with topsoil intact.
- Areas compacted by traffic.
- Note: Tree canopy with tap root not to be planted within 20' of dam toe.
- Suggested development:
 1. High tree density of canopy to screen structure.
 2. Salvaged saguaros planted at immediate toe area.
 3. Replacement of understory.
- Estimated area: 638,670 sq. ft. or 14.7 acres.

III. Downstream and upstream slope of dam structure

- Downstream slope at 2:1 and averaging 55' wide.
- Upstream slope of 3:1 and averaging 65' wide.
- Coarse granite soil compacted to 110%.
- Cacti salvaged.
- Note: Tree canopy with tap root not to be planted on structure.

- Suggested development:

- 1a. Provide permanent, supplemental irrigation since slopes are over 4:1. Provide impact sprinklers at dam top which allow irrigation of slope with minimum trenching in rocky, highly compacted soil.
- 1b. Provide high density of understory growth to camouflage slope.
- 1c. Plant salvaged cacti and Ocotillo.
- 1d. Disperse spoil granite boulders.
- 1e. Vary slope on upstream and downstream faces, alternately.

OR

- 2a. Plant salvaged cacti and Ocotillo.
- 2b. Disperse spoil granite boulders.
- 2c. Vary slope on upstream and downstream faces, alternately.
3. See special use section of developmental uses.

- Estimated area: 2,395,100 sq. ft. or 54.9 acres.

IV. Service Road on Dam

- 14' wide.
- Level.
- Note: Tree canopy with tap root not to be planted on structure.
- Suggested development:
 1. Crown profile.
 2. Provide controlled access gates.
 3. See special use section.

V. Upstream toe

- 20' wide, level strip.
- Tree canopy demolished.
- Understory cultivated into soil.
- Cacti salvaged.

- Areas compacted by traffic.
- Note: Tree canopy with tap root not to be planted within 20' of structure.
- Area subject to undulation.
- Suggested development:
 1. Salvaged saguaro to be planted at immediate toe area.
 2. Replacement of understory.
- Estimated area: 39,200 sq. ft. or .89 acres.

VI. Upstream toe extension (Estimated area: 39,200 sq. ft. or .89 acres)

- 20' wide, level strip.
- Major canopy saved.
- Understory cultivated into soil.
- Cacti salvaged.
- Compacted areas due to traffic.
- Area subject to undulation.
- Suggested development:
 1. High density canopy planting to screen dam.
 2. Replacement of understory.
 3. Five strand barb wire fence hidden in canopy to control access to dam.

VII. Transition to floodway

- 60' wide level strip with washes.
- Undisturbed habitat except for next item.
- 20' wide access corridors at 500' intervals to dam.
 1. Canopy demolished.
 2. Understory cultivated into soil.
 3. Cacti salvaged.
 4. Soil compacted by traffic.
- Area subject to undulation.

- Suggested development:
 1. Minor planting of canopy.
 2. Replacement of understory.
- Estimated area to be developed: 48,000 sq. ft. or 1.1 acre.

VIII. Upstream and Downstream Bank of floodway-borrow area.

- Two 10' wide, level strips.
- Canopy demolished.
- Understory cultivated into soil.
- Cacti salvaged.
- Soil compacted by traffic.
- Suggested development:
 1. Canopy planting - special type.
 2. Understory planting - special type.
- Note: Special type to differ from typical plant list, due to availability of natural water.
- Estimated area: 399,200 sq. ft. or 9.1 acres.

IX. Floodway-Borrow area upstream from dam

- Area defined by 2:1 and 3:1 sloping banks of varying width (about 10' max.) including;
- An earthen floodway 12' wide (min.) with borrow area expanding the floodway width to 70' wide (average) and with depth ranging from 2' to 5' deep.
- Bottom of area may be depicted by 2' min. soil depth above caliche rock.
- Suggested development:
 1. Borrow shall be taken in a random borrow method from upstream and downstream bank of floodway. Specific locations of borrow shall insure the retainment of washes and major landscape canopy formations.
 2. Due to the frequency of undulation and siltation in the floodway only understory shall be re-established.

3. Backfill borrow with waste caliche with dressing of topsoil.

- Estimated area: 1,796,400 sq. ft. or 41.2 acres.

X. Transition to R.O.W.

- 700' average width, level grade with wash formations.

- Undisturbed canopy and understory.

- Area subject to undulation, with depth diminishing to upstream R.O.W.

- Suggested development:

1. Higher density canopy planting in a spine to reinforce screening of dam along R.O.W.

2. Area ideal for secondary use development. See developmental systems:

a. Spoil fill used for architectural grading and dressed with topsoil.

b. Winding services road created to provide for supplemental truck watering of canopy with secondary use as equestrian trail system.

(1) Planned areas for pocket, organized park uses.

(2) Uses not to be redundant with Userly Mountain Semi-Regional Park.

(3) Pocket parks to be graded for and equipped for flood irrigation by separate water meters.

(4) Pocket parks to be planned to include drinking fountains and primitive restrooms.

(5) Graded area provided for parking.

(6) Fence out parking areas from park areas and provide posted, controlled access gateways.

- Estimated total areas: 13,972,000 sq. ft. or 320 acres.

XI. Upstream R.O.W.

- Suggested development:

1. Provide 5 strand barbed wire fence to control access.

XII. Downstream Roadway Ramp slopes and toe areas within R.O.W.

- 4:1 slope areas (4)
- Suggested development - See III.
- Estimated area: 20,000 sq. ft. or .4 acre.

XIII. Upstream Roadway Ramp slopes and toe areas within R.O.W.

- 4:1 slope areas (4) plus 20' wide level area at toe.
- Canopy demolished.
- Understory demolished.
- Cacti salvaged.
- 110% compacted soil on slopes, level areas compacted by traffic.
- Note: Tree canopy with tap root shall not be planted within 20' of dam.
- Suggested development:
 1. Plant dense canopy as possible.
 2. Plant dense understory.
 3. Plant salvaged cacti.
 4. Provide for permanent supplemental irrigation of slopes to insure vegetation typical of dam face.
 5. Disperse spoil granite boulders on ramp slopes and adjacent dam slopes in random fashion. Ramp and adjacent dam areas to receive this treatment on first priority.
 6. Fence road R.O.W. with five strand barbed wire providing controlled access gate at dam service road.
 7. Provide 9' square box culverts in lieu of 9' diameter culverts to allow for the possible future pedestrian use.
- Estimated area (4): 72,000 sq. ft. or 1.6 acres.

XIV. Emergency Spillway ramps (2)

- 28,000 sq. ft. of area with slopes of 2:1. (.6 acres)
- See III for further description and recommendations plus:
- Chain link fence and structure.

XV. Emergency Spillway Transition

- 25,000 sq. ft. of level area to south of spillway ramps and 45,000 sq. ft. of level area to north of spillway ramps. Areas are similar to Zone II except wider, 80' to 160' wide. (400,000 sq. ft. or 9.18 acres of vegetation)
- Suggested development:
 1. Similar to Zone II.
 2. Permanent supplemental irrigation would insure better screening of the emergency spillway from views along Bush Highway.

Note: 1.89 mile long Spook Hill Floodway R.O.W. is composed of the following:

XVI. Floodway (Estimated area: 20.62 acres)

- 90' wide concrete channel with 2:1 slopes and a 30' wide bottom.
- Suggested development:
 1. Salvage cacti.
 2. Salvage topsoil.
 3. Salvage granite boulders.

XVII. Downstream Floodway Service Road

- 13' wide roadway.
- Suggested development:
 1. Level grade adjacent to floodway.
 2. Salvage cacti.
- Estimated area: 2.93 acres

XVIII. Downstream Floodway Transition

- 60' wide strip of generally level grade.
- Disruption to foliage unknown, so assume - cacti salvaged and understory cultivated into soil.
- Note: Tree canopy with tap root not to be planted within 20' of floodway.
- Suggested development:
 1. Replacement of understory.
 2. Plant salvaged, cacti and Ocotillo on slopes over 4:1.
- Estimated area: 600,000 sq. ft. or 13.8 acres.

XIX. Upstream Floodway Service Road (Estimated area: 2.93 acres)

- 13' wide roadway.
- Suggested development:
 1. Irregular alignment through Zone XX.
 2. See secondary use as described in #6 and #7 of Zone XX.

XX. Upstream Floodway Transition (Estimated area: 1,197,504 sq. ft. or 27.49 acres)

- 120' wide strip of generally level grade.
- Disruption of foliage is unknown, so assume - cacti salvaged, understory cultivated into soil, and major canopy saved.
- Suggested development - See Developmental Systems:
 1. Provide architectural sculpturing of area by use of spoil caliche from floodway.
 2. Provide 6" layer of topsoil on caliche fill.
 3. Replacement of understory.
 4. Salvaged cacti to be planted on slopes over 4:1.
 5. Plant Canopy along service road.

6. Service road to wind through area and use for supplemental watering of canopy.
7. Secondary use of service road for equestrian trail system.

XXI. Upstream Floodway R.O.W.

- Suggested development:

1. Five strand barbed wire fence to control access.
2. Provide posted and controlled access in extreme northern section for service road and future secondary trail use.

CHAPTER 6

DEVELOPMENTAL SYSTEMS

System Description

A. Planting Methods

Note: Specific plant material shall be selected for specific zones.

- Aa. Seeding - Mechanical seed placement by a "range land drill". Equipment capable of planting in extremely coarse soil. Mulch seed with wild hay or grain straw cultivated into soil during compaction or cultivation depending on area. Operation to include fertilizer. Plant material may include canopy and/or understory, but is most efficient with understory. Estimated cost: 1¢ per sq. ft.
- Ab. One gallon container planting - Planting material from one gallon container stock in pit. Operation to include soil mix for pit backfill from stock-piled topsoil, mulch, and fertilizer. Plant material may include canopy and/or understory. Estimated cost is \$5 per plant.
- Ac. Five gallon container planting - Same as above, except with five gallon container stock. Plant material may include canopy and/or understory, but is most efficient with desert canopy for immediate show. Estimated cost is \$15 per plant.
- Ad. Salvaged and Replanting - Ocotillo and cacti are the only species which may be safely transplanted. Other materials should be sold and healthy materials bought at time of construction. Prime operations shall include excavation, healing-in for storage in fenced area, and transplanting of material. Estimated cost averages \$10 per plant including large and small cacti.

Ae. Scarifying Soil - Operation shall include cultivation of soil to 6" depth where compacted by construction traffic or as specified.

Note: This item is included in the seeding section and this item should be considered for areas of existing topsoil with native seed content.

Af. None - Specific areas may be defined where growth may not be established, not be maintained, or already have sufficient growth.

B. Irrigation

Note: Specific planting methods may require specific irrigation. These will be noted below. All systems to be used in coordination with natural rainfall. If vegetation is required on slopes over 4:1, a permanent supplemental system will be required.

Ba. Temporary Hand and Truck Watering - This irrigation shall be used on a temporary basis to germinate seeds or establish container material and cacti. It is effective on slopes less than 4:1. Maintenance costs make this system too expensive to be used as a supplemental source. System requires immediate roadway for access. Should be used in combination with natural rain of February for seeding. Est. cost \$175/acre for two waterings.

Bb. Drip Irrigation is a low pressure, low precipitation rate system providing water to individual plants. It requires extensive trenching depending on quantity and spacing of material. It is very effective where water sources, pressures, and gallonage are limited. Should be used where soil is not coarse and highly compacted to irrigate container material. System requires an injector to fertilize plant material. Rodents may damage system if not diverted to other sources of water. May be used for temporary or permanent supplemental irrigation.

Bc. Impact Sprinkler System is a high pressure, high precipitation rate system providing water to large areas. This system requires a minimum of trenching and is independent of plant spacing. It should be used where trenching must be kept to a minimum and where a high density of planting is required. This system is effective in germinating and growing seed material. May be used as temporary or permanent irrigation. If used extensively or frequently, it will require much water.

Bd. Flood Irrigation is the least expensive irrigation system to install. It requires level graded areas for irrigation with retaining dikes. This system is effective in germinating and growing material from seed. The system is to be used if areas of turf may be desired. It uses large amounts of water, and may be considered as permanent.

