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ASSOCIATES

**RIO SALADO
DEVELOPMENT ALTERNATIVES**

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RIO SALADO DEVELOPMENT ALTERNATIVES

Prepared for
Rio Salado Development District

by
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January 24, 1983

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I. Overview

The previous report, "Rio Salado Evaluation Report," pointed out the tremendous potential in the reclamation of the Rio Salado, both as a great resource for public recreation, and a chance to reconcentrate the sprawling growth of the metropolis. It also noted certain difficulties and dangers that must be confronted, including problems of access, financing, and the management of water, reversing the popular image of the river as a wasteland, and avoiding inadvertent damages to the low-income population resident nearby. This report presents two basic ways of realizing that potential and confronting those dangers. They are described in detail, and their social, economic, political and environmental impacts are laid out and compared with the alternative of no concerted reclamation of the riverbed.

The "no reclamation" alternative, or the continuation of present actions, does not imply no change in the Rio Salado district. New development, primarily industrial, is now occurring there and will continue, and present activities will persist, including the progressive mining of the riverbed for sand and gravel. New or rebuilt public works will continue to be required: levees, roads, bridges, utilities, landfills and so on. "No reclamation" will have costs, benefits and impacts of its own, which can be compared to the two proposals.

Two additional proposals are described in detail, in text and illustrations. Both involve major reclamation, including transformation of the present riverbed into a continuous regional park, and intensive development of its banks for industry, housing, recreation, tourism, and cultural and educational uses. Reclamation Alternative I, which does not require any additional upstream flood control, provides for a 100-year flood of 200,000 cubic feet per second (CFS), in a principally dry channel with a sand and gravel bottom and armored sides. This channel is furnished with a constantly flowing canoeway, planted with desert plants, and enlivened with greentopped park islands which enclose protected channels and small water bodies. The wild desert penetrates the entire metropolitan region, and is open to public boating, hiking, camping, riding, and other sports. On the banks above the flood channel, primarily to the south where there is the most room for development, the landscape is transformed into a linear oasis, running with water and lush with intense planting. Here are located the new uses attached to the edge of the river, within a continuous new parkway to the south.

Reclamation Alternative II depends on the construction of additional upstream flood control, which will reduce the 100-year flood to 55,000 cfs. In this case, the riverbed itself can be transformed into a chain of narrow lakes, connected with drops and brief rapids, all set in a grassy bed, and enriched with lush low water planting along the waterways. Like Alternative I, this riverbed would be a continuous regional park, but could support additional recreational activities, including swimming, fishing, small boat sailing on the larger lakes, golf and organized sports. It would also have island features and a canoeway, and the banks on either side would be intensely developed, with two flanking parkways.

The various elements of these two proposals are described in detail. They include such features as:

- new high technology industries linked to Arizona State University (ASU);
- a special mix of industry, housing and recreation;
- an extension of Papago Park, associated with commercial recreation and a continuing education center for ASU;
- a "water garden" associated with a magnet school and special industries;
- such new public institutions as a Southwest Cultural Center, a water museum, and "Discovery Place," a children's museum;
- a new State Fairgrounds;
- a site for a new domed athletic stadium;
- a possible national/international Exposition;
- a desert arboretum;
- a future new settlement extending to the west;
- lakes for boating and swimming;
- camp grounds;
- "white water" rapids;

- equestrian trails;
- archaeological and historic sites; and,
- many associated elements.

Both alternatives propose first developments at Central Avenue in Phoenix and at Mill Avenue in Tempe, and proceed onwards from those points to link up the river as a whole. Both recreate the old flowing river, in wet or dry form, and convert the present wasteland into a continuous public recreation ground.

Very briefly, the various impacts of these alternatives are estimated as follows:

1. There is sufficient water to accomplish either reclamation, without drawing on scarce supplies. Both would begin by using non-potable ground water--that is, water which is salty or polluted--which will improve the environment by drawing the water table down from possible contact with old landfills. Then the source would shift to using sewage effluent, after additional treatment, as this source grows in the future. This shift will prevent lowering of the water table below the desired levels. Both sources would not compete with other demands. Scheme II will require about 60% more non-potable water than Scheme I. The potable water requirements of any new development in the Rio Salado will be no more than a shift of demand from other metropolitan locations.
2. Both schemes will successfully manage floods at the 100-year level: Alternative I by means of its levees, and Alternative II with levees and additional dams upstream. The "no reclamation" alternative will also gradually improve flood management but will leave many areas unprotected for a number of years.
3. Both reclamation schemes offer vast new resources for recreation, culture, and education. Both include many water features, and a new and intriguing landscape, open to the public throughout its length. But Alternative II is able to provide a series of larger lakes and substantially more green space, in the bed of the river. "No reclamation" will provide no new recreation, beyond the single park and golf course presently planned in both Phoenix and Mesa,

and the possibility of some bankside water features in Tempe. The new educational facilities in both I and II, especially the proposed magnet school, will not only make the area attractive to the incoming population, but significantly improve the life chances of the present low-income people. Under no reclamation, the present dismantling of schools will undoubtedly continue.

4. ~~Both plans provide substantial amounts of acreage for new mixed use private development generally between the parkways and the river bed.~~ Those are lands which are proposed for acquisition by the District, both to control development more effectively and to realize some of the value added by the huge public investment required. Alternative I creates 1,800 acres of such land in all. Alternative II, due to its more extensive water features and green space, may be expected to attract additional development to its banks, which will spill over into the areas behind. 2,600 acres are made available for private development between the parkways in this scheme. The total estimated new development generated, in acres over a 25 year period, is as follows:

Anticipated New Private Development

<u>Major Use</u>	<u>Without Special Reclamation</u>	<u>Alt. I</u>	<u>Alt. II</u>
Industrial	1,750	795	1,270
Office	0	95	160
Retail	30	50	95
Commercial/ Recreation	0	20	115
High Density Residential	35	455	625
Low Density Residential	200	715	1,180
Hotels	55	175	310
(rounded)	2,070	2,305	3,755

- 5. The economic impacts lies principally in the new jobs and dwellings created in the district, the increase in land values, and new taxable land rescued from the existing floodplain. The new dwelling units and jobs are primarily redirected from sprawling growth at the metropolitan edge.

The increase in jobs is estimated to be:

	<u>Without Reclamation</u>	<u>Alt. I</u>	<u>Alt. II</u>
New Jobs in District	27,825	32,250	53,715

While there is not a significant difference in the actual number of new jobs between Alternative I and future development without special reclamation, Alternative I represents more of a variety of job types due to the mixed use nature of the proposed development. Without a reclamation effort, practically all new jobs would be industrial in character.

The supply of new housing units would be increased by 15,385 in Alternative I, 21,300 in Alternative II, and only 1,770 without special reclamation. In Alternatives I and II, land values between the parkways and the river may be expected to rise eight to ten fold in twenty years above present values, excluding the effects of inflation. The amount of new annual property tax revenues due to a rescue of land from the existing floodplain is \$13,000,000 in Alternative I and \$32,000,000 in Alternative II in year 25 of development.

- 6. The displacement of present housing, in both plans, is estimated at about 350 dwelling units in 20 years. This may appear a low number, but it is predicated on a substantial effort to strengthen and revitalize existing neighborhoods nearby. If not, there will be a major loss of present housing, and a large displacement and disorganization of existing communities.

7. Both plans raise no serious issues of transportation, while greatly improving east-west flows in the vicinity of the river. Major generators, such as a stadium or a State Fairground, are located to take advantage of present or planned freeways and expressways, and no serious conflicts are expected. Except for the significant cost of relocating power transmission lines, the public facilities that must be constructed--roads, bridges, and utilities--are roughly equivalent in all three futures, or at most represent only a redistribution of public works from the metropolitan fringe to the center. It is possible, although not here analyzed, that Alternatives I and II represent a net saving of public works over the no-reclamation alternative, since they can primarily take advantage of streets and utilities already in place.

8. Neither reclamation plan disturbs any known archaeological or historic site. Both plans enhance certain key sites of this kind. Both take account of aircraft noises generated by the present airport, and assume that no new third runway will be built.

9. Total costs of acquisition and construction are roughly estimated for the three alternatives as follows: No Reclamation, \$71 million; Alternative I, \$565 million; and Alternative II, \$696 million.

current \$?

Such long term capital costs are deceiving, however, since it is the rate of investment and required repayment that is crucial, not the long-term totals. The profile of investments is yet to be calculated in detail. Estimated annual public operating and maintenance costs are: without Special Reclamation, \$2 million; Alternative I, \$20 million; and Alternative II, \$29 million.

10. There are a number of issues of implementation of these plans, primarily those of financing, of methods of land acquisition or the control of private development, and of operation and maintenance. The report in general recommends a strong district development entity, able to acquire, finance, lease or sell, operate, maintain, and control the development along the Rio Salado. Other than the public lands in the riverbed, and certain special public or park facilities, development would be in the normal mode of a public framework supporting private development. The

acquisition of most lands within the parkways by the district entity is recommended, however, to be resold, or where possible, leased to private users.

The report lists a number of potential sources of financing this great public work, including the issuance of general obligation and revenue bonds, the recapture of increased land values through leasing or re-sale, the use of tax increments, various specific and general public grants, and user fees. These are discussed as potentials, with their advantages and disadvantages. An estimate of some of the revenue components has been made, but a complete balance sheet must await preparation of the financial plan in the next stage. At this stage, however, it appears that Alternative II has a more favorable benefit to cost ration. This is largely due to the taxes that will be created on land reclaimed from the existing floodplain and to the greater tax increments on all land within the planning area.

11. A number of legislative changes will be required to implement the Rio Salado proposals, including the enabling and establishment of a tax increment district, the ability to acquire land by eminent domain by the district development entity, various procedural changes and increases in staffing in the State Land Trust to facilitate land transfers and revisions.

The features and consequences of the three alternatives are detailed in the main body of this report. We strongly recommend the adoption of either Alternative I or II, depending on the judgement of the Rio Salado Development District as to the feasibility of upstream flood control, and the desirability of the new landscape produced. Either alternative will produce a magnificent new public resource for metropolitan Phoenix. At this early state in planning of course, either one will get modified in many detailed ways.

II. Description of Alternatives

We present two general alternatives for the reclamation of the Rio Salado, along with an estimated future state of the river if no special effort of reclamation were made, which is to be used as a baseline for comparison. The first alternative plan assumes that no further upstream dams are built, and copes with a 100-year flood of 200,000 cubic feet per second (cfs). The second is based on additional upstream flood control, which will reduce the 100-year flood to 55,000 cfs. Both alternatives show how the Rio can be reclaimed as a great linear regional park and locus of new metropolitan development.

The two alternatives differ in substantial ways in their treatment of the river bed and its banks, in the location and mix of various uses, and in the nature of the public works involved. Thus they illuminate the consequences of the key policy decisions. But they also have similarities, which spring from the nature of the river, the existing constraints, and the character of the metropolitan region. Some of the more specific parts of the two plans are not necessary consequences of the basic assumptions, but are indicated differently on each plan in order to expose sub-alternatives. For example, a possible State Fairgrounds may be shown in two separate locations. Thus certain detailed plan elements can be interchangeable. Both alternatives make the same assumptions about implementation and so plan elements will also shift if those assumptions are judged undesirable. The final plan may well be an amalgam of the two presented, plus the many revisions which the Board and its Technical Advisory Council will suggest.

The two most important decisions to be made are the scope and institutional basis of development action, and the assumed flood level. Whatever the Board's decision on the latter point, we recommend that first phase development should begin before any additional upstream flood control is completed, and that either long-range assumption must provide for an unexpected turn into its opposite. That is, a plan based on increased upstream flood control must show how it would respond if that control did not in fact occur, and one based on no further upstream control must show how it would change if that control were to come about.

Future Development Without Special Reclamation

A decision to forego a coordinated effort to reclaim the Rio Salado does not mean that no change will occur there. Public structures will be built along it. The existing fragmented system of levees will be completed in part by private initiative and by necessity in some areas by public action. New bridges will be built and old ones repaired. Further industrial development can be expected to occur in Phoenix, sometimes displacing poor families. Some of what the City of Tempe has projected in the way of commercial and recreational development may also come about. The District will, however, remain relatively underdeveloped. It will continue to be a physical and psychological barrier between north and south Phoenix, and, in particular, it will remain in the public mind as a wasteland, a public dumping ground. Thus it will be, as before, the logical place to put low value, unpleasant or noisy activities, landfills, transmission lines, sewer outfalls, and the like. Aircraft noise can increase with less public outcry than might otherwise occur. Sand and gravel mining will continue where reserves are plentiful, leaving pitted land in the floodway. These depleted mining areas will, in part, be reclaimed for new industrial developments. The floodway itself will be progressively confined within rock-faced levees. Its bed will remain rough, dry, barren and refuse strewn. Groundwater under the river will increasingly be polluted by contact with the many landfills during periodic flooding.

Waste areas of this kind are not useless in urban regions. They provide a safety valve for unwanted activities. However, if the Salt River remains a wasteland, the metropolis will have lost a great recreational opportunity and the outward spread of the region will continue unchecked.

Alternative I - Reclamation Without Additional Upstream Flood Control

This first plan explores the amenities that would be possible in the Rio Salado even if no further upstream flood control facilities were built.