Be. None - Shall be areas which may be too remote to truck water or too costly, to provide another system. "None" areas would be naturally irrigated by seasonal rains. This system is effective if planting is in coordination with seasonal rains, but sparse growing results. Method should not be attempted on slopes over 4:1.

C. Special Uses

This section includes planning and construction for uses other than flood retarding or specific revegetation. In some cases other uses may be incidentally facilitated during floodway construction. In other cases, sites for special uses may be partially prepared for special uses and would require further development before use. In any case, special use areas would require a special use permit providing for the maintenance by park systems or public groups.

- Ca. Equestrian and Hiking Trail System could incidentally be provided. It would require minimal maintenance.
- Cb. Trail System with Oasis Pocket Parks would require special irrigation and planting. Should include drinking fountain and primitive restroom facilities. Pocket parks would require minimal maintenance and possible outside funding. They could be planned for at this time.
- Cc. Pedestrian Trail System with underpass at roadways may be incidentally provided during floodway construction. This would be facilitated by providing 9' square box culverts along the floodway in lieu of 9' diameter culverts. At this time, cost differentials may not be acceptable in providing for this long range planned use without outside funding. Essential to a pedestrian trail system would be the oasis pocket park facilities of Item Cb. The pedestrian trail system would also require minimal maintenance.
- Cd. Bicyclist Trail System would be a more extensive development. This would require the installation of a paved surface from 6' to 8' wide. The system would require the box culverts as mentioned in Item Cc above. Also important to this trailway would be the oasis pocket park facilities of Item Cb.
- Ce. View Point development would be used in conjunction with all forms of the trail system. The view would be from dam crest at varying points. 10:1 ramp grading could be provided incidental to dam grading. Development would be special fencing to control access on dam slopes. Construction of look-out points should be seriously considered to facilitate a user demand which could result in destruction of fencing or vegetation, if not satisfied.

Cf. Private Use by developers or special interest groups may also be considered. These would be granted by County Flood Control to guarantee the maintenance of additional development or use areas. These uses should be evaluated as to the susceptibility to damage by flooding. Also, the possible damage a use may create on an area should be considered.

Such uses may include an arboretum, pastoral lands, equestrian show rings, equestrian training rings, equestrian stalls, model airplane fields, model glider fields, hang glider training fields, and go-cart track facilities.

Note: See appendix for area trail systems.

CHAPTER 7

SOLUTION AND ALTERNATIVES

During this "Problem Identification and Alternative Solutions" period of the work, it became very evident that there was only one primary goal: To revegetate defoliated construction areas and camouflage the structure with native plant materials as soon as possible. Supportive of this primary goal, came the effort to control and isolate the areas of construction to ones that would result in the least destruction of natural plant materials. Where grading is required the irreplaceable, large quantities of cacti should also be salvaged and replaced to maintain the local character.

Below is a summary of control measures which should be rigidly maintained during grading construction.

1. The areas where borrow is taken, with "random" borrowing allowing the retention of the major washes and associated plant forms should be controlled.
2. The areas where construction circulation is required, major landscape canopy should be retained and the understory cultivated into the topsoil.
3. In all areas where borrow circulation or fill is required, the cacti and ocotillo shall be salvaged.
4. Areas of topsoil which have been compacted by circulation, should be cultivated as a minimum step towards revegetation.
5. Waste granite boulders should be randomly dispersed along dam slopes, first near roadway ramps and as quantity prevails, secondly as slopes move away from such ramps.
6. Required topsoil shall be salvaged and stockpiled to meet needs.

For landscape planting, a general spine of development has been used to organize the concept. This spine uses plant material in the most efficient manners to revegetate and provide screening as required by each zone along the spine. Alternative solutions are arrived at by plugging different planting or irrigation system groups into the zones along the spine.

Below are the specific areas of concern and how they are planted.

1. The dam slopes have been planted from seed to produce a high density of understory. If irrigation to permanently support this growth is not feasible, only the salvaged cacti should be planted here.

This camouflages the upper crest of the dam which will be viewable from both downstream and upstream. This method should be effective within a one year period.

2. The toe of the dam has been densely planted with canopy to camouflage the view of lower portions of the dam where understory may become more sparse due to irrigation system limitations. This is the least expensive method to screen the lower portions of the dike and would become effective in a two to three year period.
3. Both 1 and 2 above should be effective camouflage where the four existing residential subdivisions and Bush Highway come into close proximity to the dam.
4. An additional strip of high density canopy form has been suggested along a proposed construction road. This roadway would be located upstream above the dam and would provide additional dam screening that would not be subject to critical undulation. This construction road and canopy could possibly be used in future years as a part of the Maricopa County Trail System.

5. Along the roadway ramps over the dam, canopy and dense understory have been planned for to screen the view point from the top of the dam onto the borrow and floodway, excavated areas. These would also become effective in a two to three year period.
6. The emergency spillway was planned for high density canopy screening from Bush Highway. This planting could become effective within a two year period.
7. Lastly, areas affected by construction traffic, borrow, or fill have been planned for reseeding and truck watering to germinate seeds. This is a planned, long range revegetation process. Plant materials will germinate and the process of natural selection will become the factor determining species, density and actual location of the plant material. Substantial effects should be produced within a two to three year period.

In the appendix of this booklet refer to "Functional Combinations of Developmental Systems". These are the puzzle parts which may be combined to produce the desired landscape treatment at the desired cost.

Totaling all "combination number ones" for each developmental zone produces our highest and most expensive treatment. This estimate may be considered as our first concept. It includes:

1. Planted understory and permanent irrigation on the dam.
2. Five gallon containers, screening canopies with temporary drip irrigation.
3. Seeded and truck irrigated areas of borrow, fill, or construction traffic damage.

For this planting concept, see "Functional Combinations of Development", in the Appendix.

<u>Appendix Page No.</u>	<u>Item Cost</u>
45	\$ 84,298
48	\$163,571
51	\$ 6,068
52	\$ 67,388
55	\$ 5,137
58	\$ 10,984
59	\$ 49,894
60	\$ 66,400
63	\$ 1,460
66	\$ 5,880
69	\$ 8,156
72	\$ 1,788
73	\$ 0
74	\$ 12,360
75	\$ 1,788
76	<u>\$ 66,560</u>
Total Cost	\$551,732

The second concept may be based on the following:

1. Structure planted with seed and permanent irrigation.
2. One gallon container stock for screening with temporary irrigation.
3. Seeded and truck irrigated borrow, fill, or construction traffic damaged areas.

For this planting concepts, see "Functional Combinations of Development in the Appendix.

<u>Appendix Page No.</u>	<u>Item Cost</u>
46	\$ 67,668
49	\$161,571
51	\$ 6,068
53	\$ 50,758
56	\$ 3,705
58	\$ 10,984
59	\$ 49,894
61	\$ 49,800
64	\$ 1,340
67	\$ 5,080
70	\$ 7,806
72	\$ 1,788
73	\$ 0
74	\$ 12,360
75	\$ 1,788
77	<u>\$ 57,745</u>
Total Cost	\$488,355

Concepts One and Two, use container stock and installed irrigation systems to re-vegetate and screen in high impact areas. Both one and five gallon plants should not be considered as extravagant plant installations. From these, one may guarantee a product. It is felt that a range of cost between these two concepts to be a minimum solution to the problem. The range in cost for these is \$551, 732 to \$488,355.

The third concept may be based on the following:

1. Structure planted with salvaged cacti only (no irrigation).
2. Seeded and truck irrigated borrow, fill, or construction traffic damaged areas.

For this planting concept see, "Functional Combinations of Development" in the Appendix.

<u>Appendix Page No.</u>	<u>Item Cost</u>
47	\$ 7,958
50	\$ 38,220
51	\$ 6,068
54	\$ 868
57	\$ 2,217
58	\$ 10,984
59	\$ 49,894
62	\$ 0
65	\$ 520
68	\$ 1,609
71	\$ 6,156
72	\$ 1,788
73	\$ 0
74	\$ 12,360
75	\$ 1,788
78	<u>\$ 33,280</u>
Total Cost	\$174,710

This solution is not recommended, but provides the observer with a "bottom line" figure of \$174,710 for minor cacti salvage and seeding. This solution would guarantee little, short-range future revegetation effect to the overall, future visual problem.

In conclusion, it is felt that the solution is to revegetate for the short-range future with minimal development to the rights-of-way. If at a later date the area may find a secondary use, the revegetation will be established and will compliment this use.

See the appendix for "Problem Identification and Alternate Solution", sheets 1 through 5, and supplemental pre-conceptual study sheets 1 through 3 in the appendix.

APPENDIX

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM TOE

COMBINATION NUMBER: 1

TOTAL COST: \$84298

Developmental System

Estimate Item Cost

- Aa. Seeding 638,670 S.F. x \$0.01/SF
UNDERSTORY MATERIALS \$6,386
- Ab. One gallon container planting none
- Ac. Five gallon container planting tree hedge @ 12' o/c for 19960'
1663 plants @ \$15 ea. 24945
- Ad. Salvaged and Replanting salvage and plant in other zone
60 plants @ \$10 each x 14.7 acre 8820
- Ae. Scarifying Soil see seeding
- Af. None
- Ba. Temporary Hand and Truck Watering TRUCK TWICE TO GERMINATE
\$175/acre x 14.7 acre 2572
- Bb. Drip irrigation 1663 emitters @ \$25 each 41575
- Bc. Impact Sprinkler System
- Bd. Flood irrigation
- Be. None
- Ca. Equestrian and Hiking Trail System
- Cb. Trail System with Oasis Pocket Parks
- Cc. Pedestrian Trail System
- Cd. Bicyclist Trail System
- Ce. View Point
- Cf. Private Use

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM TOE

COMBINATION NUMBER: 2

TOTAL COST: \$ 67,668

Developmental System	Estimate Item Cost
Aa. Seeding <i>UNDERSTORY MATERIALS: 638,670 S.F. x \$, 01/SF</i>	<u>6,386</u>
Ab. One gallon container planting <i>tree hedge @ 12' o/c for 19960' 1663 plants @ \$5 ec.</i>	<u>8315</u>
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>planted elsewhere \$, 10 each x 14.7</i>	<u>8820</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE TO GERMINATE \$175 x 14.7 ec.</i>	<u>2572</u>
Bb. Drip irrigation <i>1663 emitters @ \$25 each \$130/ec. x 14.7</i>	<u>41,575</u>
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM TOE

COMBINATION NUMBER: 3

TOTAL COST: \$ 8,958

Developmental System	Estimate Item Cost
Aa. Seeding <u>CANOPY AND UNDERSTORY</u> <u>638,670 S.F. x \$.01/SF</u>	<u>6,386</u>
Ab. One gallon container planting	
Ac. Five gallon container planting	
Ad. Salvaged and Replanting	
Ae. Scarifying Soil	
Af. None	
Ba. Temporary Hand and Truck Watering <u>TRUCK WATER TWICE TO GERMINATE</u> <u>8175 x 14.7 AC.</u>	<u>2572</u>
Bb. Drip irrigation	
Bc. Impact Sprinkler System	
Bd. Flood irrigation	
Be. None	
Ca. Equestrian and Hiking Trail System	
Cb. Trail System with Oasis Pocket Parks	
Cc. Pedestrian Trail System	
Cd. Bicyclist Trail System	
Ce. View Point	
Cf. Private Use	

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM AND UPSTREAM SLOPE OF DAM

COMBINATION NUMBER: 1

TOTAL COST: \$163,571

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory material</i> <i>2,395,100 SF x \$.01/SF.</i>	<u>23951</u>
Ab. One gallon container planting <i>supplemental understory @ ramps.</i> <i>500' ALONG STRUCTURE - AVERAGE 10' W</i> <i>ALONG UPPER AREA</i>	<u>2000</u>
Ac. Five gallon container planting <i>400 plants x \$5 ea.</i>	
Ad. Salvaged and Replanting <i>60 per acre salvaged</i> <i>110' R.O.W. x 5280' x 4.78 miles ÷ 43560 = 63.7 AC.</i>	<u>38220</u>
Ae. Scarifying Soil <i>60 x 63.7 x \$10.</i>	
Af. None	
Ba. Temporary Hand and Truck Watering	
Bb. Drip irrigation	
Bc. Impact Sprinkler System <i>1420 HEADS @ \$70/HEAD</i>	<u>99,400</u>
Bd. Flood irrigation	
Be. None	
Ca. Equestrian and Hiking Trail System	
Cb. Trail System with Oasis Pocket Parks	
Cc. Pedestrian Trail System	
Cd. Bicyclist Trail System	
Ce. View Point	
Cf. Private Use	