The stream channel must then be planned to carry a possible 100-year flood of 200,000 cfs. This implies a very different treatment of the river. Permanent water bodies cannot be put in the riverway, since they would be scoured out, or filled in, during any major flood. The only feasible bottom is gravel and coarse sand, dotted with deep-rooted desert plants. Sediment deposition is to be expected. The banks must be armored with rip-rap or concrete. But plants can be introduced in the crevices of a rip-rap face, and deep-rooted trees can be placed along any continuously-flowing channel of water. In major flood, their roots will hold, even if their tops do not. Thus, even though the floodway must be dry, the banks and a waterway within it can be made green.

The plan proposes clusters and strings of embanked islands, well planted on their tops and along their banks, sometimes narrow and long where the main channel is restricted, but in all case providing adequate capacity for the smooth discharge of flood waters. The islands are created out of the stream bed itself, by the planned action of normal sand and gravel mining, or with fill brought in from other public works in the region. The planted tops of some islands might be allocated to particular areas or groups in the city for development and maintenance. Between these islands, the dry bottom takes on the braided pattern of the former Rio Salado: the image of the river is recreated in dry materials.

The stream bed is made interesting by the planted banks and islands, and by the narrow curving spaces between them. On the south side of the bed, at a somewhat higher elevation to avoid the low flood flows which might be expected every several years, flows a small channel with occasional drops and rapids, which can carry non-powered boats along the river. One can also ride along the dry bed on horseback, or in specialty vehicles. This wild desert strip would be an open public ground cutting through the heart of the city. It would be illuminated at night, to make a river of light through the center of the city, another image of the old natural stream. This will allow extended night-time use of the river bottom.

The developed banks, by contrast with the streambed, are intensely green, shaded, and rich with water. Bicycle paths and walkways skirt the river edge on this lush highlands. A continuous narrow stream runs along the south bank, above the streambed, where it is safe from being swept away. At intervals, this stream opens into small lakes. It is lined with walkways and developments can front upon it as well as upon this river edge trail. These features are shown in the plan and the typical sections. Should upstream flooding in fact be reduced after a scheme of this kind were undertaken, earth, grass, trees and water can be imported to soften the dry bottom.

The General Plan

Let us scan this proposal, as it might unfold within 25 years, and as if we were moving downstream from Mesa to beyond 35th Avenue. The features we mention here are shown in more detail on the accompanying general plan.

In Mesa, and in the Salt River Pima-Maricopa Community, the upper river is shaped into a broad basin, to be used as a desert wildlife refuge, and for free, extensive recreation. Sand and gravel mining would go in parts of this basin. On the north, this reach would be bordered by agricultural and industrial uses. On the southern edge, in Mesa, two small lakes and a golf course will be adjacent to low-density housing. At the lower end of this basin, the proposed new Mesa sewage plant would discharge its treated water into the boatway, which is to run the length of the District.

Below this point, the river will be transformed into its typical landscape island clusters threaded with dry streamways. Industrial uses are located along the southern edge, and also along the north, but some distance back from the banks. Along the near northern edge, there runs a band of commercial recreation, which is an extension of the new development at the junction with the Indian Bend Wash.

South of the river, a parkway begins at Alma School Road which will run as far as 35th Avenue in the west. In this alternative, the parkway and its associated band of development runs only along the southern side of the Rio Salado. The southern bank is favored because it is less affected by noise, has more generous space available,

and can more easily be connected to a residential hinterland. Land on the north is relatively narrow, noise-impacted, and blocked off by I-10, the railroad, the airport, and industrial development. Focus on the south, moreover, puts the Rio Salado in the foreground of any new development (as it will be seen from the side from which most citizens will enter it), rather than to its rear. This dramatizes the river, and helps to bind North and South Phoenix together, while giving a badly needed stimulus to the latter. Nevertheless, while this scheme pays principal attention to the south side, it also seizes on particularly favorable locations on the north bank, such as at Papago Park.

At McClintock Drive, we arrive at the historic, picturesque location where the Buttes and the Indian Bend Wash join the Rio Salado, across from Arizona State University. On the south, ASU will build its new golf course, while a hotel has been located at the base of the Tempe Butte. On the north, Papago Park will be extended to the river edge, beyond the old Indian Bend Canal at the edge of the hills. Resort facilities or restaurants would be placed along these foothill locations. A sculptural wall would be a feature of this new park, displaying a symbolic history of the region, and planned as a major urban monument. Adjacent to Papago Park on the east, the site would incorporate a hotel with conference facilities appropriate for use by the ASU Center for Continuing Education. Such a Center might also include recreational features. This conference center would allow the University to house visiting scholars and guests as well as to provide room for those attending alumni events, symposiums, special courses, and conferences. Nearby offices could rent meeting rooms for their own special conferences and briefings. Farther east, on both sides of the mouth of the Indian Bend Wash, a special mix of industry, recreation, and continuing education would develop, having connections to Arizona State University, to the entertainment and resort functions along Hayden Road and further north in Scottsdale, and to the High School technology industry developing around the airport. North of this, high density housing would line the west side of the completed Indian Bend Wash park. The junction of Wash and river would be marked by monuments set on an artificial elevation, which could also be the gnomon of a giant sun dial. Large rock sculptures cross the streambed along the course of the reef of

bedrock, just below the surface. By its history and its geology, this is a unique location along the course of the river.

Once past the Mill Avenue bridges, the continuous band of new development on the south bank begins, which lies between the parkway and the river, and which will extend to 35th Avenue and beyond. Through the center of this ribbon, which varies in width from 100 to 2000 feet, a small stream courses. It is divided in intersecting, braided rills, enlivened with small drops and ponds, and overhung with lush planting. The rills provide spaces for small restaurants and services within their embrace. Occasionally, this stream widens to form small lakes. It is a linear oasis, the watery counterpart of the dry river below. Uses fronting on the parkway, or on the river to the north, also front on this wet green world within the development belt. The progressive construction of this oasis, and of the parkway that parallels it, will be the triggers which set off private development along the line.

West of Mill Ave., the development of the south bank consists primarily of industry, which here enjoys close access both to ASU and to the airport. But we also will find an equestrian center accessible to the trails in the riverbed, and a small public park with its lake. As I-10 is crossed, and the development band moves farther from the noise zone of the airport, housing begins to mix in with the industrial and office uses. Here we illustrate the potentialities of a planned integration of work and living, which make possible a short daily journey, as well as such ancient privilege as walking or cycling to work, returning home for lunch, flexible supervision of children, part-time employment, or convenient housing for key employees or guests. Development can respond to changes in the market. The resulting urban landscape is more interesting (and more instructive to children). This band of mixed uses, threaded by its linear oasis, continues to the City park now under construction, and, through it, links to the water garden at Central Avenue. It is illustrated in the accompanying detailed plan. On the narrower and noisier north bank, there will be major industrial uses and some infill housing between 12th and 16th Streets, where the existing community would be preserved and strengthened.

We now approach a second key location: the south bank at Central Ave., between 7th Avenue and 7th Street. An intensive "water garden" will be built here, providing sites for public institutions, as well as for entertainment, shopping, recreation and some specialized residence. Initially, however, this will stimulate investment by high technology industries which are interested in a recreational setting and an education link. This central location will feature a "magnet" school, that is, a special technical high school open to students throughout the city, but with priority for students from the Rio Salado District and from high unemployment areas. Such a school would encourage families to settle in the District, and the industries locating in the area will benefit from participation in developing a skilled work force. Production facilities would be linked to technical education and to advanced research and the dissemination of research. They would be designed to explain their functions to the visiting public.

The new regional institutions located here might include a southwest cultural center, an institute dedicated to research, conservation, interpretation and communication of the southwestern heritage - and a museum and research center on a world-wide role of water. A third element could be Discovery Place, a museum for young people (and their elders) to participate in learning about the sciences and the arts. Those might be computer shops, bookstores, an ethnic market of food and crafts. Restaurants, night clubs and other entertainments would keep this true "industrial park" open in the cool of the evening. The water gardens with their terraces, streams, falls, pools and fountains, would penetrate the whole. Slender islands would be planted in the stream bed to enliven the foreground. A visible water feature might be placed at the entrance on Central Ave. Bus connections to downtown would be established.

Beyond 7th Avenue, the river opens up once more to a landscape of small hills along the north edge of the riverbed, which will form a desert arboretum displaying the life of the desert and the possibilities of desert flora. It would contain oases, dunes, mesas, and hidden "canyons," and might support a number of restaurants and other entertainment facilities. Adjacent to this, there is a lake in a park, and an equestrian center. Certain choice sections fronting

on the park are given to new housing. A golf course has been built on the old landfill west of 27th Avenue. South of the riverbed the parkway runs along the present Broadway low density housing, replacing the auto junk yards now located there.

Beyond this point, the plan does not fix the disposition of the river land, but recommends that this ground should be preserved for a major future development. One of the strategic aims of the entire plan, implemented by the initial occupation at Central Avenue and followed by the progressive westward extension via the desert aboretum and the parkway, is to open up this empty western territory, now abandoned by the northward and eastward drive of Phoenix. Here we see a future new settlement on a completely unexploited growth axis of the metropolis, carried out according to a careful general plan, and making maximum use of the recycled water released by existing urban settlement. District strategy should be designed to unlock and to control that great opportunity.

Alternative II - Reclamation With Additional Upstream Flood Control

This second plan assumes that the additional upstream flood control will be in place within ten years, and that subsequent development will have to deal with a flood of no more than 55,000 cfs. This has important consequences for the bed and banks of the floodway. The plan shows the eventual conversion of that floodway into a long succession of narrow, interlacing lakes, for the most part one-quarter to one mile long, formed by low drop structures and linked by a continuous boating waterway. Drop structures would occur about every two miles, as shown on the plan, but in two locations, below 7th Avenue and between Mesa and the airport, the slope of the river allows longer length of quiet water. At each drop, the waterway would pass through rapids, which could be attractive features for those who enjoy white water boating. Lakes and waterway are set among clusters of small planted islands, in a grassy bed, and within planted banks which are gentle or steep depending on the width of the waterway. In a new and more dramatic form, these lakes recall the old braided stream. Where needed to protect special use lakes or sensitive plantings, a shallow, grassed low-flow channel is provided, which can take the normal five-year flood. The Rio

Salado flows again, using a minimum of water and affording multiple new recreational opportunities and wildlife habitats. The entire river bed is devoted to recreation. See the proposed typical sections.

Paralleling the river bed are two curving parkways - generally within 1,000 to 2,500 feet of the streambed on the south side and rather closer to the north - within which the District or other public agencies will have acquired most of the land, and where the new riverside development gradually unfolds. The previous plan was compelled to leave the riverbed dry, and to place its flowing water up on the south bank, beyond the reach of major floods. This plan can water the riverbed itself, and focus both banksides on the extended parkland that results.

The General Plan

Once again, we scan this proposal downstream from Mesa, as it might appear in 25 years. Where its features are similar to those in the previous plan, we will pass over them more quickly. The general plan illustrates them in detail.

Above Country Club Road, within the Indian community, the Rio Salado is shaped into a broad sedimentation basin in which flood velocities are sufficiently reduced that the water will drop its load of silt, sand, and gravel, and so will not damage the lakes and plantings located downstream. This basin will be an extended landscape, clothed in native desert plants, in places mined for the retained sand and gravel, but for the most part a wildlife refuge, open to camping and horseback riding.

Below the wide drop structure of this retention basin, the streambed can be planted with grass. The first lake occurs at Alma School. It lies wholly within the Indian Community, and is open to recreational use on a fee basis. Effluent from the new Mesa sewage plant feeds that first lake, after undergoing tertiary treatment. South of this lake and its borders is low density residence and then a new Mesa public golf course. North of it, the land is given over to agriculture and industry, in accord with present Indian plans.

At the junction with Indian Bend Wash, we encounter a sheet of water a mile and a half long, the largest lake in the entire Rio Salado system. It will be used for swimming, fishing, and boating. To the north is the continuing education, recreation and industrial center previously described, connecting westward to resort facilities along the old canal. As before, the Indian Bend Wash is completed with a stream and lakes and lined along the underdeveloped western edge with high density housing. To the south is the new hotel at Hayden Pass, as well as A.S.U. and its proposed golf course. The drop structure which creates this large lake is designed to make a dramatic link across the streamway just where the Buttes step across it, and where the underground granite reef - the major geologic feature of this region - slips underneath it unseen. A curving linear form, or line of landscaping, will pass over this dam, to run along the Indian Bend Canal at the foot of the hills, celebrating this historic crossing.

Below the bridges at Mill Ave., the river opens into another broad expanse, filled with a dense cluster of islands and interlacing lakes. Here we are under the noisy approach zone of the airport, and so this stretch will be devoted to ball fields and a wildlife park, and to a golf course within the islands. North of this is the new State Fairgrounds, an associated theme park, and the historic outdoor museum at Pueblo Grande, all as shown on the detailed plan. To the south is industry, an equestrian center, and the clubhouse for the golf course in the streambed, lying next to a belt of park which extends westward of Old Town Park.

Still further west, where the river channel generally narrows to 1,000 feet or less, we find major new development on the south. This consists of high technology industry and offices, associated with ASU and the airport. Just south of this is an excellent location for a future domed sports stadium, well connected to both I-10 and the Hohokam Expressway. Moving westward along this southern line, the industrial and office uses begin to be mixed with housing, once I-10 is crossed and the airport noise diminishes. As in the previous plan, this is an innovative blend of residence, work place, and recreation. This mix extends to 7th Street, except for the new city park and golf course at 16th Street. The land along the north side is somewhat more restricted, due to the presence of I-10 and the airport, but is generally devoted to offices and industry,

At 24th Street, the river broadens to form a large new island, with parkland, offices, high density housing and one or more hotels. This will be a prestige location and a principal event along the course of the river. It is illustrated by a detailed plan and view.

At 7th Street and Central Avenue, we approach the existing new industrial development on the north, and the river is confined between steep banks. But it still sports narrow lakes, and a waterway on a grassy bottom, all part of the continuous regional park. To the south, at this point, is one of the key features of the plan: a water garden in which is set a complex of public institutions, special productions facilities linked to education, entertainment, shopping, recreation, and some specialized residence. While similar in general nature to the proposal in the previous plan, it is more ambitious in scope. It has been created by a World's Fair or special exposition, whose opening was timed to coincide with the building of the upstream flood control dams. Work is directly integrated with education, residence and recreation, in a setting which enhances all these functions. As before, the new regional institutions include a southwest cultural center, a museum of water, a museum for young people, a magnet technical high school. There would be computer shops, bookstores, restaurants, night clubs and other entertainments. An ethnic market would sell food, crafts and other specialties. Tributary streams run down into the streambed lake. Direct connections to downtown Phoenix would be made. See the detailed plan. Commercial uses flank the Central Avenue bridge up to the span itself, narrowing the apparent length of this key connecting link. A symbolic superstructure has been added to the span, which at night traces out in lights a rising phoenix. These features are illustrated in the accompanying view.

Beyond 7th Avenue, the river opens up once more to the landscape of small hills which contains the desert arboretum, as in the previous plan. But now the hills can be interlaced with waterways. North of this, sections fronting on the park are given over to new housing. A golf course has been built on the old landfill west of 27th Avenue. South of the arboretum, the parkway runs for a stretch along the present Broadway, then swings wide to give space to several major new resorts along the braided stream and its lakes.

Beyond this point, this plan shows that the ground is preserved for a major future development, a new settlement, on a completely unexploited growth axis of the metropolis. This is a strategic opportunity.

Phasing

Both plans begin at the same two points. The first is at Central Avenue in Phoenix, on the south side of the river, and the second is at Papago Park and the Indian Bend Wash, primarily on the northern side. Central Avenue is the symbolic axis of the metropolis, and a successful development at this point will tie downtown to the Rio Salado, and also leap the chasm between north and south Phoenix. Moreover, it will set the stage, not only for remaking the river eastwards toward Tempe, but also for opening up the axis for growth to the west. Its potential benefits justify a significant concentration of public and private investment. We have suggested the unique mix of uses that might occur there, and how that apparently formless environment could be transformed, and so transform the popular image of the river. One plan suggests a world's fair or special exposition as a launching platform, and the other a particular linkage of production and education. Both rely on a "water garden" setting, using the relatively exhausted gravel mines for that purpose. Other devices may be possible, but it is clear that a decisive act is required here.

The two plans differ in their scale at this point, and in the treatment of the river in their foreground. The dry scheme, which counts on no upstream flood control, can make its new river landscape immediately. The wet scheme must wait on the new dams to take its final form, and so must time any exposition carefully, to synchronize with completion of the upstream works. But it could begin with a dry landscape, as a precursor to its future lakes.

The second point for early action is at Tempe, east of Mill Avenue. The buttes and the Wash make this the most picturesque section of the river, and it is the one most closely connected to Indian history and to the history of white settlement. It is also a significant geological break-point. Finally, the presence of A.S.U., the favorable market location, and the active plans of the city of Tempe, all reinforce the special quality of this place.

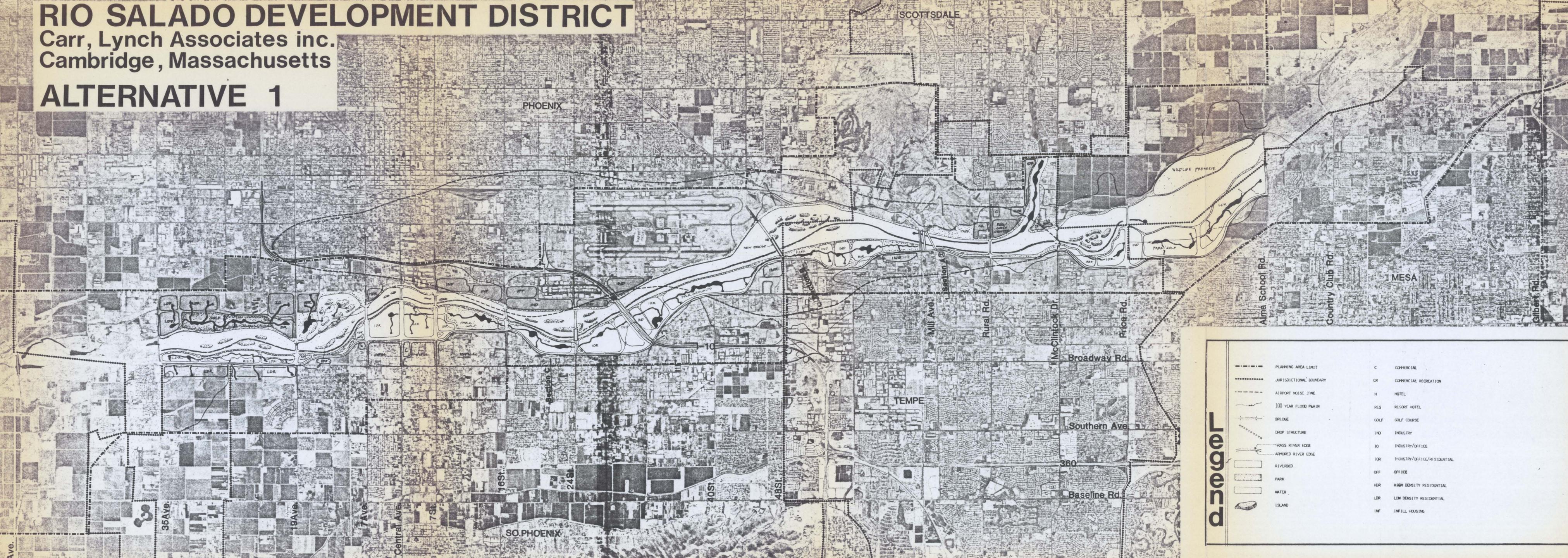
Both plans make similar recommendations for seizing these potentialities. They differ in scale, and in the treatment of the riverbed. In the one, a dry course is enlivened with islands and rock sculptures. In the other, this space is occupied by the largest lake in the system. In the latter case, however, development could proceed successfully even before this lake was created, due to the favorable characteristics of this special area. Given a successful consolidation of the multiple power lines which converge here, and a solution to the congested Mill Avenue crossing, early development seems quite feasible.

If both points are occupied and transformed within the first ten years, the potential of the river will have been demonstrated. The anchors will have been set from which can unfold a progressive development of the entire line - first an inward movement to link the two anchor points to one another, and then an outward movement to the east and the west, to match the growth of the metropolitan area. The extension of the Rio Salado might in time become an element in even large plans, such as that of an ultimate metropolitan "green ring," composed of the Indian Bend Wash, the Rio Salado, the Agua Fria, and the CAP Canal. While these two localities are the principal targets for early investment, many other actions will be needed in the first phase. There will be levees to complete, and the bed and banks must be cleared. Water sources will be researched and developed. Industrial areas would be created close to the airport, to help generate an early income stream. Some new infill housing will be required. In particular, early steps must be taken to protect those nearby residential communities that are to remain. Major financial, legal, and administrative measures must be carried through, and public support must be marshalled.

RIO SALADO DEVELOPMENT DISTRICT

Carr, Lynch Associates inc.
Cambridge, Massachusetts

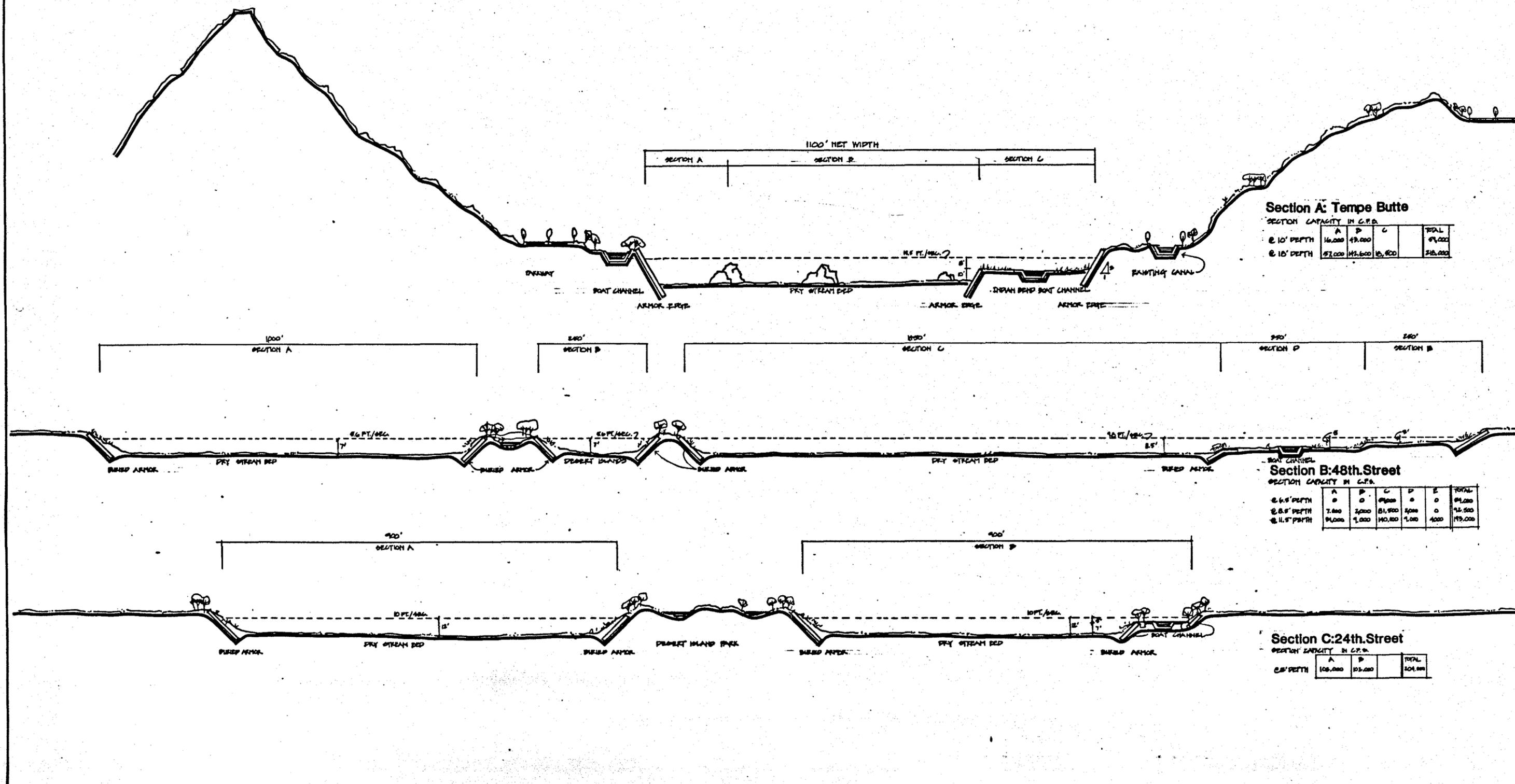
ALTERNATIVE 1



Legend

--- (dashed line)	PLANNING AREA LIMIT	C	COMMERCIAL
--- (dotted line)	JURISDICTIONAL BOUNDARY	CR	COMMERCIAL RECREATION
--- (dash-dot line)	AIRPORT NOISE ZONE	H	HOTEL
--- (wavy line)	100 YEAR FLOOD PLAIN	RES	RESORT HOTEL
--- (line with cross-ticks)	BRIDGE	GOLF	GOLF COURSE
--- (line with vertical ticks)	DROP STRUCTURE	IND	INDUSTRY
--- (line with horizontal ticks)	GRASS RIVER EDGE	IO	INDUSTRY/OFFICE
--- (line with diagonal ticks)	ARMORED RIVER EDGE	IOR	INDUSTRY/OFFICE/RESIDENTIAL
--- (line with horizontal dashes)	RIVERBED	OFF	OFFICE
--- (stippled area)	PARK	HDR	HIGH DENSITY RESIDENTIAL
--- (blue area)	WATER	LDR	LOW DENSITY RESIDENTIAL
--- (island shape)	ISLAND	INF	INFILL HOUSING

NOTE
ALL SECTIONS ARE DRAWN LOOKING WEST.



Section A: Tempe Butte
SECTION CAPACITY IN C.F.S.

	A	B	C	TOTAL
8.10' DEPTH	16,000	49,000		65,000
8.15' DEPTH	57,000	142,500	16,500	216,000

Section B: 48th Street
SECTION CAPACITY IN C.F.S.