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM AND UPSTREAM SLOPE OF DAM

COMBINATION NUMBER: 2

TOTAL COST: \$161,1571

Developmental System	Estimate Item Cost
Aa. Seeding <i>UNDERSTORY MATERIAL 2,395,100 SF x \$.01/SF</i>	<u>23951</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 per acre salvaged 110' R.O.W. x 5280' x 4.78 miles ÷ 43560 = 63.7 ac 60 plants x 63.7 ac. x \$10 each</i>	<u>38,220</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System <i>1420 HEAD @ \$70/HEAD</i>	<u>99,400</u>
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM AND UPSTREAM SLOPE OF DAM

COMBINATION NUMBER: 3

TOTAL COST: \$ 38,220

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 PER ACRE SALVAGED 110' x 5280' x 4.73 miles = 43560 = 63.7 ac. 60 plants x \$10 x 63.7 acres</i>	<u>38,220</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	<u>0</u>
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM TOE

COMBINATION NUMBER: 1

TOTAL COST: \$ 6068

Developmental System	Estimate Item Cost
Aa. Seeding <i>UNDERSTORY MATERIAL 39200 SF. x \$.01 / SF.</i>	<u>\$ 392</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 plants @ \$10 each x 9.2 acre</i>	<u>5520</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TWICE TO GERMINATE \$175 x .89 ac</i>	<u>156</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM TOE EXTENSION

COMBINATION NUMBER: 1

TOTAL COST: \$67388

Developmental System	Estimate Item Cost
Aa. Seeding <i>use existing topsoil seeds</i>	<u>0</u>
Ab. One gallon container planting	<u> </u>
Ac. Five gallon container planting <i>RANDOM TREE HEDGE @ 12' x 6' FOR 19960'</i> <i>1663 plants @ \$15 ea.</i>	<u>24,945</u>
Ad. Salvaged and Replanting <i>60 plants @ \$10 each x .89 acre</i>	<u>534</u>
Ae. Scarifying Soil <i>.89 ACRES @ \$200/acre</i>	<u>178</u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE TO GERMINATE</i> <i>\$175/acre x .89 ac.</i>	<u>156</u>
Bb. Drip irrigation <i>1663 emitters @ \$25 each</i>	<u>41,575</u>
Bc. Impact Sprinkler System	<u> </u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM TOE EXTENSION

COMBINATION NUMBER: 2

TOTAL COST: \$50758

Developmental System	Estimate Item Cost
Aa. Seeding <i>USE existing topsoil seeds</i>	<u>0</u>
Ab. One gallon container planting <i>RANDOM TREE HEDGE @ 12' x 6' FOR 19960' 1663 plants @ \$5 each.</i>	<u>8315</u>
Ac. Five gallon container planting	<u> </u>
Ad. Salvaged and Replanting <i>60 plants @ \$10 each x .89 acre</i>	<u>534</u>
Ae. Scarifying Soil <i>.89 ACRES @ \$200/acre</i>	<u>178</u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE TO GERMINATE \$175 x .89 acre</i>	<u>156</u>
Bb. Drip irrigation <i>1663 emitters @ \$25 each</i>	<u>41,575</u>
Bc. Impact Sprinkler System	<u> </u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM TOE EXTENSION

COMBINATION NUMBER: 3

TOTAL COST: \$868

Developmental System	Estimate Item Cost
Aa. Seeding <i>USE EXISTING IN TOPSOIL</i>	<u>0</u>
Ab. One gallon container planting	<u> </u>
Ac. Five gallon container planting	<u> </u>
Ad. Salvaged and Replanting <i>60 plants x \$10 x .89 AC</i>	<u>534</u>
Ae. Scarifying Soil <i>\$200/ea. x .89 AC</i>	<u>178</u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>\$175/ea. x .89 AC</i>	<u>156</u>
Bb. Drip irrigation	<u> </u>
Bc. Impact Sprinkler System	<u> </u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO FLOODWAY

COMBINATION NUMBER: 1

TOTAL COST: \$ 5137

Developmental System	Estimate Item Cost
Aa. Seeding <i>ACCESS TO DAM FROM BORROW 3.75' x 5280' / 500 INTERVALS = 40 60' LONG x 50' WIDE x 40 = 12,000 SF 12,000 SF x \$.01 =</i>	<u>120</u>
Ab. One gallon container planting	<u> </u>
Ac. Five gallon container planting <i>3 plants per access pt. 40 x 3 x \$15</i>	<u>1800</u>
Ad. Salvaged and Replanting <i>60 plants x \$10 x .28 AC.</i>	<u>168</u>
Ae. Scarifying Soil	<u> </u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>\$175 x .28 ACRES</i>	<u>49</u>
Bb. Drip irrigation <i>120 EMITTERS x \$25</i>	<u>3000</u>
Bc. Impact Sprinkler System	<u> </u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO FLOODWAY

COMBINATION NUMBER: 2

TOTAL COST: \$3705

Developmental System	Estimate Item Cost
Aa. Seeding <i>ACCESS CORRIDOR TO DAM USE EXISTING SEEDS</i>	<u>0</u>
Ab. One gallon container planting <i>40 AREAS X 3 plants x \$5</i>	<u>600</u>
Ac. Five gallon container planting	<u> </u>
Ad. Salvaged and Replanting <i>\$200/AC. X .28 AC.</i>	<u>56</u>
Ae. Scarifying Soil	<u> </u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>\$175/EC. X .28 EC.</i>	<u>49</u>
Bb. Drip irrigation <i>120 EMITTERS X \$25</i>	<u>3000</u>
Bc. Impact Sprinkler System	<u> </u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO FLOODWAY

COMBINATION NUMBER: 3

TOTAL COST: \$ 2217

Developmental System Estimate Item Cost

Aa. Seeding *ACCESS TO DAM FROM BORROW* 2000
 $3.78 \times 5280' + 500 = 40$ ACCESS POINTS
 $100' \text{ LONG} \times 50' \text{ WIDE} \times 4 = 20,000 \text{ SF}$

Ab. One gallon container planting _____

Ac. Five gallon container planting _____

Ad. Salvaged and Replanting 168
 $60 \times 10 \times .28 \text{ acres}$

Ae. Scarifying Soil _____

Af. None _____

Ba. Temporary Hand and Truck Watering 49
 $\$175/\text{acre} \times .28 \text{ ACRE} =$

Bb. Drip irrigation _____

Bc. Impact Sprinkler System _____

Bd. Flood irrigation _____

Be. None _____

Ca. Equestrian and Hiking Trail System _____

Cb. Trail System with Oasis Pocket Parks _____

Cc. Pedestrian Trail System _____

Cd. Bicyclist Trail System _____

Ce. View Point _____

Cf. Private Use _____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UP AND DOWNSTREAM FLOODWAY BANKS

COMBINATION NUMBER: 1

TOTAL COST: \$ 10984

Developmental System	Estimate Item Cost
Aa. Seeding <i>canopy and understory</i> <i>399,200 SF x \$.01/SF</i>	<u>3992</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 plants x \$10 x 9.1 acre</i>	<u>5400</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE TO GERMINATE</i> <i>\$175 x 9.1 ACRES</i>	<u>1592</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: FLOODWAY AND BORROW AREAS

COMBINATION NUMBER: 1

TOTAL COST: \$ 49894

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory material</i> <i>1,796,400 S.F. x \$.01/S.F.</i>	<u>17964</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 Plants x 1/10 each x 41.2 acre</i>	<u>24720</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE FOR GERMINATION</i> <i>\$175 x 41.2 acres</i>	<u>7210</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO P.O.W.

COMBINATION NUMBER: 1

TOTAL COST: \$66,400

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting <i>Tree plantings along proposed construction road as additional dam screening</i>	<u>24900</u>
Ad. Salvaged and Replanting <i>1600 plants @ \$15 each</i>	_____
Ae. Scarifying Soil	_____
Af. None <i>AREA UNTOUCHED BY CONSTRUCTION</i>	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation <i>1600 EMITTERS @ \$25 each</i>	<u>41500</u>
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System <i>PROVIDED AS CONSTRUCTION ROAD</i>	<u>0</u>
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO R.O.W.

COMBINATION NUMBER: 2

TOTAL COST: \$49800

Developmental System	Estimate Item Cost
Aa. Seeding	
Ab. One gallon container planting <i>TREE PLANTING ALONG THE PROPOSED CONSTRUCTION ROAD AS ADDITIONAL DAM SCREENING</i>	<u>\$ 8300</u>
Ac. Five gallon container planting <i>1660 plants @ \$5 EACH</i>	
Ad. Salvaged and Replanting	
Ae. Scarifying Soil	
Af. None <i>AREA UNTOUCHED BY CONSTRUCTION</i>	
Ba. Temporary Hand and Truck Watering	
Bb. Drip irrigation <i>1660 EMITTERS @ \$25 EACH</i>	<u>41500</u>
Bc. Impact Sprinkler System	
Bd. Flood irrigation	
Be. None	
Ca. Equestrian and Hiking Trail System <i>PROVIDED AS CONSTRUCTION ROAD</i>	<u>0</u>
Cb. Trail System with Oasis Pocket Parks	
Cc. Pedestrian Trail System	
Cd. Bicyclist Trail System	
Ce. View Point	
Cf. Private Use	

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: TRANSITION TO R.O.W.

COMBINATION NUMBER: 3

TOTAL COST: 0

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting	_____
Ae. Scarifying Soil	_____
Af. None <i>AREA UNTOUCHED BY CONSTRUCTION</i>	_____ <u>0</u>
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____ <u>0</u>
Ca. Equestrian and Hiking Trail System	_____ <u>0</u>
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 1

TOTAL COST: \$1000

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory material</i> <i>20,000 SF x \$0.01/SF</i>	<u>200</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting <i>12 plants @ \$15 ea.</i>	<u>180</u>
Ad. Salvaged and Replanting <i>60 plants x \$10 EACH x .4 Acre</i>	<u>240</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System <i>12 HEADS @ \$70 EACH</i>	<u>840</u>
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 2

TOTAL COST: \$1340

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory</i> <i>20,000 SF x \$.01</i>	<u>200</u>
Ab. One gallon container planting -- <i>canopy</i> <i>12 plants x \$5</i>	<u>60</u>
Ac. Five gallon container planting	
Ad. Salvaged and Replanting <i>60 plants x \$10 x .4</i>	<u>240</u>
Ae. Scarifying Soil	
Af. None	
Ba. Temporary Hand and Truck Watering	
Bb. Drip irrigation	
Bc. Impact Sprinkler System <i>\$70</i> <i>12 HEADS x \$70</i>	<u>840</u>
Bd. Flood irrigation	
Be. None	
Ca. Equestrian and Hiking Trail System	
Cb. Trail System with Oasis Pocket Parks	
Cc. Pedestrian Trail System	
Cd. Bicyclist Trail System	
Ce. View Point	
Cf. Private Use	

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 3

TOTAL COST: \$ 520

Developmental System	Estimate Item Cost
Aa. Seeding <i>canopy & understory</i> <i>20,000 S.F. x \$.01</i>	<u>200</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 x \$10 each x .4</i>	<u>240</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>\$175/ea x .46 ea</i>	<u>80</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 1

TOTAL COST: \$5880

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory material</i> <i>72,000 SF. X \$.01/SF.</i>	<u>360</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting <i>30 plants canopy material @ \$15 EACH</i>	<u>1200</u>
Ad. Salvaged and Replanting <i>60 plants x \$10 x 1.6 ACRE</i>	<u>960</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System <i>48 HEADS @ \$70/EACH</i>	<u>3360</u>
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 2