	A	B	C	D	E	TOTAL
8.6.5' DEPTH	0	0	0	0	0	0
8.8.5' DEPTH	7,800	2,000	51,900	2,000	0	63,700
8.11.5' DEPTH	94,000	1,000	10,800	1,000	4,000	110,800

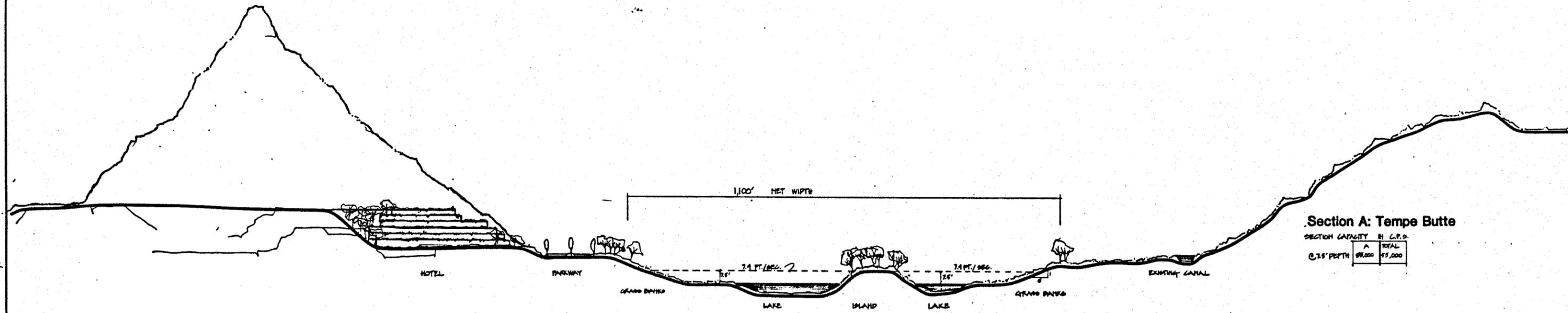
Section C: 24th Street
SECTION CAPACITY IN C.F.S.

	A	B	TOTAL
8.8.5' DEPTH	108,000	93,000	201,000

RIO SALADO DEVELOPMENT DISTRICT
Carr, Lynch Associates Inc.

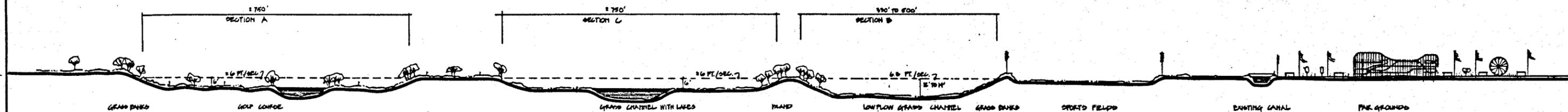
ALTERNATIVE 1
SECTIONS

NOTE
ALL SECTIONS ARE DRAWN LOOKING WEST.



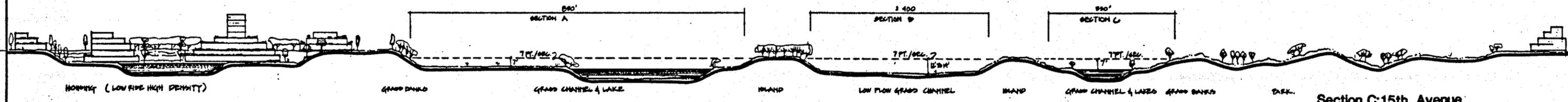
Section A: Tempe Butte

SECTION CAPACITY	IN C.F.S.	
	A	TOTAL
0.75' DEPTH	\$8,000	\$5,000



Section B: 48th Street

SECTION CAPACITY	IN C.F.S.			TOTAL
	A	B	C	
0.6' DEPTH	\$2,000	\$2,000	\$3,000	\$5,000



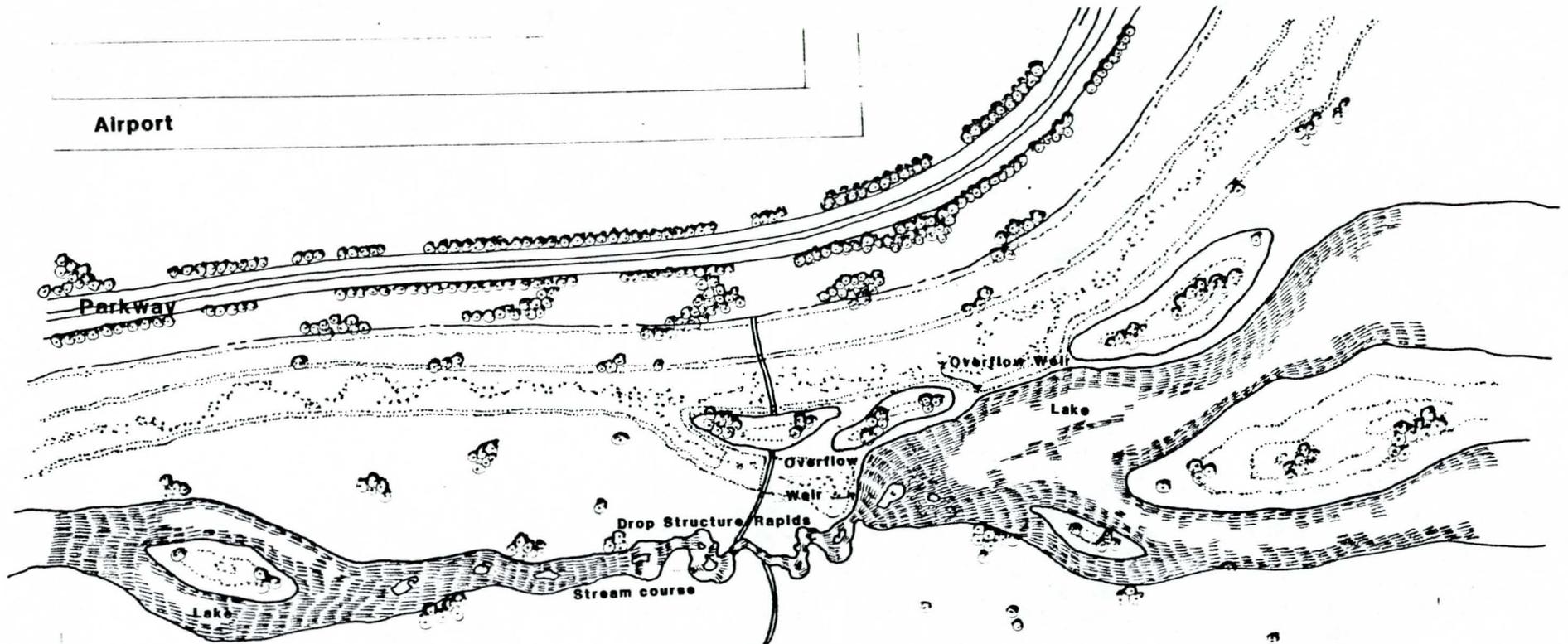
Section C: 15th Avenue

SECTION CAPACITY	IN C.F.S.			TOTAL
	A	B	C	
0.1' DEPTH	\$1,500	\$1,000	\$2,500	\$5,000

RIO SALADO DEVELOPMENT DISTRICT
Carr, Lynch Associates Inc.

ALTERNATIVE 2
SECTIONS

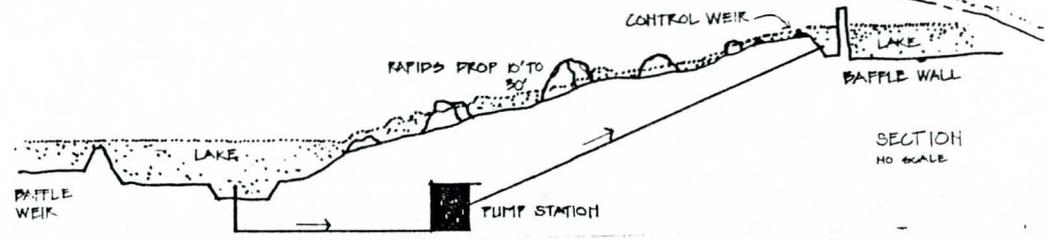
Airport



Industrial Area

ALTERNATIVE 2

Plan: Drop Structure/Rapids



SCALE 1" = 300'

III. Impacts and Feasibility of Schemes

Water needs for the proposed Rio Salado Development include two main components: potable water for domestic consumption and non-potable water for lake and stream supply and evaporation and for the irrigation of parks and other planted areas. Our evaluation concludes that water is available and affordable for either development alternative.

Alternative II involves extensive streambottom development based on completion of upstream flood control. Alternative I considers only minimal encroachment into the floodway, with no upstream flood control. Both schemes project development acreage for various land uses. Estimates of domestic water consumption were established by multiplying these acreages by the specific density and per capita use factors.

Based on these factors, average annual demands in acre feet have been established. In addition to the average annual demand, the average daily demand and the peak demand for the peak day have been calculated and shown in gpm. These are shown in detail on Tables A-1 through A-4 and are summarized in Table A-9, "Summary of Water Uses", Rio Salado Project, all of which are in the Appendix of this report.

Expected increase in population due to the Rio Salado Project is anticipated to be from 25,000 to 50,000 people, depending on the final Master Plan. This means that the expected annual domestic water use should increase from 5,000 to 15,000 Acft/yr. The District should apply for up to 15,000 Acft/yr of Central Arizona Project water. This allotment could then be exchanged for poorer quality water from the various municipalities and be used for non-potable demands in the early years.

Our initial evaluation of water resources revealed some 33 major and minor possible sources. Many of these are considered excellent. The basic recommended approach to acquiring non-potable water, however, is the use of groundwater and wastewater effluent. However, if any other sources become available, they should be integrated into the basic approach of water supply, and the overall master water plan should be revised to reflect the additional sources.

Since the projected development of the Rio Salado does not substantially increase the projected growth rates for the region, the domestic water requirements within

the Rio Salado boundary would be the responsibility of the municipality within which the development lies or of a private developer. In the case of a small isolated development, such as a restaurant or a small shopping center with specialty shops, for example, a small well, capable of producing less than 35 gpm may satisfy water needs, including any minor irrigation of lawns or other grassed areas. Minor chemical treatment may be necessary for these small wells. Water treatment facilities and water distribution systems should also be provided by the respective municipalities. Therefore, the impact and feasibility analysis concerns itself primarily with non-potable water consumption.

Alternative I

Non-Potable Water Needs

The quantity of water required for non-potable use in ~~Alternative I, Phase 1~~, consists of approximately 2,709 acre feet per year for Phoenix and 893 acre feet per year for the areas east of Phoenix, for a total estimated annual consumption of 3,602 acre feet. This converts to an approximate peak daily demand of 3,664 gpm for Phoenix and 1,108 gpm for the area east of Phoenix.

The estimated non-potable water demand for Phase 2 is 11,350 acre feet for Phoenix and 7,630 acre feet for the area east of Phoenix. This totals 18,980 acre feet for Phase 2 of the Project. The peak demands are approximately 14,076 gpm for the Phoenix area and 9,462 gpm for the areas east of Phoenix. The total estimated demand for Alternative I is 22,583 acre feet with a peak demand of 28,010 gpm. A detailed breakdown of the requirements is shown on Tables A-5 through A-8.

Non-Potable Water Sources

The strategy for developing the water system for Alternatives I and II is as follows. During the early development of the project, poor quality groundwater would be the primary source of water. As some of this groundwater has been contaminated with leachate from the various landfill sites, it would be diluted, blended, and treated until it is suitable for body contact. The poor quality wells are those wells which produce water that does not meet public health standards, such as much of the groundwater in the Salt River, downstream from the Mill Avenue Bridge.

During Phase 1 development, with peak demands of 3,664 and 1,108 gpm for Phoenix and the Tempe areas, respectively, it may be possible to locate several existing wells or drill new wells in order to satisfy all of the Phase 1 needs. In the early stages of Phase 2 however, lake and irrigation requirements will increase. The requirements will eventually reach a peak demand of approximately 14,000 gpm for the Phoenix area and 9,500 gpm for the area east of Phoenix.

Considering the long range plans of the Arizona Department of Water Resources to reduce groundwater withdrawals in the Phoenix Active Management Areas, the plan would phase out groundwater pumping, (particularly as poor or hazardous water sources are cleaned up), replacing it with wastewater effluent from the metropolitan area treatment plants. The available effluent will grow with regional growth. Mesa's Dobson Avenue Plant and Falcon Field Plant may serve as primary sources for this and application for their use should be a high priority in the District's plan.

The secondary treated effluent can be conveyed via the proposed canoeing channel, which runs the length of both alternatives. At various locations, separate pumping systems could pump and store water in lakes whether in the river bed or on the banks for use in the irrigation systems. If effluent is readily available, consideration should be given to contracting for it and using it even in the beginning in order to reduce the amount of proposed groundwater pumping. The use of effluent, however, is a bit more costly.