TOTAL COST: \$ 5080

Developmental System	Estimate Item Cost
Aa. Seeding 72,000 SF x \$.01/SF	<u>360</u>
Ab. One gallon container planting 80 plants x \$5	<u>400</u>
Ac. Five gallon container planting	<u> </u>
Ad. Salvaged and Replanting 60 plants x \$10 each x 1.6 cc.	<u>960</u>
Ae. Scarifying Soil	<u> </u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering	<u> </u>
Bb. Drip irrigation	<u> </u>
Bc. Impact Sprinkler System 48 HEADS x \$70 each	<u>3360</u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM ROADWAY RAMPS

COMBINATION NUMBER: 3

TOTAL COST: \$ 1609

Developmental System	Estimate Item Cost
Aa. Seeding <i>canopy & understory</i> <i>72,000 SF x \$.01</i>	<u>360</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 plants x \$10 x 1.6 cc</i>	<u>960</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>\$175 x 1.65 cc</i>	<u>289</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: EMERGENCY SPILLWAY RAMPS

COMBINATION NUMBER: 1

TOTAL COST: \$ 8156

Developmental System	Estimate Item Cost
Aa. Seeding <i>under story material</i> <i>40' x 10,000' = 400,000 SF.</i> <i>400,000 SF. x \$.01/SF</i>	<u>4000</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting <i>SCREENING TREES</i> <i>50 plants @ \$15 EACH</i>	<u>750</u>
Ad. Salvaged and Replanting <i>40' x 10,000' = 43,560 = 9.18 acre</i> <i>60 plants x \$10 x 9.18 acre</i>	<u>550</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TRUCK TWICE TO GERMINATE</i> <i>9.18 acre x \$175</i>	<u>1606</u>
Bb. Drip irrigation <i>50 emitters @ \$25 EACH</i>	<u>1250</u>
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: EMERGENCY SPILLWAY RAMPS

COMBINATION NUMBER: 2

TOTAL COST: \$ 7506

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory material</i> <i>400,000 SF. @ \$.01/SF</i>	<u>4000</u>
Ab. One gallon container planting <i>50 plants x \$5 =</i>	<u>250</u>
Ac. Five gallon container planting	<u> </u>
Ad. Salvaged and Replanting <i>60 plants @ \$9.18 EACH x 9.18</i>	<u>550</u>
Ae. Scarifying Soil	<u> </u>
Af. None	<u> </u>
Ba. Temporary Hand and Truck Watering <i>9.18 ac x \$175</i>	<u>1606</u>
Bb. Drip irrigation	<u> </u>
Bc. Impact Sprinkler System <i>20 HEADS @ \$70 EACH</i>	<u>1400</u>
Bd. Flood irrigation	<u> </u>
Be. None	<u> </u>
Ca. Equestrian and Hiking Trail System	<u> </u>
Cb. Trail System with Oasis Pocket Parks	<u> </u>
Cc. Pedestrian Trail System	<u> </u>
Cd. Bicyclist Trail System	<u> </u>
Ce. View Point	<u> </u>
Cf. Private Use	<u> </u>

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: EMERGENCY SPILLWAY RAMPS

COMBINATION NUMBER: 3

TOTAL COST: \$ 6156

Developmental System	Estimate Item Cost
Aa. Seeding <i>400,000 SF x \$.01 SF</i>	<u>4000</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 plants x \$9.18</i>	<u>550</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>\$175/acc. x 9.18 acc.</i>	<u>1606</u>
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM FLOODWAY SERVICE ROAD

COMBINATION NUMBER: 1

TOTAL COST: \$1788

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>1.87 mile x 5280' x 13' = 43560 = 2.98 acre. 60 plants x \$10 x 2.98 acre</i>	<u>1788</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: DOWNSTREAM FLOODWAY TRANSITION

COMBINATION NUMBER: 1

TOTAL COST: 0

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>USE OF CACTI SALVAGED ELSEWHERE ON SLOPES OVER 4:1 @ SERVICE ROAD</i>	_____ 0
Ae. Scarifying Soil	_____
Af. None	_____ 0
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____ 0
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: FLOODWAY

COMBINATION NUMBER: 1

TOTAL COST: \$12,360

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>1.39 x 5280' x 90' = 43560 SF. = 20.6 ACRES. 60 plants x \$10 EACH x 20.6 ACRES</i>	<u>12360</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM SERVICE ROAD

COMBINATION NUMBER: 1

TOTAL COST: \$ 1788

Developmental System	Estimate Item Cost
Aa. Seeding	_____
Ab. One gallon container planting	_____
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting $1.89 \times 5280' \times 13'4 = 43560 = 2.98 \text{ ACRE}$ $60 \text{ PLANTS} \times \$10 \text{ EACH} \times 2.98 \text{ ACRE}$	<u>1788</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering	_____
Bb. Drip irrigation	_____
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM FLOODWAY TRANSITION

COMBINATION NUMBER: 1

TOTAL COST: \$66560

Developmental System	Estimate Item Cost
Aa. Seeding <i>UNDERSTORY</i> <i>1,197,504 S.F. x .01/S.F.</i>	<u>\$11,975</u>
Ab. One gallon container planting	_____
Ac. Five gallon container planting <i>Random Tree Hedge 12' x 12' for 9979'</i> <i>332 plants @ \$45 EACH</i>	<u>12,480</u>
Ad. Salvaged and Replanting <i>60 plants x \$10 EACH x 27.49 AC</i>	<u>16494</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TRUCK WATER TWICE TO GERMINATE</i> <i>\$175 x 27.49 ac.</i>	<u>4811</u>
Bb. Drip irrigation <i>332 EMITTERS @ \$25 EACH</i>	<u>20800</u>
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM FLOODWAY TRANSITION

COMBINATION NUMBER: 2

TOTAL COST: \$57745

Developmental System	Estimate Item Cost
Aa. Seeding <i>understory 1,197,504 S.F. x \$0.01/SF</i>	<u>\$11,975</u>
Ab. One gallon container planting <i>Random tree hedges @ 12' x 12' for 9979' 332 plants @ \$5 EACH</i>	<u>4160</u>
Ac. Five gallon container planting	_____
Ad. Salvaged and Replanting <i>60 plants x \$10 EACH x 27.49 ACRES</i>	<u>16,494</u>
Ae. Scarifying Soil	_____
Af. None	_____
Ba. Temporary Hand and Truck Watering <i>TWICE TO GERMINATE \$175 x 27.49 AC.</i>	<u>4,316</u>
Bb. Drip irrigation <i>332 EMITTERS @ \$25 EACH</i>	<u>20,800</u>
Bc. Impact Sprinkler System	_____
Bd. Flood irrigation	_____
Be. None	_____
Ca. Equestrian and Hiking Trail System	_____
Cb. Trail System with Oasis Pocket Parks	_____
Cc. Pedestrian Trail System	_____
Cd. Bicyclist Trail System	_____
Ce. View Point	_____
Cf. Private Use	_____

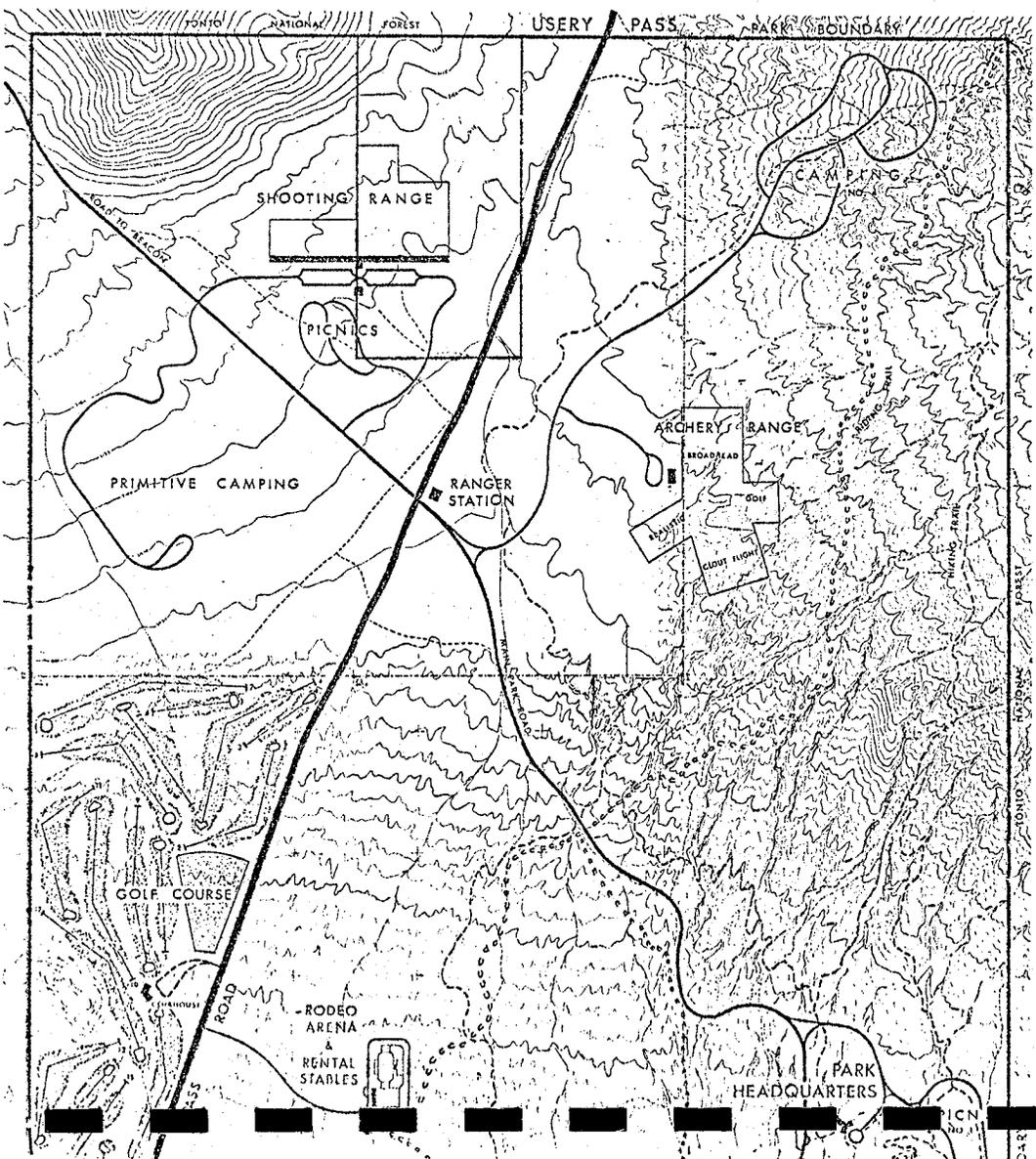
FUNCTIONAL COMBINATIONS OF DEVELOPMENTAL SYSTEMS

ZONE: UPSTREAM FLOODWAY TRANSITION

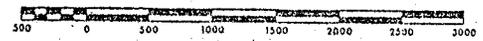
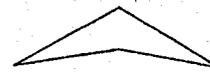
COMBINATION NUMBER: 3

TOTAL COST: \$ 33,280

Developmental System	Estimate Item Cost
Aa. Seeding <i>UNDERSTORY & CANOPY</i> $120' \times 1.39 \text{ miles} \times 5280' = 1197504$ $1197504 \text{ S.F.} \times \$0.21 / \text{SF}$	<u>\$11,975</u>
Ab. One gallon container planting	
Ac. Five gallon container planting	
Ad. Salvaged and Replanting $120' \times 1.39 \text{ mile} \times 5280' = 43,560' = 27.49 \text{ ACRES}$ $60 \text{ plants} \times \$10 \text{ EACH} \times 27.49 \text{ ACRES}$	<u>\$16494</u>
Ae. Scarifying Soil	
Af. None	
Ba. Temporary Hand and Truck Watering <i>TWICE TO GERMINATE</i> $\$175 \times 27.49 \text{ AC}$	<u>4811</u>
Bb. Drip irrigation	
Bc. Impact Sprinkler System	
Bd. Flood irrigation	
Be. None	
Ca. Equestrian and Hiking Trail System	
Cb. Trail System with Oasis Pocket Parks	
Cc. Pedestrian Trail System	
Cd. Bicyclist Trail System	
Ce. View Point	
Cf. Private Use	