Alternative II

Non-Potable Water Needs

The quantity of water required for use in Phase 1 of Alternative II, consists of approximately 3,073 Acft/yr for Phoenix and 711 Acft/yr for the areas east, respectively. These convert to an approximate peak demand of 3,800 gpm and 900 gpm for Phoenix and the areas east, respectively. Due to intense development, Phase 2 requirements increase substantially. Phoenix will require approximately 14,500 Acft/yr and the areas east will require 5,300 Acft/yr, for a total Phase 2 requirement of 19,800 Acft/yr. ~~Phases 1 and 2 have a total annual requirement of 23,600 Acft.~~ The peak demands for Phase 2 are 18,000 gpm for Phoenix and 6,600 gpm for the areas east. These convert to peak demands of 24,600 gpm for Phase 2. Detailed estimates of non-potable requirements are shown on Tables A-5 through A-8 and summarized on Table A-9.

Non-Potable Water Sources

The proposed sources of non-potable water are similar to those outlined for Alternative I. That is, early development of poor quality groundwater, and other sources. The overall intent is to phase out any over-drafting of groundwater. It is proposed that the water from wells be replaced by tertiary treated effluent. The effluent, again, may come from Dobson Road and Falcon Field Plants and be gravity fed to a series of supply lakes that are connected by a central stream through the core of the lake systems.

Other Sources

The system, as outlined in both alternatives, is the overall goal. However, the acquisition of any property that has grandfathered groundwater rights or surface water rights should be used to the fullest extent possible to enhance the development. These isolated parcels or sources of water should be considered on an individual basis and if the rights are acquired, the source should be integrated into the overall water system.

Actions Required to Secure Water Sources

Groundwater

Permits to use groundwater are issued by the Arizona Department of Water Resources. The permitting process is governed by the Groundwater statutes and administered in accordance with the rules and regulations of the Department. Specific places and uses must be established and application for permits can be made, based on the proposed uses and places. The District must demonstrate that it can use the type of water applied for, and show, by means of a detailed hydrological study, the impacts of such use on the groundwater supply and on existing uses. The department can then act in accordance with its rules and regulations. Taking groundwater from one sub-basin for use in another may be an issue in negotiations. Other complications may also develop as the Project proceeds. Such matters will have to be handled on a case by case basis.

Effluent

Acquisition of effluent for use by the District is largely a matter of contractual agreement between the producing entity and the District. Western water laws have established that return water, and effluent, are the property of the entity generating the return from an original legal use of water, so long as the return flow can be controlled, so as not to return to a common supply before it is put to a secondary use. There are now two law suits which are pending in the Salt River Valley challenging that concept. The outcome of those suits will be of interest to the District.

Estimated Cost

The estimated cost of acquisition and delivery are shown in the cost estimate tables in the Appendix for Condition 2. Condition 2 consists of developing groundwater sources and augmenting the groundwater with wastewater effluent. Condition 1, developing and using only groundwater sources, would result in a lower cost, but may not be politically feasible or environmentally desirable. The financial feasibility of using water is discussed within the overall financing strategy section of this report.

Without Special Reclamation of the River

Except in the City of Tempe, we do not foresee the development of new water bodies within the project area. Tempe, however, does have a plan which would create large lakes on the river banks for recreational use, behind completed levees. Non-potable water use for this segment of the planning area, therefore, would resemble that of Alternative II in terms of volume and cost. No doubt, Tempe would utilize the effluent from Mesa's water treatment plants as the principal water source.

Alternative I

This plan assumes that there will be no additional upstream flood control protection. It must therefore be designed to manage 100 year flows of 200,000 cfs. The major elements of Alternative I are as follows:

1. There will be no extensive channelization or stream bottom construction that will alter the primary course of the river. The natural invert and slope of the river will remain the same. The major construction element will consist of dikes and levees to reclaim outlying areas currently within the 100 year floodplain.
2. The major encroachment into the floodway will consist of series and clusters of "oasis" islands. These islands should be built primarily from material taken from the sides of the river, and put in the floodway. The islands should be constructed so that they are higher than the existing 100 year flood elevation, as well as armored or otherwise protected against scour.
3. A continuous waterway and canoeing channel is planned from approximately, the Dobson Road Sewage Treatment Plant in Mesa, to 35th Avenue in Phoenix. This channel cannot be constructed at the natural invert of the river without the necessity for major pumping facilities. For instance, a twenty foot wide, four-foot deep, concrete lined, trapezoidal channel, constructed on the natural invert of the river, would carry approximately 240 cfs or 170,000 Acft/yr. The costs for recirculation pumping of this volume would be prohibitive. A continuous waterway can be feasibly constructed and operated, if it has the following features:
 - a. The waterways should be a series of long, thin channels, with relatively flat inverts that restrict the quantity of flow to between one and twenty cfs.
 - b. A series of drop structures would be placed between the relatively flat channels. These drop structures can be designed to allow continuous canoeing or tubing over and through

them. This can be accomplished by the introduction of an isolated pumping system that recirculates a quantity of water, ranging from between 20 and 100 cfs, over the drop structure. These rapids courses would be run only in the daytime and should serve as an attraction element.

4. Hydraulic features--the introduction of clusters of islands and the continuous canoeing channel into the existing stream bottom will require the following elements:
 - a. The 100 year water surface elevation should not be raised higher than it currently exists.
 - b. The islands should be protected by means of gabions, dumped stone or other suitable armoring.
 - c. The continuous canoeing channel should be located away from the primary river channel as much as is reasonably possible. Where scour and velocity are problems, the channel should be protected at suitable locations, possibly by cutoff walls, anchors, or other retaining devices.
 - d. The canoeing channel may also serve as a primary transmission canal for wastewater effluent from the Mesa plants or poor quality ground water from wells.

Alternative II

This alternative consists of major channel bottom improvements and assumes the construction of upstream dams that will limit the 100 year flood to 55,000 cfs. The major features of this scheme are as follows:

1. A grass-lined channel or flowway is proposed with a minimum width of 1,100 feet.
2. A sedimentation basin is proposed just east of Country Club Road in the Salt River-Pima Indian Community. It protects the lakes and grass channel from silt.

3. The grass-lined channel should have a low flow channel either built into the lake system or as a separate channel in particularly sensitive areas, to carry typical storm runoff from below the dams as well as the daily urban runoff from the storm sewers.
4. Stream bottom lakes integral with grass lined channels are planned. All lakes should have recirculation systems, including a continuously flowing stream from Dobson Road to approximately 35th Avenue. The continuous flow may vary up to approximately 20 cfs (20 cfs = 14,500 Acft/yr). Lake systems should be designed so that they are not subject to stagnation or pollution. This can usually be accomplished by proper lake water recirculation system design. Lakes must be lined to minimize seepage. The grass lined channel and lake system should not be located so that irrigation or seepage may cause or intensify any leachate conditions at any of the landfill sites.
5. The major hydraulic features are as follows:
 - a. Maximum velocity of $7\frac{1}{2}$ feet per second.
 - b. Minimization of sediment inflow.
 - c. Maximum flood management design capacity of 55,000 cfs.
 - d. A low channel capable of carrying 5 to 15,000 cfs with minimal erosion.

Additional Studies

Additional studies will be needed for the flood management element of both schemes prior to any construction. A hydraulic analysis should consist of backwater analysis for the complete study area from the Agua River to Granite Reef Dam, including topographic contouring of the entire study area; design conditions for 200,000 or 55,000 cfs (including analysis of levees, islands, lakes, and the canoeing channel), and additional runs at 50,000 cfs, 100,000 cfs and 300,000 cfs for risk assessment.

A detailed sedimentation study should be performed.
The study should consist of:

- field reconnaissance and collection of samples to determine grain sized distribution;
- laboratory testing of samples to determine grain sizes and other sediment characteristics;
- computer modeling of sediment to determine aggradation and degradation characteristics;
- hydraulic and laboratory modeling of the sedimentation basin; and
- design of the sedimentation system, including sedimentation basin, size and locations of other sediment control devices.

The Rio Salado planning area currently has a population of some 50,000 residents who are largely poor and mostly black or hispanic. Most of the neighborhoods within the planning area in Phoenix are modest in character and amenities. The development of the Rio Salado and its banks will have both positive and negative impacts on this low income population.

On the positive side, these residents would have increased job opportunities close to their residences in both schemes. There can also be gains in the overall aesthetic quality of the area, in the increased availability of recreational and cultural facilities, in programs to aid homeowners and renters in the revitalization of housing, and in the number of businesses and institutions that will establish here as new, higher income residents move into the area. Finally, the proposed new secondary school would offer specialized training in skills necessary for employment by the new high technology industries which will locate in the area.

Conversely, both alternatives will cause displacement. Voluntary and involuntary relocation has been occurring gradually over the past several years as industrial concerns and junkyards have acquired properties and disrupted the residential fabric of several neighborhoods. Following is a more detailed discussion of the positive and negative social impacts of each alternative.

Education

Impacts

If the Rio Salado were left to develop on its own, further decreases in residential population in Phoenix due to industrial growth will cause further decline in the school enrollment in this area. Increased under-utilization of schools may cause budget problems for affected school districts and lead to school closings. Thus, without special reclamation of the Rio, schools may become less available to residents in the future.

With the development of new housing proposed in both alternatives, the school age population will increase in all jurisdictions. The increase in Tempe will be minimal and easily absorbed in existing schools.

The increase in Mesa will demand the construction of at least one new elementary school in both alternatives. In Phoenix Alternative I implies at least three new elementary schools, and Alternative II may require four or five.

The creation of the new magnet high-technology secondary school at 7th Street in both alternatives is an important feature. Without such a concept it may be difficult to attract new residents with children into the Phoenix portion of the planning area. It would also be a valuable new resource for the children of existing residents, helping to stabilize their older neighborhoods.

The proposed magnet school is similar in concept to the very successful Skyline Campus in Dallas. This facility was developed by the Educational Committee of the Dallas Chamber of Commerce, working with the Dallas Independent School District. It has a program consisting of three parts. First, a comprehensive high school serves the immediate geographical area, with an enrollment of roughly 1000. Second, the career development component provides specialized training for secondary school students drawn from all high school students in the city. This component offers both half-day and full day programs. Students in the half-day program attend Skyline for specialized training and return to their neighborhood schools for comprehensive courses. The full day students spend one half-day in their career development program and one half-day in the comprehensive school component. The career development component has approximately 2,750 students. Finally, the adult education program operates in the evening and on weekends and has approximately 1,500 students.

Feasibility

The construction and operation of the new schools in either Alternative has considerable associated costs. The financial strategy is included in the Implementation section of this report. One should note, however, that a considerable savings could be realized if the magnet school structure were to be built as part of the Exposition complex, as proposed in Alternative II.

Cultural

Impacts

Our initial cultural assessment indicated a lack of cultural facilities conveniently located to serve the residents of South Phoenix and a shortage of cultural programs or facilities that feature the cultures and heritage of Hispanics, Indians, and African-Americans throughout the region. The proposed reclamation of the Rio Salado can address these deficiencies.

For instance, the creation of a Southwest Cultural Center, proposed in both alternatives, would help fill these voids and bring about a greater cross-cultural understanding in the Phoenix region. Such a center could serve many functions: a conservation center and archives for the history and cultures of the state; a center for study and production of educational materials relating to that history and culture; a place of pertinent exhibits (both permanent and temporary); a center for generating travelling exhibits; an educational center where demonstrations and classes are offered relating to the diverse cultures; a performing arts center with an emphasis on amateur participation; and a trade center where vendors of cultural artifacts and hand-made goods can be found.

Feasibility

As with the magnet school, such arts facilities can be more easily created as a by-product of an exposition, such as that proposed in Alternative II. There may also be interest within the Indian community to help organize this facility. A closer examination of similar institutions which now function in other cities, such as that in San Antonio, Texas, would provide greater insight as to the operation of the facility. It is certain, however, that grants and other forms of subsidies will be required for the operation of such a facility.

Housing

Impacts and Feasibility

Except in Mesa and Tempe, little if any new housing would occur in the planning area in Phoenix, without special reclamation. In fact, given the current trend of industrial uses gradually filling up what were once residential areas, a decrease in the housing stock is likely to occur north of Broadway Road. Where these displaced families would relocate, given their meager resources, is not apparent. Based on past experience, this trend also suggests that many modest neighborhoods may be destroyed if the Rio is not reclaimed.

In Alternative I and II the supply of new housing could be greatly increased. The projected new housing development is as follows:

	<u>New Housing Units</u>		
	<u>Without Special Reclamation</u>	<u>Altern. I</u>	<u>Altern. II</u>
Low Density ¹ Market Rate	1,000	3,575	5,900
High Density ² Market Rate	770	10,010	13,750
High Density Low to Mod. Income	0	1,800	1,650
TOTAL	1,770	15,385	21,300

This housing will primarily be market rate condominiums and rental units. In both alternatives, some of this housing is found in areas that are mixed with new clean industrial and office uses.

In general, there should be very little impact on existing residents. In only a few of these development areas would there be a need to relocate existing families to make way for this housing. It is proposed that some of the new housing close to the river be constructed to rehouse displaced lower income families.

¹ Low Density = 5 dwelling units per acre

² High Density = 22 dwelling units per acre

Once constructed at a cost to the project, these families could conceivably afford to operate and maintain their dwellings on a cooperative basis, relieving the public sector of any further involvement. The site preparation for new market rate housing development as well as the costs of constructing new housing for lower income families have been included in the financing strategy for both alternatives.