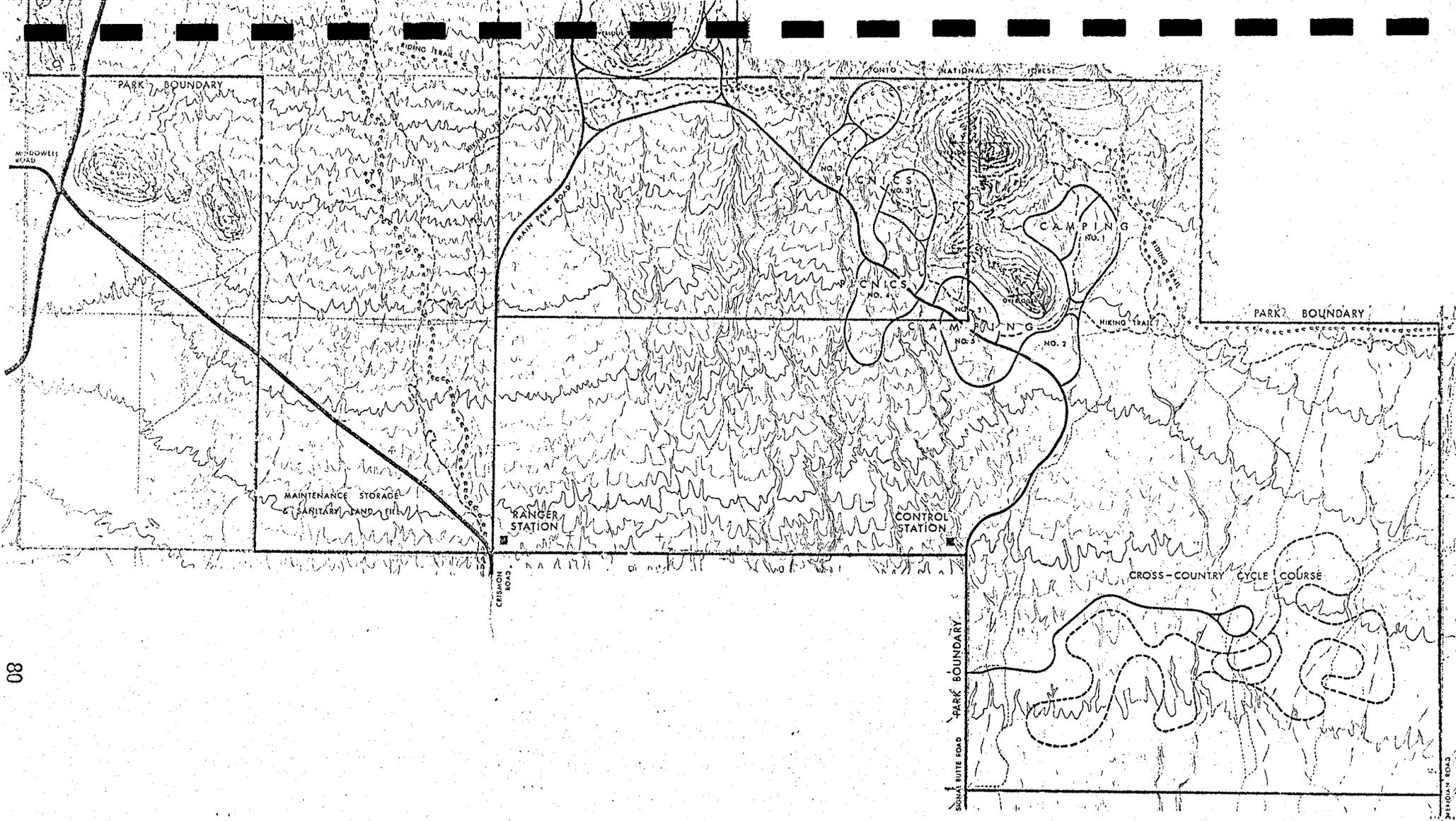


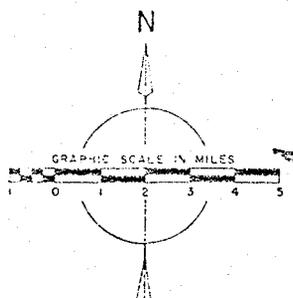
MASTER PLAN FOR
 USERY MOUNTAIN
 SEMI-REGIONAL PARK
 MARICOPA COUNTY, ARIZONA



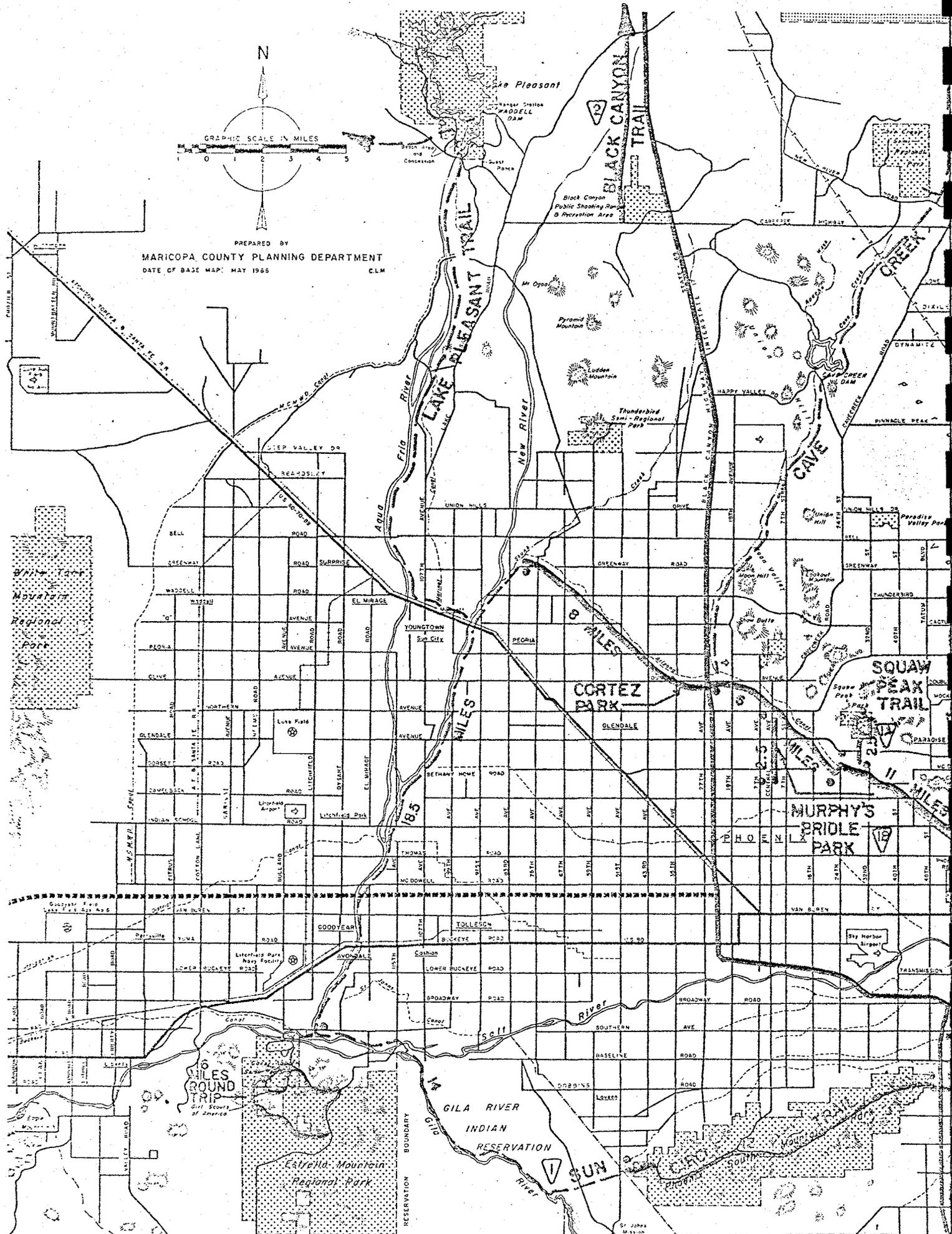
VAN CLEVE ASSOCIATES-CONSULTING PLANNERS

JULY 1967





PREPARED BY
MARICOPA COUNTY PLANNING DEPARTMENT
 DATE OF BASE MAP: MAY 1965
 CLM



HIKING AND RIDING TRAILS

CENTRAL PORTION OF MARICOPA COUNTY, ARIZONA

LEGEND

PRIMARY TRAILS

-  MARKED TRAIL
-  UNMARKED TRAIL
-  PROPOSED TRAIL

SECONDARY TRAILS

-  MARKED TRAIL
-  UNMARKED TRAIL
-  PROPOSED TRAIL

PREPARED BY
 MARICOPA COUNTY
 PLANNING AND ZONING DEPARTMENT
 PARKS AND RECREATION DEPARTMENT
 AUGUST, 1969 G. L. B.



C.A.P. THRU
SCOTTSDALE
(PROPOSED)

ARIZONA CANAL

ORME DAM
(PROPOSED)