Destruction of existing neighborhoods has been kept to a minimum in both alternatives, but it is not completely avoided. Some scattered housing units in portions of neighborhoods lie in the path of new construction of roadways or of new development. This occurs mostly along the southern edge of the river in Phoenix, where the parkway would be built, particularly from 7th Avenue to 32nd Street. Another small section is also affected north of the river from 9th Avenue to Central Avenue, causing the relocation of approximately 50 families.

In both alternatives, we have concluded that some neighborhoods are so nearly completely taken over by industry and so adversely impacted by airport noise, that it would be best to make it possible for remaining low income families to relocate into improved quarters nearby. This would allow the industrial areas to develop in a more efficient and less disruptive manner. Neighborhoods that would be discontinued in both alternatives are located north of the river from 7th Street to 12th Street and from 16th Street to 29th Street. In Alternative II, the small neighborhood from 7th Avenue to Central Avenue is also slated for redevelopment. South of the river, such redevelopment occurs from 32nd Street to 48th Street in both alternatives. In addition, approximately 50 mobile home dwellings at 24th Avenue would need to be relocated. Finally, 15 families that currently live in County Island in Tempe should be assisted to relocate in other parts of Tempe to make way for the new proposed development of this special area.

In all, approximately 325 families would be relocated in Alternative I and 300 families in Alternative II. For a project of this magnitude, this amount of direct relocation is extremely low. Relative to other recent redevelopment projects in Phoenix, it is also low. For example, in 1975, 653 families were relocated by Phase I of the Airport's

program to create an open space safety zone. Mindful of past redevelopment efforts throughout the country which have been considerably disruptive to families, we propose policies and actions that would minimize negative effects. Relocation is made more tolerable by creating affordable replacement housing closely prior to the necessary move and by insuring that homeowners receive fair compensation for their property. As stated earlier, new housing can be built nearby and offered for sale at affordable rates to relocatees or offered to groups of relocatees to operate on a cooperative basis at little or no additional increase in current housing costs.

These optimistic forecasts of minimal displacement impacts are also predicated on aggressive early action to strengthen remaining neighborhoods. The successful reclamation of the Rio Salado has the potential to cause large scale displacement of this type, especially in South Phoenix. Low income homeowners who are now unable to adequately maintain their homes will be tempted by unscrupulous speculators to sell out and renters will be pushed out when absentee landlords relent to speculators as well. This type of subtle displacement, often referred to as "gentrification," has been more severe over the past two decades in most large cities than has direct relocation.

Displacement by direct or indirect means generally has many negative effects not only on the individuals who are pushed out, but on the greater community as well. Most families are usually unable to find decent, affordable replacement housing. They go from bad to worse. Many of these families near the Rio Salado have been displaced twice before due to the construction of I-10 and expansion of the airport zone.

Despite these factors, there is relative stability and the family and community structure is strong. Recent surveys reveal that residents of this area visit family members and close friends several times per week. This network helps them to cope with their social and financial problems and helps to maintain a certain degree of discipline over the children. Causing families to move away from their familiar surroundings will disrupt this important social network and contribute to the breakdown of psychological, financial, and behavioral health of the community. An increase in delinquency, alcoholism, and other social problems would result.

Several proposed programs of action would mitigate potential massive displacement. They are:

- rehabilitation loans and grants to existing homeowners,
- exterior fix-up programs,
- downpayment loans and grants to renters to buy their units or other vacant units in the area,
- subsidized construction of new units to replace those which are not feasible to repair,
- the installation of public improvements such as streets, sidewalks, etc., at no cost to property owners,
- counseling programs to help prepare renters for homeownership or cooperative management,
- consolidation of scattered vacant parcels for efficient new development, and
- stimulation of infill housing.

Neighborhoods that require this program of action are referred to as "neighborhood revitalization" areas and are located mostly south of the river in Phoenix between the new parkway and Broadway Road, from 16th Avenue to 32nd Street. On the north side, the neighborhood between 12th Street to 16th Street also is proposed for rehabilitation in both alternatives. Finally, the small neighborhood south of I-10 from 7th Avenue to Central Avenue would be rehabilitated in Alternative I as opposed to being given over to new development as in Alternative II. Projected costs for these actions are also included in the cost estimates and funding strategy.

Recreation

The Phoenix Metropolitan Area has a shortage of parks and other outdoor recreational facilities accessible to all of its people. The Statewide Comprehensive Outdoor Recreation Plan has cited this metropolitan need for additional public parks with structured activities, centrally located recreation areas, playing fields for organized sports, bicycling facilities, horseback trails, hiking trails, and a wide range of water-based activities such as rafting/tubing, non-powered boating, and river or lake swimming. These recreational opportunities are particularly lacking in the inner cities of Phoenix and Tempe.

Without special reclamation of the Rio Salado very little in the way of new recreational development can be expected in the planning area. The City of Phoenix will complete the golf course and park between 7th and 16th Streets; the City of Mesa will complete its park and golf complex adjacent to the Dobson Road Water Treatment Plant, and the City of Tempe will probably develop some new parks and lakes on reclaimed land areas after the levee system is completed. A new equestrian facility is also likely in Tempe. These few offerings cannot substantially address the public, outdoor recreation needs of the area.

On the other hand, both development alternatives presented here create an extensive multi-faceted regional recreation facility. Continuous opportunities for horseback trails, hiking and bicycling trails, fishing, tubing, swimming, and boating are all created by both schemes throughout the central 20 miles of the District. In Alternative I, the boatway, riding trails and natural areas are found within the riverbed itself and on the armored islands. Other activities are found on the banks. Walking and jogging are provided along the small stream systems and the small lakes can provide fishing and swimming opportunities. There are also parks providing for organized sports and golf courses. Continuous shaded trails on the riverbank will allow joggers and bicycle riders to look over the riverbed and watch people tubing on the rapids and horseback riding on trails in the riverbed. In Alternative II, the majority of activities are found within the riverbed itself. Golf courses, playing fields, lakes for fishing, swimming and boating, bicycle paths, and etc. would be developed in the riverbed along the length of the central area.

In either scheme, citizens from near and far can come to the Rio Salado and spend an entire day taking part

in a variety of free or low cost activities. Beyond helping to fulfill regional recreational needs, this great central park will bring the different cultural groups of the region together and unite the northern and southern parts of the metropolis. It will become a new focus of regional pride.

There are substantial costs associated with the creation and operation of this recreational system. As will be seen by the financing strategy, these costs can be largely offset by the increased revenues resulting from the development which will be drawn to this great recreational resource, and particularly to the water features. Some additional revenues can be gained through user fees from some activities, such as golf, horseback riding, swimming, lakes and the like.

Each alternative means an increased demand for utilities, fire protection, police protection, solid waste disposal, etc. On a regional basis, these increases will not greatly exceed what has already been projected. The population of Maricopa County is expected to double by the year 2005. Either alternative will cause that growth to be more centered, reducing the sprawl to the outlying parts of each jurisdiction. Each city has already been considering and planning expanded services for this regional growth. The Rio Salado project can have a beneficial impact, since more centralized and dense development means more efficiency in public services and a lower cost to the cities.

Although the Phoenix metropolitan area is generally well served by major arterials and a freeway system, access to the river edge is poor. The river is seen at the major crossings, but these typically give no direct access. It is not possible to move along the river for any distance. Local streets are discontinuous and access to the riverbed is typically blocked by private businesses and storage yards. Also, some of the critical connections to the river corridor are congested. I-10 and Mill Avenue in Tempe consistently carry heavy traffic loads and both experience serious backups daily during rush periods. Tempe has begun to construct an east-west road system within the river bottom and Mesa is considering an extension of this roadway through its jurisdiction. Other than this parkway extension, some minor street improvements in Phoenix, and the completion of the proposed new bridges in all jurisdictions, very little improvement of the transportation system in the Rio Salado is currently planned. Any development plan for the Rio must, therefore, provide for linear transportation that will give continuous access to this great regional park and link the new land uses which will develop along it. This new system must interconnect with existing and proposed transportation elements in the Phoenix metropolitan area so that the Rio Salado development will help to unify the communities in the region.

To achieve the objectives we have proposed a parkway system paralleling the river bed. In Alternative I, a parkway would be located along the southern side of the Rio Salado connecting the band of continuous development. In Alternative II, two parkways would parallel the river bed, north and south of the Rio Salado. Along with the parkways, a system of bicycle, pedestrian and equestrian trails would be located in both schemes. This system would be for recreation and for alternative transportation modes (i.e., other than the car) between the various proposed land uses.

In detail, the transportation element in both alternatives had to take account of several existing studies and considerations:

Mesa Transportation Study

The Rio Salado Parkway proposed for construction along the south side of the river in the Mesa Transportation study has been incorporated into the development alternatives.

Price Road Expressway

The proposed Rio Salado parkway(s) will intersect the proposed Price Road Expressway at grade. As traffic volumes increase on the proposed expressway and parkway(s), warrants for channelization and possibly grade separation and ramps will need to be studied.

Mill Avenue

Mill Avenue presently crosses the river southbound on a bridge, with a parallel northbound, at-grade roadway. The proposed Rio Salado parkway(s) and land uses will be designed to accommodate a second bridge for Mill Avenue that is now under consideration. An existing bridge that formerly served Mill Avenue is presently closed and in need of repairs. The possibility exists to redeck the old bridge and use it as a pedestrian overpass.

Hohokam Bridge--48th Street

The new two-lane Hohokam Bridge is paralleled by a two-lane roadway in the river bed. The plans for the Rio Salado parkway(s) and land uses will accommodate replacement of the at-grade Hohokam roadway with a new bridge.

Stadium Access

The location of the proposed domed stadium on the south side of the river between 48th Street and 40th Street will provide convenient and flexible access for patrons. Both of the streets intersect the proposed parkways and also interchange with I-10. If future traffic volumes

warrant improvements, stadium parking access can be controlled at exits and entrances by variable message and direction signs, closing off specific parking area exits, construction of service roads along I-10 from 48th Street to 40th Street (and possibly further west and across the river) and other traffic system management measures and road construction.

Airport Access and the Clear Zone

The development of the Rio Salado master plan has been coordinated with the airport master plan. The proposed Rio Salado parkway(s) will increase accessibility to the Sky Harbor Airport.

In Alternative II, the north parkway is located close to Sky Harbor Airport and within the "clear zone" of runway 26L. The "clear zone" is an area of land adjacent to the end of a runway that is intended to be level and free from structures, obstacles and any type of development that encourages assemblages of people. The purpose of the zone is to accommodate aircraft which overrun or undershoot the runway. FAA clear zone policy is to restrict development within 2500 feet of the end of runways. The location of the parkway has been set to minimize encroachment in the clear zone and the design of the parkway will include flat grades and slopes to avoid abrupt changes and fixed obstructions.

Fairgrounds Access

The development alternatives have carefully located the Fairgrounds to accommodate a large number of automobiles that can be expected. Access to the proposed Fairgrounds in Alternative II will be by Washington Street and Van Buren Street. Both of these streets intersect with the Hohokanum Expressway which in turn will intersect with the proposed Rio Salado parkway(s).

The Fairgrounds in Alternative I is located south of the river between 40th and 48th Streets. This location makes a convenient tie-in with I-10 and with the proposed new parkway.

Exposition Access

Access to the Exposition site will be provided by the proposed south parkway for east-west traffic and by 7th Street and Central Avenue for north-south movements to and from downtown Phoenix. Slip ramps from I-10 to the service roads in the vicinity of 7th Street and 7th Avenue will provide regional access.

Elwood Street--University Drive Connector

There are plans to complete Elwood Street to connect with University Drive. A portion of the proposed connecting road can be incorporated into the Rio Salado Parkway or into the local street system of the district. The specific utilization of this right-of-way into the overall system will need more detailed study in the next phase.

Future Traffic Volumes

The proposed Rio Salado parkway(s) are four-lane limited-access arterials along most of its length with at-grade intersections. This design will minimize construction costs. However, the design of the parkways should permit future reconstruction to accommodate widening to six lanes if necessary, channelization at some intersections, and grade-separations and interchanges to replace some at-grade intersections.

Mass Transit

To supplement private car transportation, a bus shuttle system is proposed to connect areas of concentrated activity along the Rio Salado development with each other and also with downtown Phoenix. First stage of a bus shuttle system could include a linear shuttle along the south parkway connecting land uses along 10 miles of the district including the Fairgrounds and the Stadium. A shuttle between the cultural facilities on Central Avenue and downtown Phoenix would also be operated. Buses would be 25-passenger mini-buses. The east-west shuttle would run at 30-minute headways,

seven days a week between 7 AM and 8 PM costing about \$300,000 annually. Annual revenues are estimated at \$100,000 for a deficit of \$200,000 per year. The downtown shuttle would operate at 20-minute headways, seven days a week between 10 AM and 7 PM costing about \$120,000 annually. Assuming a lower fare for this limited run, revenues would be about \$70,000 with a deficit of \$50,000. Mass transit systems typically operate at a deficit and federal and state funds have generally been available to subsidize them.

There are currently numerous physical barriers and difficult environmental conditions within the Rio Salado district. They include the presence of high power transmission lines, railroad tracks, the I-10 freeway, sewage treatment plants, landfills, airplane noise, open storage and junk yards, and archaeological sites. Following is an assessment of the development alternatives as they relate to these environmental conditions.