GRANITE REEF
COUNTY PARK

GRANITE REEF
DIVERSION DAM

KEY

- TRAIL SYSTEM (PROPOSED)
- ////// COUNTY PARK
- ~~~~~ FLOODWAY, CANAL, OR AQUEDUCT

SALT RIVER INDIAN RESERVATION

TONTO NATIONAL FOREST

SPOOK HILL
FLOODWAY

PROPOSED
TRAILS
IN F.R.S.
B.O.W.

USERY MOUNTAIN
SEMI-REGIONAL
COUNTY PARK

SOUTHERN CANAL

SPOOK HILL
F.R.S.

SIGNAL BUTTE
FLOODWAY

McDowell

McKellips

Brown

University

Apache

Broadway

Road

Road

Drive

Boulevard

Road

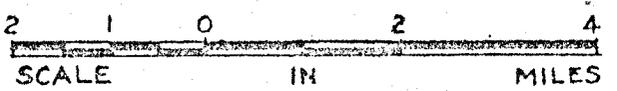
Highway

Bush

BUCKHORN-MESA
WATERSHED BOUNDARY

APACHE
JUNCTION

PARK AND TRAIL SYSTEMS MAP



MARICOPA COUNTY PARKS AND RECREATION DEPARTMENT

4701 EAST WASHINGTON STREET, PHOENIX, ARIZONA 85034

ADMINISTRATION & PARKS 262-3711

RECREATION 262-3716



Memo to: Herb Donald, Chief Engineer and General Manager
Flood Control
From: Robert H. Milne, Director, Parks and Recreation
SUBJECT: ENVIRONMENTAL IMPACT STATEMENT, BUCKHORN-MESA WATERSHED
Date: October 10, 1975

Reference the draft Environmental Impact Statement, Buckhorn-Mesa Watershed, Arizona.

First let us congratulate the Soil Conservation Service on the excellent work that has been done in developing the subject plan. The side slopes of 6 to 1 on the dikes is a commendable decision. The idea of drip irrigation on the structures, as well as replacing plant material in borrow areas, is a highly commendable approach to diminishing the visual impact of these rather sizeable structures.

We do, however, foresee some possible problems with this plan. As you may know, the CAP Canal or Granite Reef Aqueduct will be used as a trail way. It is anticipated that this will be used by both horsemen, hikers and quite heavily used by bicyclists. It is important in the interest of maintaining continuity in our existing trails system that certain access points be provided particularly along and across the proposed Signal Butte floodway. If the floodway is built on the rectangular channel basis, it would be necessary to place fences on both sides of the canal. If the canal is developed along the trapezoidal cross-section method, fences would not be needed so long as the slopes going into the bottom of the channel were of a sufficient grade to allow people walking or possibly even riding a horse to descend from the dike into the bottom of the channel.

Another feature of the project that may well create a problem is the existence of the Heber-Reno Sheep Drive which terminates at or near the general alignment of the Signal Butte floodway. It will be necessary to maintain the continuity of this historic and significant Sheep Drive. Crossings should be provided for both pedestrian and livestock at a variety of locations along this channel.

PARKS AND RECREATION COMMISSION

- LARE FELSTEAD - CHAIRMAN
- SUSAN COHILL - VICE CHAIRMAN
- EDDIE ARNETT - SECRETARY
- MIKE AUGUSTINE

- RAY BLASDELL
- HERB CAYWOOD
- DALE K. DOMBEY
- FRED M. GUIREY

- DONALD R. LIEM
- CHESTER D. MCNADD
- A. T. FRED STAPLEY

October 10, 1975

Page 2

It is also important that trail access be provided from the Central Arizona Project canal along the Signal Butte or a route near the Signal Butte floodway to the vicinity of Signal Butte flood retention structure and then to the Pass Mountain Dam outlet allowing hikers and horsemen to enter the park by trail from the CAP canal.

We would also ask that during the construction of the flood control structures that no vegetation be disturbed nor any fill taken from County Park property. If the borrow and plant materials can be taken from downstream, we feel that this would be preferable to disturbing the natural vegetation which exists in the park. This would be particularly true in the construction of the Pass Mountain flood retention structure and the Raven Roost flood retention structures, if that structure should be built. The unimproved road indicated on the project map passing along the east side of Section 3 and 34, Range 7 East, Township 2 N, is a road that we have, for some time, been trying to obliterate.

Another area of considerable concern to us is at the northeast end of our Bush Highway Recreation Area where the Central Arizona Project Canal is located, and where the Spook Hill dike will be constructed. Our concern is the potential damage that could result to the floodplain on the upstream side of the area. We anticipate that we will have only 16 acres of land available for park purposes northeast of the proposed floodplain, and if possible, prefer that it be left in its natural state. This would enhance the recreation potential of the area.

Thank you for the opportunity to comment on this project.

Bob Milne

Robert H. Milne

R:G:p

Thursday, January 29, 1976

Landscaping of Flood Control Project Aired at Hearing

By ED TAYLOR

Landscape architects for the proposed Spook Hill Dam, a part of the Buckhorn-Mesa Flood Control Project, heard requests Wednesday from East Mesa residents that the earthen structure be developed for recreational uses.

Plans call for the controversial dike to extend for about four miles from McDowell Road and the Bush Highway to 92nd Street north of University. Residents of the area have opposed the project because of the disruption it might cause.

"I see you people (the landscape architects) as the saviors of this project," said Elijah Cardon, 2550 N. 87th Street, at the meeting which was held at Fremont Junior High.

Residents suggested that the dike and reservoir be landscaped and developed with picnic areas, hiking and bridle trails, parks, a golf course and a desert arboretum. "If this is a worthwhile project we should do it right," Cardon said.

Architects at the meeting were A. Wayne Smith and Martin Umberger of A. Wayne Smith and Associates of Tempe. The firm has been hired by the

Soil Conservation Service, one of the sponsors of the project, to design the landscaping. Other sponsors are the Maricopa County Flood Control District, Pinal County Board of Supervisors and the East Maricopa Natural Resource Conservation District.