Archeological Sites

Archeological sites within the central portion of the planning area are located in the floodplain from Price Road going eastward, from Mill Avenue to Scottsdale Rd. on the north bank, and from 40th-48th Street at Buckeye Road. Detailed archaeological examinations must be conducted before any actions can be taken in these areas. If such examinations reveal significant archaeological finds, the plans may require adjustments of both public and private development.

Alternative I and II have avoided proposing major developments at the known locations. The plans either preserve these areas in a natural state or propose uses such as parks which can be made compatible with ruins. For example, Alternative II proposes lakes and a wildlife area in the Price Road area. A specific find would influence the shape and size of the lakes, but archaeological sites should be fully compatible with a wildlife preserve. The Pueblo Grande ruins between 40th and 48th Streets have been preserved in both schemes and in Alternative II a new park runs between the pueblo and the river, preserving the traces of the Indian canal system.

Airport Noise

The impact of airport generated noise is severe over a very large portion of the Rio Salado Planning Area. The Ldn 65 noise contour within which housing, office and community facility uses are not desirable is shown on both plans. In both schemes industrial and recreational uses

are located within this high noise zone. No new housing has been proposed and some existing housing in this zone is proposed for redevelopment.

Both schemes recommend the revitalization of a neighborhood within Ldn 65 on the north side of the river between 12th and 16th Streets. This neighborhood is sizeable and the social and physical disruption which would result if it were redeveloped would be severe. New infill housing within this area should, however, be designed to insulate its occupants from the noise.

The proposed expansion of the airport to include a third runway south of the present two would very seriously limit the types of development possible in the District from 7th Avenue to Mesa. New residential uses and many public facilities would be precluded from this entire central zone on both sides of the river. In both alternatives, therefore, we have assumed that such expansion will not be carried through at Sky Harbor. This is a major policy issue which should be resolved before major financial commitments are made to the development of the Rio Salado.

Air Quality

Whether or not special reclamation of the river occurs, an increase in industrial development will take place. Traffic, therefore, will also increase and the air quality will change. A more detailed traffic study would need to be conducted to more precisely determine the levels of air contaminants that could be expected in each alternative. What can be said at this time, however, is that Alternatives I and II have been designed to minimize potential negative impacts. The stimulation of clean, high technology industries, the creation of a shuttle bus system, and the encouraged use of bicycling to and from work places are features which are aimed at keeping the air quality as high as possible despite the expected increases of population and employees. These design alternatives are also expected to have only a minute impact on the humidity levels and should present no odor problems if the water bodies are kept flowing and free of stagnation.

Landfills

There are nearly 30 known landfill and dumping sites along the Rio and many more that are not recorded. At least one of these sites is known to have caused contamination of the groundwater nearby during times of flooding; others are suspected. Many of the large landfills have also been cited for inadequate gas monitoring. Some of these problems are being addressed at City owned sites, but other sites will continue to be a threat to health and safety far into the future.

Both schemes can help to remedy this situation. The levee work in Alternative I offers added protection to the landfills from rushing flood waters. To create this water feature in both alternatives, it is proposed to pump groundwater away from these landfills, mixing and diluting it to safe levels with water from other sources. Such pumping can insure no further spreading of the contamination of groundwater. The lake bottoms would also be lined to prevent seepage into the groundwater and water table. Finally, the two schemes generally propose low density activities such as parks and golf courses as appropriate reuses of landfills.

One site, the 19th Avenue landfill in Phoenix, has recently been listed by the EPA as one of the nation's 300 most dangerous, due to the presence of toxic substances as a result of the leachate process. In both schemes, this landfill is seen as becoming part of a large desert park and arboretum, a central feature in the strategy of opening development to the west. It is possible that this landfill will need to be removed before the park can be built. This will require careful study during the initial implementation period. Indeed, all landfills must be tested for hazardous wastes in the initial implementation phase.

Transmission lines

High power transmission lines run along the length of the riverbed from Tempe to Central Avenue in Phoenix. The static electricity that emanates from them, the visual disturbance caused by the poles, towers and lines, and the building code restriction on structures under them are extremely limiting. Either alternative

would require some relocation of these lines, especially in the heavily impacted Tempe section. Alternative I, however, can accept the present location through most of Phoenix. Alternative II, however, to avoid conflict with the more active uses proposed for the riverbed, and also for scenic reasons, requires relocation of the lines in Phoenix as well as Tempe. Although precise realignments will require more detailed study, the embankment of I-10 would seem to be a possible location for the lines through Phoenix. In Tempe, due to the power plant to the south bank and substations on the north, there are numerous lines which ideally would be placed underground. However, the cost of that would be at least fivefold the cost of aboveground location. It is our judgement at this stage that the major problems can be solved through above ground relocation of 10 miles of lines in Alternative I and 20 miles in Alternative II. These costs have been included in the estimates that follow.

Railroad Line and The Freeway

The two alternatives have been careful to propose uses that would be compatible with the railroad right of way. Housing, for example, is not located near this line but industrial uses are. Alternative II makes special use of the rail line to serve exhibitors in the proposed new State Fairground. The rail bed would be fenced off to the general public and a pedestrian bridge would be constructed above it to connect the State Fair with the adjacent theme park and the river. No new housing has been proposed to locate adjacent to I-10. Rather, industrial uses and high traffic generators such as the domed sports stadium have been placed to take advantage of its good regional access. These uses are also not adversely affected by the noise of the freeway. More details on transportation related impact and feasibility can be found in the transportation section of this report.

Sewage Treatment Plants

In both schemes, industrial uses and parks have generally been located adjacent to these large facilities. We have also attempted to locate new housing

so that it is not downwind of the foul odors emanating from the drying beds. This is another problem requiring more detailed analysis during early implementation and careful monitoring to avoid development conflicts. At least one such plant, that near 27th Avenue in Phoenix, should relocate its drying beds to the west, away from the Rio, in order to open up the fine development potential of this area.

Open Storage

At present large stretches of open storage and auto junk yards can be seen along the river edge, especially in South Phoenix. These unsightly uses will remain and multiply with no special reclamation, acting as a disincentive for more attractive development. These uses will be a significant problem to be overcome in the early years of either alternative.

Both alternatives propose new, attractive uses for these storage areas. This implies the relocation and perhaps consolidation of existing operations to more compact, less critical areas in Phoenix and Tempe. One of the few places within the District where such uses can remain without conflict with new development is along University Drive from 40th Street to Tempe. Such businesses are also compatible with the character of industrial development which is being encouraged in Area A of Phoenix, north and west of the Rio Salado and 7th Avenue.

Environmental Research and Education

The development of the Rio under either scheme offers a magnificent opportunity for research, demonstration and education. The project as a whole can be a demonstration of worldwide significance on the good use of water in an arid land. Alternative I particularly emphasizes ways of achieving maximum impact from small amounts of water. However, of greater importance is that each scheme makes use of waters unsuitable for other purposes or which might otherwise be wasted. Further, both provide opportunities for groundwater recharge. The proposed water museum would explain and demonstrate the natural cycles of water, including human use, and

reveal all aspects of water use and flood management in the Rio.

Further, the project provides an opportunity for research and demonstration on the appropriate use of plants and landscape in an urbanized desert setting. The proposed Desert Park and arboretum would be a focus of this, but the entire metropolitan park can show how it is done. This can provide an education for people in the region in how to use plants on their own property and an inspiration for people in other parts of the worlds where water is scarce.

Finally, the project can demonstrate the benefits of sound planning for city development. This includes more efficient use of existing infrastructure, effective mixed use which lets people live close to their jobs, and the integration of new development with parklands and natural features. The proposed Southwest Cultural Center, children's museum ("Discovery Place") and magnet school are all institutions focused on various types of education currently missing in the Phoenix region. Finally, reclamation of an urban wasteland at this scale has not been done before, and the Rio Salado will thus be a demonstration of great significance. This project demonstrates how such reclamation can redirect regional growth in a manner which both conserves scarce resources and creates splendid new opportunities.

Below is a summary of public costs associated with the development of the Rio Salado. These costs are shown for Alternative I and II, as well as for future development without a concerted reclamation of the riverbed. A series of more detailed cost estimates and land area tables are found in Appendix B. These estimates reflect both one-time costs such as land acquisition, site preparation, and construction and the operating and maintenance costs of those items which will remain a public responsibility. The costs are also broken down by phase but not by year.

We present these estimates in some detail so that they can be scrutinized and critiqued. Taken in total, they give a good idea of the order of magnitude of difference between the schemes. Many of the individual numbers will go up and down as the underlying assumptions and concepts are tested and revised. For example, we have assumed that all land within the parkways (including a narrow strip on the north river bank in Alternative I where there is no parkway) would be acquired by the District, both to achieve effective control over future development and to realize an offsetting portion of the massive value added by public improvements. Of this land, we assumed that the State Land Trust might acquire about one third through land trading. If either this concept or our assumptions about the role of the Land Trust are changed, there will be a large resulting difference in project cost. There are many such assumptions in the estimates.

We have also not broken these expenditures down by agency. For example, some of these costs would be borne by City Government, some by the State, some by School Districts, some by the Rio Salado Development District, etc. Following the Cost Summary we describe some of the major cost features of each alternative.

SUMMARY OF RIO SALADO DEVELOPMENT AND
OPERATING COSTS
(000)

<u>Category</u>	<u>Without Special Reclamation</u>	<u>Alter- native I</u>	<u>Alter- native II</u>
Riverbed			
Phase 1	\$ 12,800	\$ 50,840	\$ 57,480
Phase 2	12,000	132,440	241,900
Total	<u>24,800</u>	<u>183,295</u>	<u>299,380</u>
Riverbank			
Phase 1	\$ 20,520	\$ 94,554	\$ 59,482
Phase 2	15,540	236,350	215,276
Total	<u>36,060</u>	<u>330,904</u>	<u>274,758</u>
Public Services			
Phase 1	\$ 9,290	\$ 32,533	\$ 15,056
Phase 2	434	18,179	57,190
Total	<u>9,724</u>	<u>50,712</u>	<u>72,546</u>
Total Acquisition and Construction			
Phase 1	\$ 42,610	\$168,927	\$132,018
Phase 2	27,975	386,969	514,366
Total	<u>70,585</u>	<u>564,896</u>	<u>646,384</u>
Operating Costs			
Phase 1	\$ 1,164	\$ 1,871	\$ 2,352
Phase 2	2,191	19,883	28,559

Without Special Reclamation

The armoring of the channel so that portions of the floodplain can be developed in the manner desired by the City of Tempe is likely to cost nearly \$25 million. Tempe would also need to expend \$9 million to relocate the power transmission lines to create an environment appropriate for development. Completion of the parkway system and improvements to city streets and arterials will require an estimated \$12 million over the next 25 years.

Alternative I

Three quarters of the riverbed development cost is for armoring the channel and islands. This, of course, is an approach to flood management, and, like dam construction, it is expensive. The amount for completing the armored channel is \$130 million. Approximately \$24 million is included to build new low cost housing and assist existing homeowners in the rehabilitation of their houses. Similarly, \$26 million is added to make needed public improvement to revitalize existing residential neighborhoods.

The creation of a pedestrian and bicycle trail/park system costs \$69 million. Lakes, streams and tributaries on the banks are built for \$28 million. The construction and furnishing of schools are shown at \$44 million. Finally, operating estimates are dominated by the costs of maintaining lakes, parks, and trails.

Alternative II

Creating the watery riverbed in this scheme is costly. The sediment basin, a necessary first stage, costs \$14 million alone. Creating the grass channel, parks and islands to withstand a 55,000 cfs floodwater flow will cost \$128 million.

On the banks, Alternative II is similar to Alternative I with expenditures for low-cost housing, lakes, parks, schools and neighborhood improvements. The cost to relocate the high power transmission lines in this scheme is more than double at \$22 million, since work is needed in Phoenix as well as in Tempe.

The operating costs of Alternative II are higher because of the greater amount of water needed (\$3.9 million annually in Phase 2), the more extensive parks, grass, and lakes to maintain, and the higher municipal costs for police and fire protection to service the projected increased private development.

This section evaluates the economic impacts of the two alternative plans on the District and on the region; the potential new private developments within Rio Salado Development District under Alternatives I and II; and measures the costs and benefits of the alternative plans. In order to best evaluate and compare the alternative development plans the two alternatives have also been compared where possible to future development without special reclamation; in other words, without a coordinated plan for the development of the District.

The economic impacts of alternative development scenarios on the Rio Salado Development District and the region evaluated in this section include the following:

- o New Development Opportunities
- o Effect on Property Values/Tax Revenue
- o Employment Impacts
- o Flood Control
- o Regional Efficiency
- o Regional Growth
- o Recreational User Benefits
- o Sand and Gravel
- o Tourism
- o Population and Housing
- o Project Costs
- o Implementation/Financing

In assessing the impacts of future development alternatives, the following aspects have been taken into consideration whenever possible:

1. The magnitude of the impact. What is the anticipated change in the impact phenomena?
2. The incidence of the impact. Who is affected by this change?
3. The significance of the impact. Given the magnitude of the change and its incidence, how important is it? A determination of the significance of an impact requires a value judgment as to whether the change and its effects are significant and acceptable.