Under engineering plans drawn up for the project, the dike and reservoir would be dry most of the time, Umberger said. However, during heavy rain storms, the dikes would block off water flowing out of the Utery Mountains and protect lower urban and farming areas from flooding. It would also protect the Central Arizona Project canal which is proposed to run parallel to the dike.

Water trapped behind the dam would drain off to the Salt River in a maximum of 10 days, Umberger said.

Herb Donald, director of the Maricopa County Flood Control District, said his agency is prohibited by law from funding recreational facilities other than landscaping on flood control structures.

More intensive recreational development would require sponsorship by some other organization such as the County Parks Department

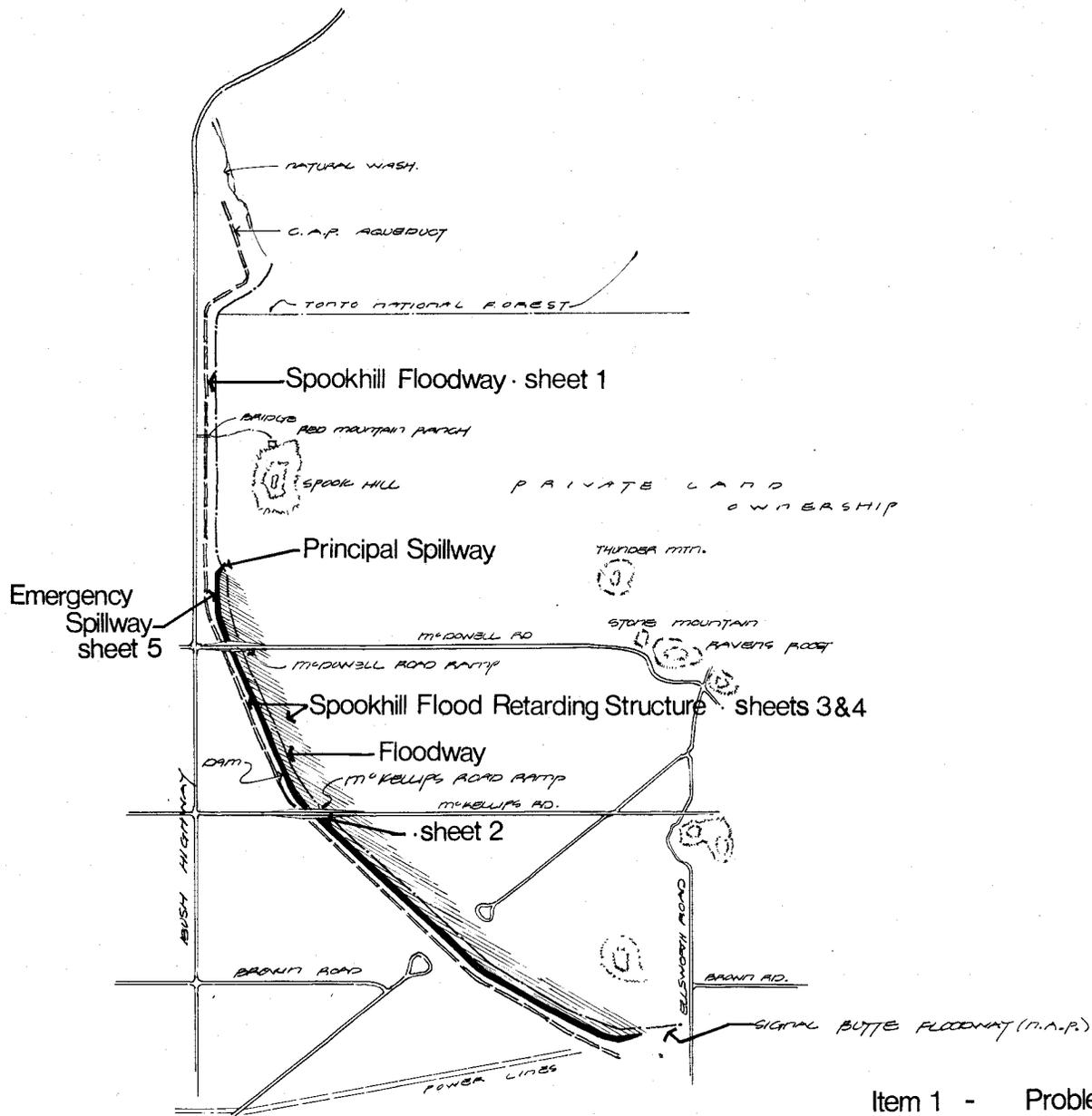
or a homeowners association, he said.

However, he said the district would make the land available to another sponsor that would be willing to construct and maintain the facilities.

When contacted by the Tribune after the meeting, Clare Felstead, a Mesa resident and member of the county parks board, said the department would be interested in the recreational development of the area.

"The department is always interested in anything that involves recreation for county residents," he said. "Our only restriction is finances."

He said the county parks department has been asked to serve as a catalyst for recreational development of the entire Central Arizona Project right-of-way within the county. Development of the Buckhorn project could tie in with overall plans being made for the CAP, he said.



Item 1 - Problem Identification & Alternative Solutions

Project Location & Key Map

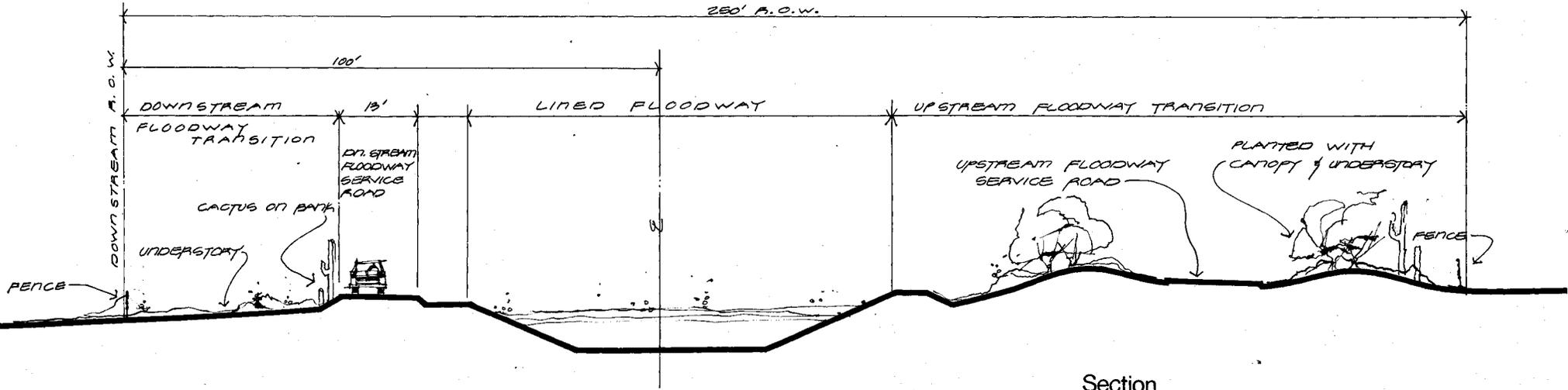
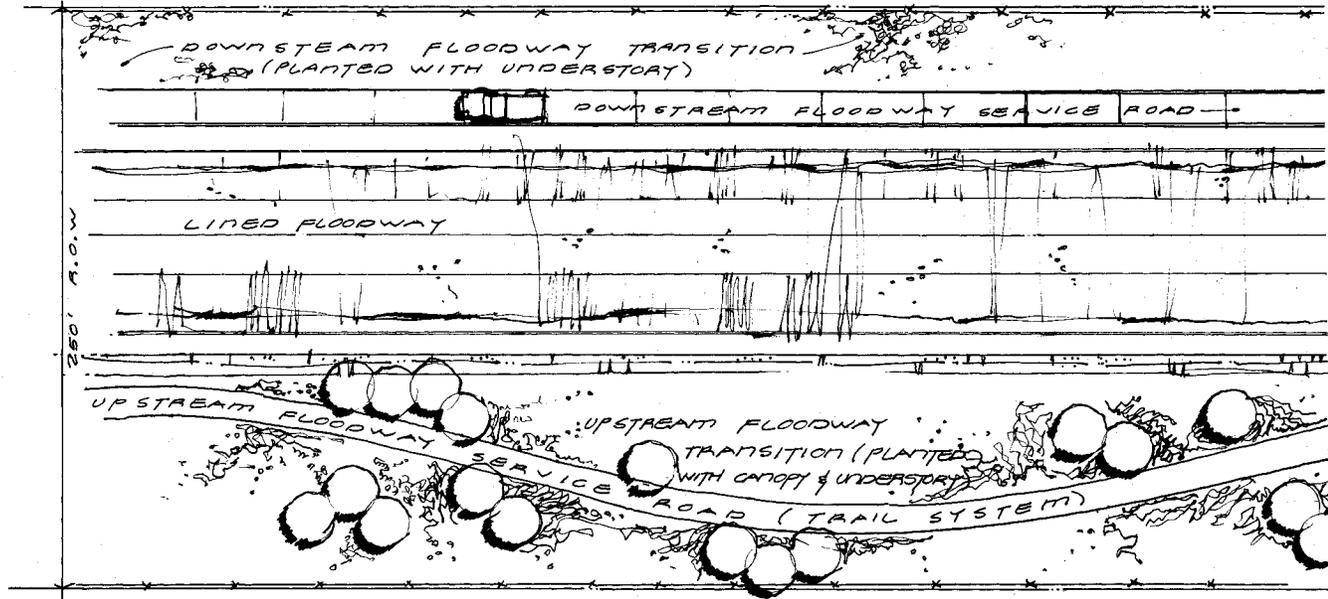


A. Wayne Smith & Associates Planning, Landscape & Architecture
 2120 South Rural Road Tempe, Arizona 85282

SPOOKHILL FLOODWAY

Plan View

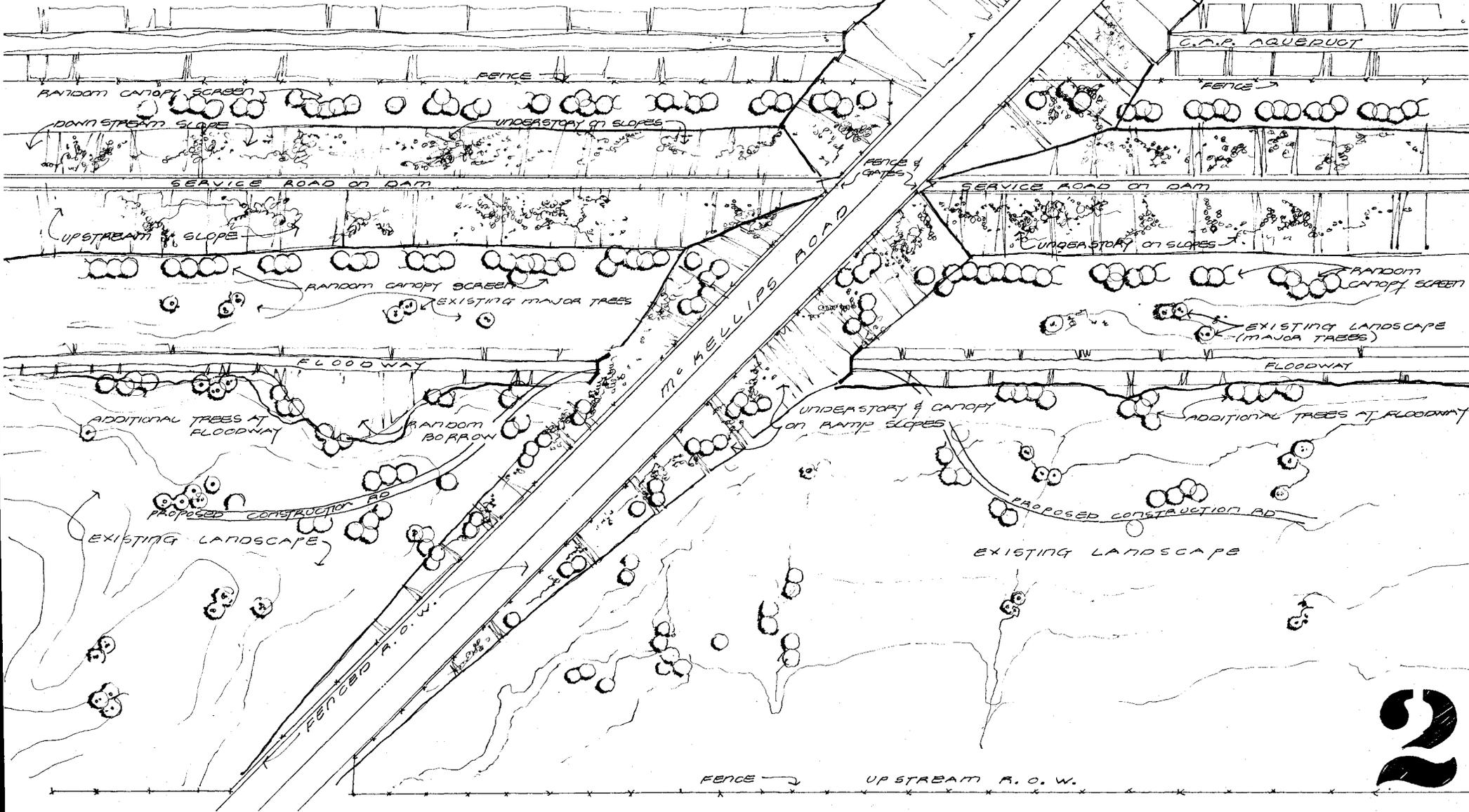
north



Section

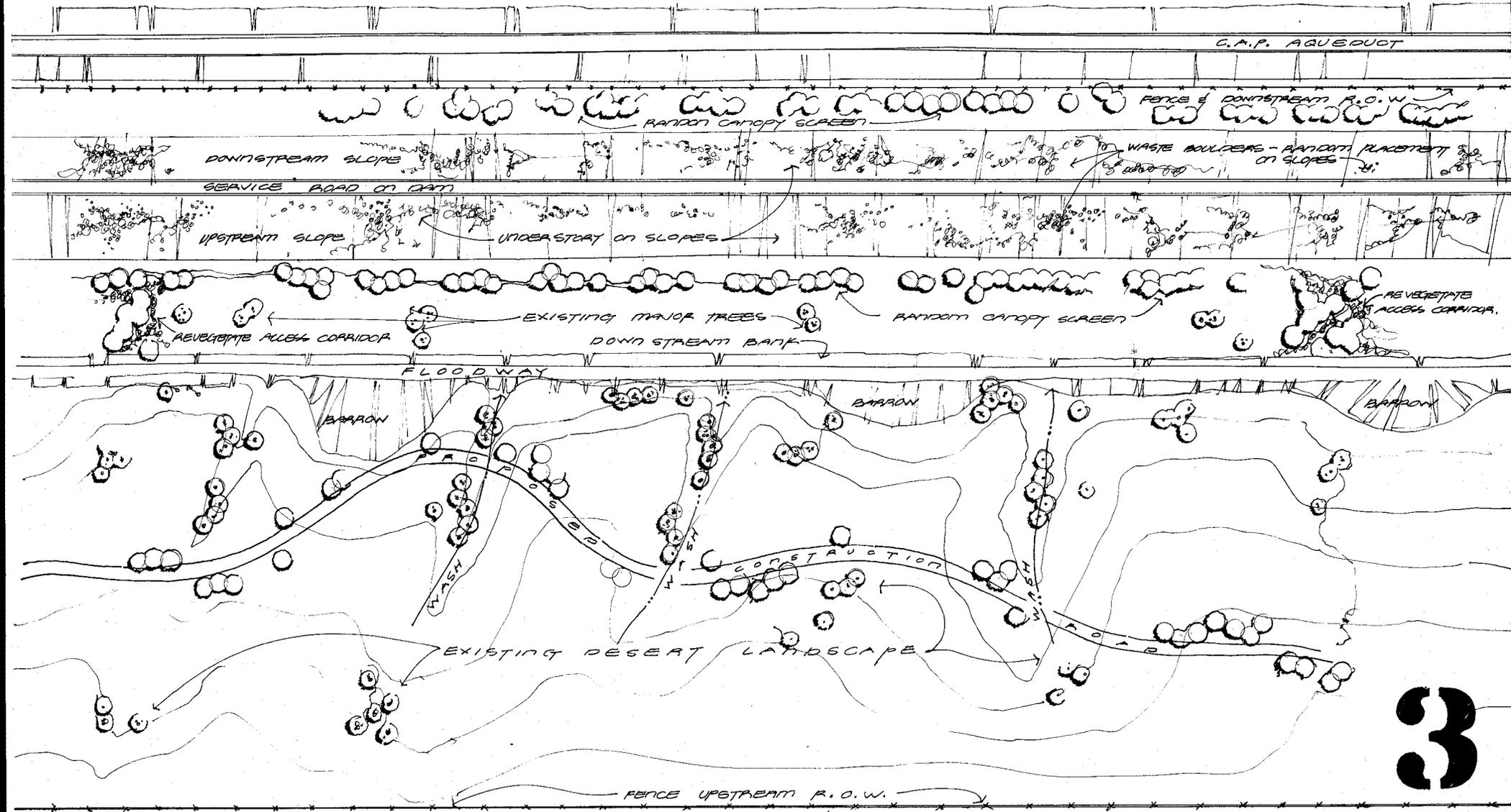
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McKELLIPS ROAD RAMP



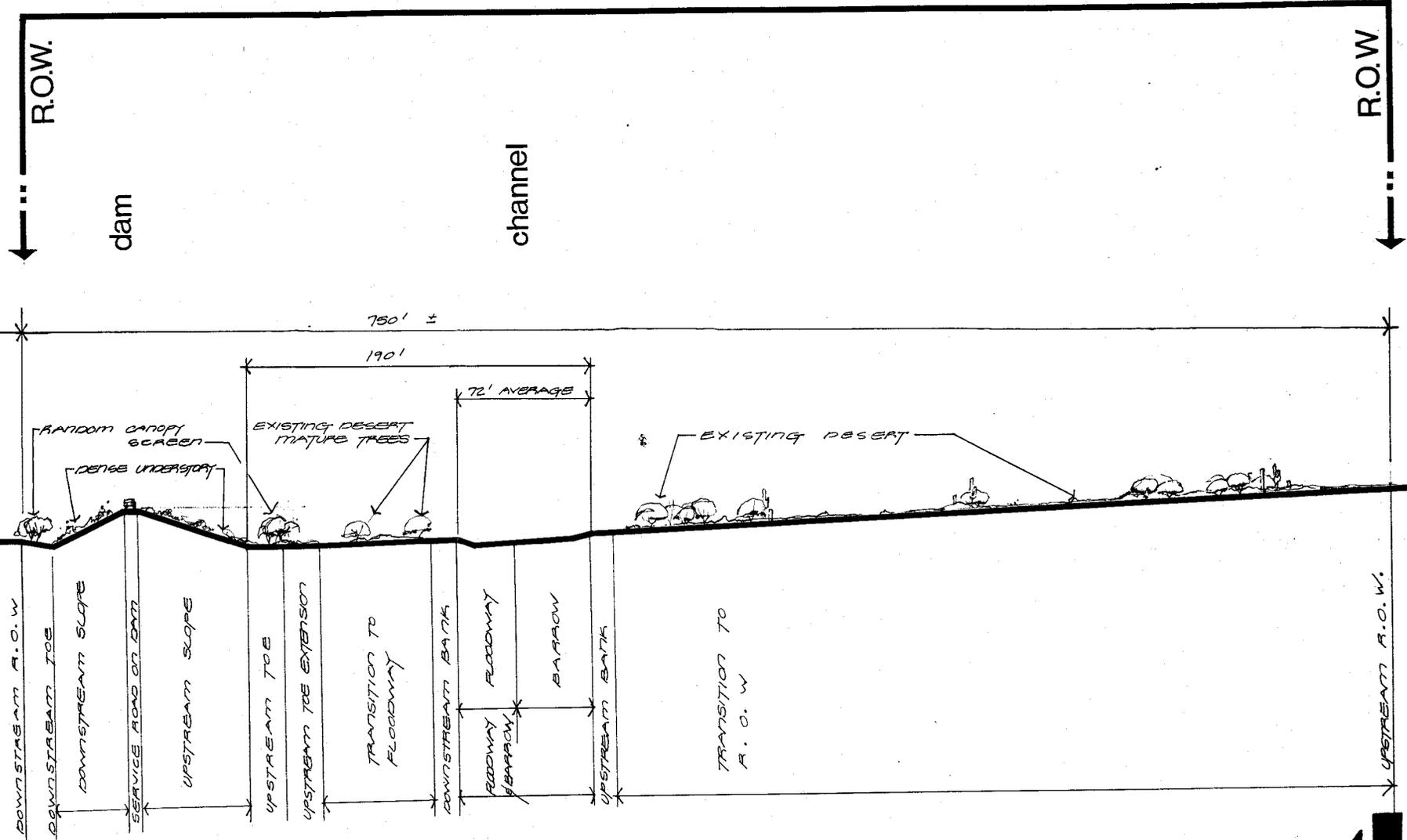
SPOOKHILL FLOOD RETARDING STRUCTURE- PLAN VIEW

north



SPOOKHILL FLOOD RETARDING STRUCTURE - TYPICAL SECTION

c. a. p. aqueduct



R.O.W.

dam

channel

R.O.W.

70'

750' ±

190'

72' AVERAGE

RANDOM CANOPY SCREEN
DENSE UNDERSTORY

EXISTING DESERT MATURE TREES

EXISTING DESERT

DOWNSTREAM R.O.W.

DOWNSTREAM TOE

DOWNSTREAM SLOPE

SERVICE ROAD ON DAM

UPSTREAM SLOPE

UPSTREAM TOE

UPSTREAM TOE EXTENSION

TRANSITION TO FLOODWAY

DOWNSTREAM BANK

FLOODWAY

BARROW

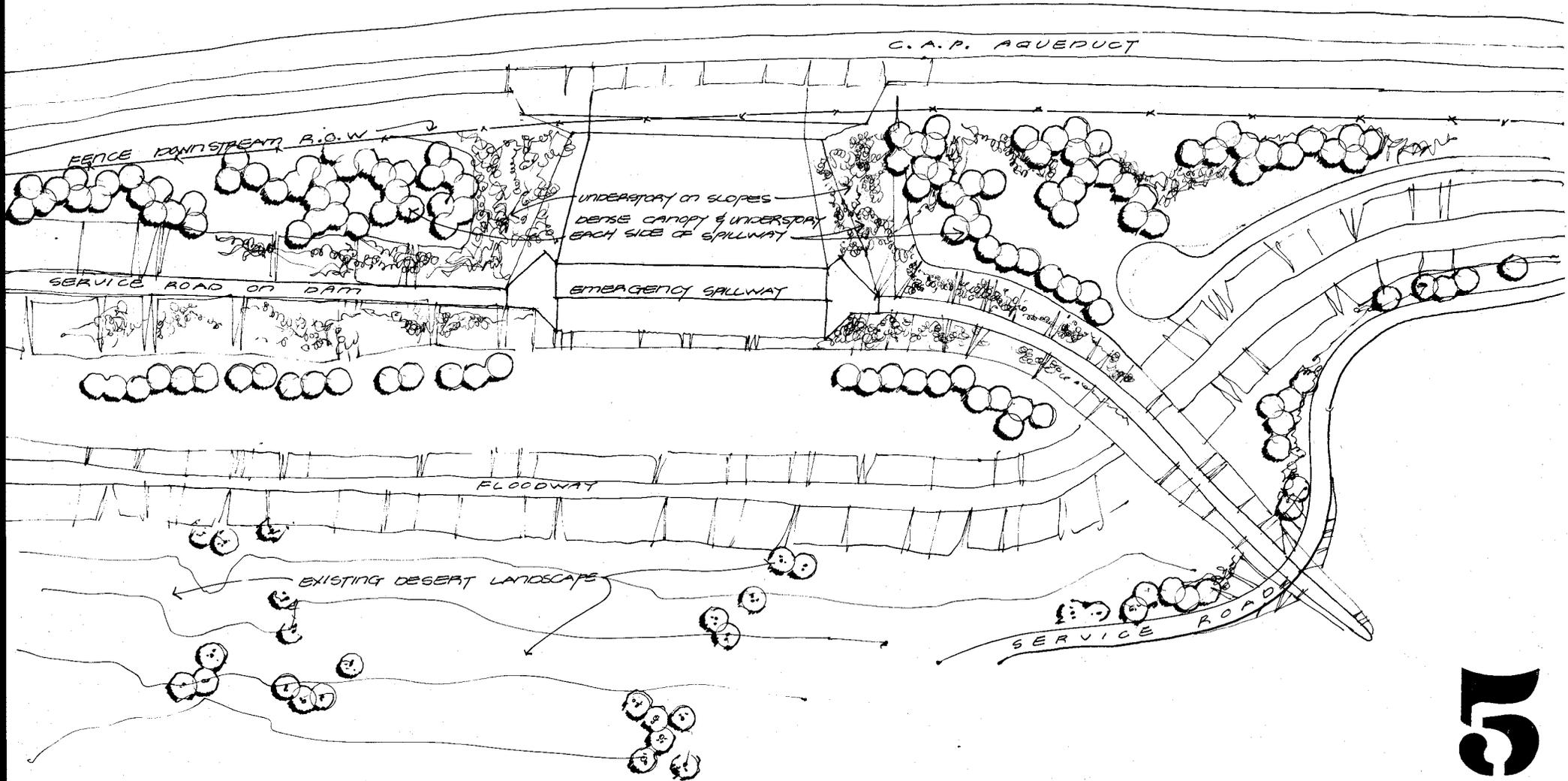
UPSTREAM BANK

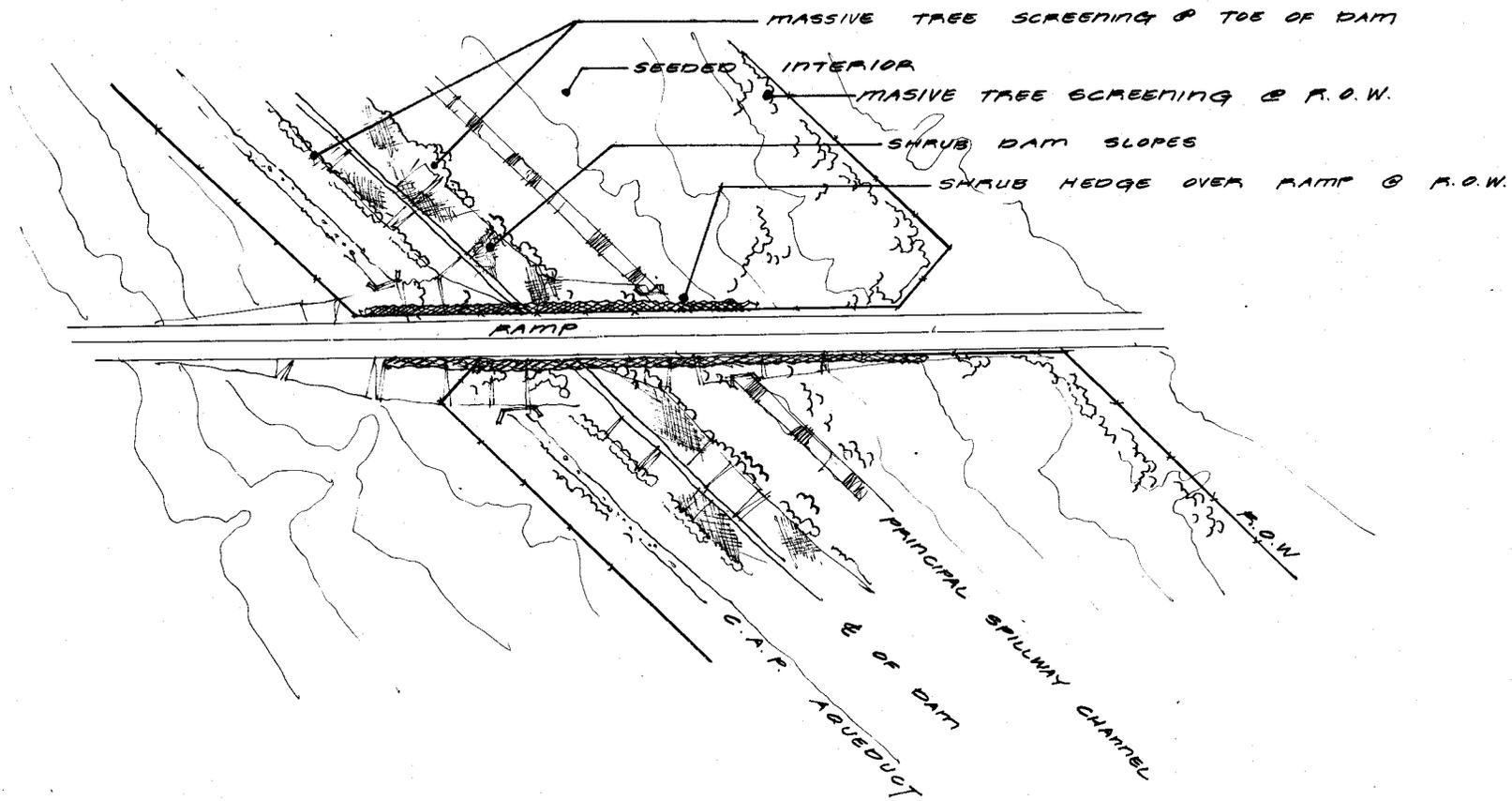
TRANSITION TO R.O.W.

UPSTREAM R.O.W.

EMERGENCY SPILLWAY

north





PRE-CONCEPTUAL STUDIES

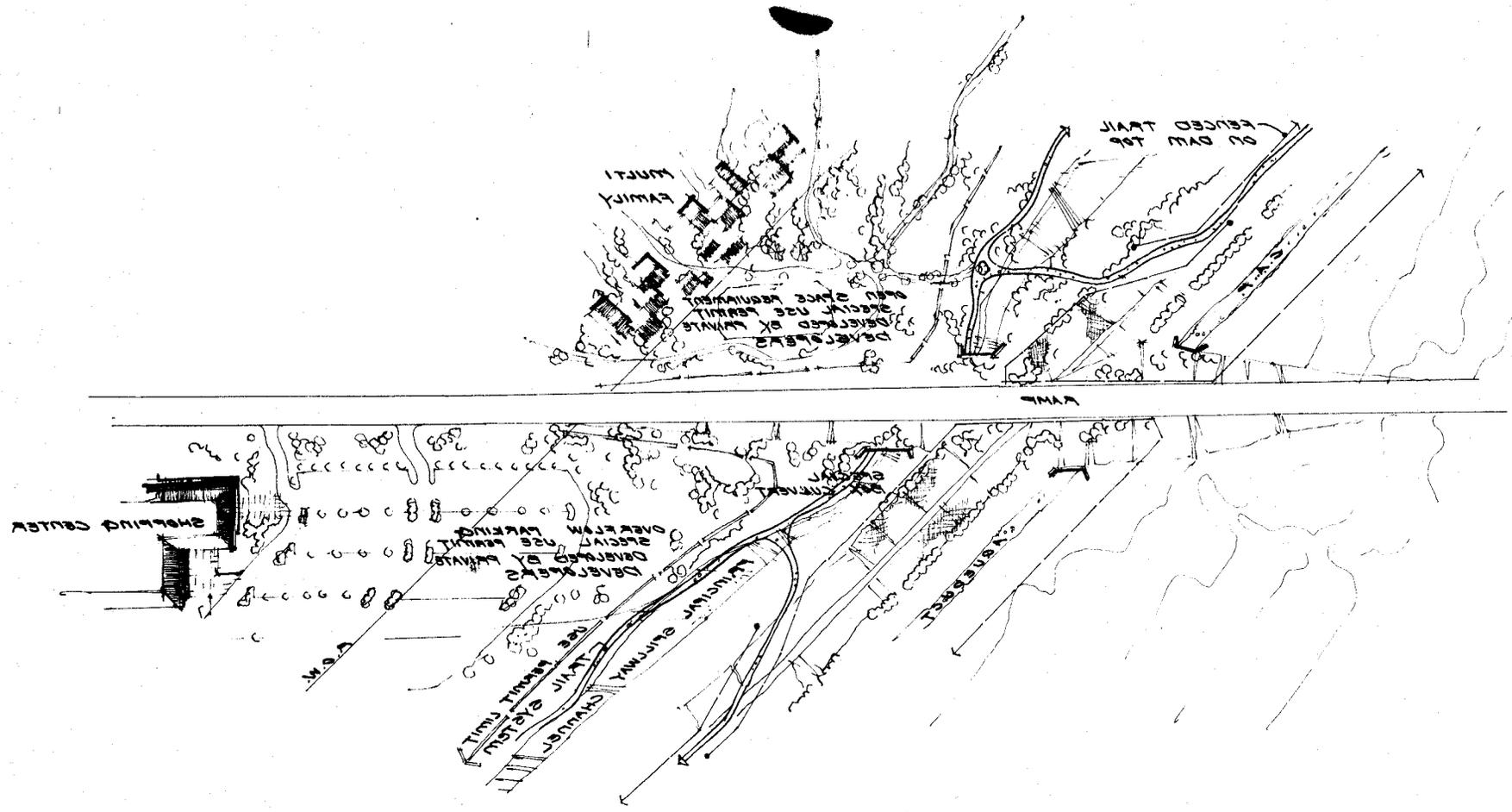
SPOOK HILL F.R.S. ——— SCREEN PLANTING & DAM PLANTING

I

SPECIAL USE PERMITS TO DEVELOPERS

F&E - CONCEPTUAL STUDIES

2600 K HILL F.R.S



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