New Development Opportunities

The levels of potential new development within the Rio Salado Development District reflect both regional market conditions and the elements of each plan. The amounts and types of private development to occur in Alternatives I and II have been determined taking into consideration the absorption rates and market issues presented in an earlier report on the market feasibility of land development related to Rio Salado. A revised table of these absorption potentials for light industrial, retail, office, hotel and residential uses is shown in detail in Appendix C, Table 1, and summarized below, and represents Rio Salado's possible capture of regional development over a ten year phase one and 15 year phase two period.

Estimates of Land Absorption Potentials Within The Rio Salado Development District (acres)

<u>Use</u>	<u>Alternative I</u>	<u>Alternative II</u>
Light Industrial	1,025	1,400
Low Density Residential	720	1,200
High Density Residential	455	655
Office	110	180
Retail	110	230
Commercial Recreation	75	100
Hotel	1,600	2,800

The amounts of private development to occur in planned areas under Alternatives I and II, are shown in Appendix C, Table 2, and are summarized below. Also shown are estimates of what might occur if future development occurs without special reclamation.

The amounts of private development in planned areas shown under each alternative plan do not necessarily reach the maximum absorption potentials, because physical design and planning issues have also been taken into account in developing these plans. This excess demand may still occur within the District boundaries but outside the planned areas which fall primarily within the parkways.

Private Development in Planned Areas
(acres)

	Future Development Without Special Reclamation	Alternative I	Alternative II
Light			
Industrial	1,750 ^{1/}	795	1,270
Low Density			
Residential	200	715	1,180
High Density			
Residential	35	455	625
Office	0	95	160
Retail	30	50	95
Commercial			
Recreation	0	20	115
Hotel	55	60	15
Resort Hotel	0	115	295
TOTAL	2,070	2,305	3,755

^{1/} Includes light and heavy industry.

The use which is least sensitive to the levels of investment and public amenities is, of course, industry. However, the type of industry which will occur varies between future development without special reclamation and Alternatives I and II. Without special reclamation, industrial development will continue to occur within the District, but with less emphasis on the high tech industrial park. While some industrial parks will occur in Rio Salado without special reclamation, particularly in the airport area and in Tempe and Mesa, there will also be a lot of heavier and less labor-intensive industry. For example, warehousing and trucking firms may locate near I-10 and the airport along Rio Salado. Residential, office, retail, and hotel uses are unlikely to occur without special reclamation efforts except in the Indian Bend Wash/Tempe area.

In Alternatives I and II the amount of residential, office and hotel uses are closely related to the level of amenities provided. Retail uses follow and serve these other uses, especially residential. Because Alternative II provides more continuous and larger water bodies and

more green belts, the density of development can be higher under this alternative.

The timing of development is directly related to the timing of public improvements and amenities and, in the case of Alternative II, to the completion of upstream flood control. Development of residential and resort hotels especially will depend on the timing of public investments.

Effect on Property Values and Property Tax Revenues

The current average market value of land in the flood plain of the Salt River is \$20,000 per acre. This compares to average metropolitan area market values for prime developable land as follows: \$160,000 per acre for prime industrial land and \$200,000 per acre for prime commercial land. Thus, rescuing land from the flood plain for development could increase property values of such land by 8 to 10 times. Currently, land within the Rio Salado District in Phoenix which is outside the flood plain is also valued at a low price. Such industrial land is estimated to have a market value of approximately \$40,000, reflecting non-intensive uses of such land and the current undesirability of much of the land for higher uses. Land outside the flood plain in Tempe and Mesa is estimated to have a somewhat higher market value, between \$60,000 and \$80,000 per acre.

The text table on the following page shows the projected property tax revenue increases from development within the District in the next 25 years under the two proposed alternatives and under future development without special reclamation. These values and revenues are based on the acreage projections by use for each phase. In estimating property tax revenues, ERA relied in part on a prior report prepared by a task force formed to study the economic impacts of upstream flood control, entitled Rio Salado and Plan Six Development Projects. This report quantified increased property tax revenues generated by the development around four hypothetical lakes created after upstream flood control. The assumptions as to the expected value of these developments and their property tax revenue potentials were based on detailed conversations with assessors and real estate specialists in Maricopa County. After reviewing this report and confirming the ranges of costs utilized, ERA has utilized

some of these factors in our evaluations, in particular: building construction costs by type and land values of improved land. A tax rate of \$10 per \$100 assessed value was used in both this and the prior report, which reflects the current continued level of secondary and primary taxes within the District. Because Alternative II provides more water amenities adjacent to both sides of the River, and thus is able to create a stronger image and a wide band of prime developable land, per acre property values are assumed to be somewhat higher in Alternative II than in Alternative I. These differences would be greatest for the residential and resort hotel land uses. (Cumulative and annual property tax revenues are calculated in Tables 3 and 4 in Appendix C.)

Estimated Net Property Tax Revenue^{1/}
Increment From New Development

	Annual in Year 25	Cumulative Over 25 Years
Alternative I ^{1/}	\$34,710,000	290,309,000
Alternative II ^{1/}	\$60,904,000	452,980,000

^{1/} Represents property tax revenues from building value only, as land within the District is assumed under Alternatives I and II to be owned by the District and leased to private developers. Does not include tax increments from increases in value of properties already built up within the District. Figures are in constant 1982 dollars.

Employment Impacts

The level of employment under each alternative has been projected for two types of employment: one-time construction impacts from both public improvements and private development within the District, and permanent employment by businesses within the District. The cost of construction, construction payroll and person-years of construction employment are shown for the two alternatives in Table 5 in Appendix C. (The employment projections for Alternative II do not include employment to construct any upstream dams.) A summary of construction employment impacts is shown on the following page.

Construction Employment Impacts

	Future Development Without Special Reclamation	Alternative I	Alternative II
Total Cost of Construction (000)			
Public	70,585	430,200	485,430
Private	595,000	1,367,100	2,178,600
Total Cost	665,585	1,797,300	2,664,030
Construction Payroll (000)	332,793	898,650	1,332,015
Employment (Person Years)	16,639	44,933	66,601
Average Annual Employment	666	1,797	2,664

Because the cost of public improvements within the District is similar under both Alternatives I and II, the construction employment from these improvements is similar. Most of the difference in construction employment between Alternatives I and II is due to the different levels of private development generated. However, because much of this development would occur elsewhere in the region if Rio Salado does not occur, the incremental impacts are primarily the result of the public improvement costs. A summary of construction employment impacts from public improvements only is shown below:

Average Annual Employment Impact
From Public Improvements

	Future Development Without Special Reclamation	Alternative I	Alternative II
Phase 1	107	345	239
Phase 2	47	487	650

Permanent levels of employment within the District are projected by type of employment by phase for both alternatives in Table 6 in Appendix C. While these figures do not necessarily represent net new jobs to the region, they do represent employment opportunities in the central core of the region, and opportunities within easy reach of the lower income residents of South Phoenix. In both alternatives, industrial employment accounts for a major portion of District employment.

Levels of New Employment by Industry
in Rio Salado

<u>Category</u>	Future Development Without Special Reclamation	<u>Alternative I</u>	<u>Alternative II</u>
Industry	26,250	23,850	38,100
Office	0	5,700	9,600
Retail	1,350	2,250	4,500
Hotel	225	450	1,515
TOTAL	27,825	32,250	53,715

Flood Control

By rescuing land from the flood plain, either through the construction of levees or upstream flood control, Rio Salado is making available for development land which previously was of limited value. In the broader sense, it is adding "new" land to those jurisdictions within the District. So in the case of a city like Tempe, which is nearing saturation and which is landlocked by other communities, it represents an opportunity to add new land to the tax roles. The acreages rescued from the flood plain for Alternatives I and II are shown in Table 7 in Appendix C.

The increased property tax revenues generated by the development of land rescued from the flood plain under Alternatives I and II are as follows:

Estimated Property Tax Revenue Increase
From Land Rescued From The Floodplain

	<u>Annual in Year 25</u>	<u>Cumulative Over 25 Years</u>
Alternative I	\$15,056,000	127,786,000
Alternative II	\$32,292,000	261,731,000

The difference in the potential property tax revenue impacts from flood relief between alternatives is substantial, with Alternative II providing considerably higher new tax revenues, which accumulate over time.

Further, there are potential savings due to upstream flood control from two sources: reduced flood damages and reduced flood insurance costs. The Corps of Engineers estimates potential damages saved at \$133 million in a 100 year event and \$527 million in a 500 year event.^{1/}

Without Rio Salado, additional levees will reduce damage but may be done piecemeal, leaving some areas still vulnerable to flooding.

Regional Efficiency

In the case of future development without special reclamation, regional growth will continue to occur on the edges of urban areas, and underutilization of vacant land in the District will continue. Both Alternatives I and II will help to reduce sprawl by opening up new land for development in the center of the region, providing housing and employment opportunities in the region and encouraging increased housing densities. Prior studies have shown that there are substantial public and private cost savings from reducing sprawl, including:

- o infrastructure costs (roads and utilities)
- o air pollution costs
- o energy costs (gasoline)
- o personal costs

^{1/} Draft Economic Supplement for Flood Control. Central Arizona Water Control Study, September, 1981, U.S. Army Corps of Engineers.

Because Alternative II will encourage greater densities than Alternative I, an increase in regional efficiency is potentially greatest under this alternative.

Regional Growth

It is difficult to quantify the impact of Alternatives I and II on overall regional growth, although they cannot help but be positive. A review of literature on the impact of major open space and water-related projects shows that while these amenities are considered important to an area's overall growth and capture of the nation's growth, no one has been able to quantify this impact with any precision. A survey of cities with major water-related amenities, was undertaken but was unable to isolate impacts on development patterns and types, but was not able to quantify an impact on overall regional growth.

Both Alternatives I and II offer features which will provide Phoenix with a positive and strong image, and which will add to the quality of life in the region, an important factor to businesses making metropolitan locational decisions. Because Alternative II has more water and green features, offers the greatest recreational benefits, and makes a bolder statement, it will have the greatest impact on overall regional growth.

Recreational User Benefits

In the field of recreation economics, a variety of approaches have been developed to measure the qualification of recreational user benefits for use in cost-benefit analysis.

The primary values or direct benefits from recreation areas are those realized by the users of the area. Such enjoyment has economic value to the extent that people express a willingness to pay for the opportunity to engage in such activities. In the case of privately-owned areas, their willingness to pay finds expression in the prices paid for the land and improvements. Users of public outdoor recreation areas may not be required to pay an entrance fee or other direct use charge, but they do incur costs for the whole outdoor recreation experience. Although "free" in one sense, use of the public recreation opportunity is far

from free when one considers the travel and other costs necessary to take advantage of it. Monetary values assigned or attributed to natural resources used for public recreation--by whatever process seems most appropriate--need have little or nothing to do with prices or fees charged for such recreation opportunity. The value of public outdoor recreation areas to the users depends upon the willingness of the users to incur costs in order to enjoy the recreation experience, including travel costs.

While a detailed analysis has not been done here to quantify recreational user benefits, Alternatives I and II obviously provide substantial user benefits when compared to future development without special reclamation. Both provide open space for recreation within easy reach of the metropolitan area population, and address the needs identified for open space for sports, bicycling, picnicing, and other recreational uses. Alternative I provides a continuous small boating channel for canoes and kayaks, and some small lakes, while Alternative II provides larger water bodies for water recreation including small boat sailing. Because Alternative II offers more water than Alternative I, it produces more user benefits.

Sand and Gravel Operations

The sand and gravel industry represents a major presence on the Salt River and is of importance to the local construction industry. According to the Arizona Rock Products Association, at least three quarters of the sand and gravel mined in Maricopa County comes out of the Salt River. Almost all of the sand and gravel mined there is used locally, primarily for non-residential construction purposes.

Fifteen major sand and gravel operators on the Salt River were identified by the Arizona Rock Products Association as being within the Rio Salado Development District and there are another 5 or so smaller plants on the Salt River. Most of the sand and gravel companies on the Salt River produce ready mix concrete at their plants, and some also manufacture pre-stressed concrete products and asphalt. Employment in sand and gravel operations on the Salt River is estimated at 2,900 employees.

The impacts of reducing sand and gravel operations within the District will vary depending on the timing and locations of those relocations. Contrary to what many people think, sand and gravel are expendable resources. Periodic flooding of the Salt River does not replenish the supply of sand and gravel.

In terms of regional employment impacts, the sand and gravel industry represents a very small share of regional employment (0.4 percent) totalling 2,900 employees.

Relocating sand and gravel operations outside the District could result in increased construction costs if transportation costs increase. However, alternative sites upstream on the Salt River and on the Aqua Fria are close to the developing areas of the region and should not add significantly to the cost of sand and gravel.

Tourism

Rio Salado will have a positive impact on tourism by providing water recreation opportunities, resort/hotels, equestrian facilities and other recreation facilities for area visitors. Both alternatives will provide recreation facilities for hotels in downtown Phoenix, although Alternative II will provide a lot more water oriented activities. Both alternatives will encourage visitors to Phoenix to extend their length of stay, but again, Alternative II will have a greater impact. A World's Fair could generate \$220 million in tourist expenditures in the area.

Population and Housing

The projected increase in population, school age children and dwelling units under each alternative by phase is shown in Table 8 in Appendix C by phase. A summary of this population and housing increase by the 25th year of Rio Salado development is compared to future development without special reclamation below:

<u>Category of Increase</u>	<u>Without Special Reclamation</u>	<u>Alternative I</u>	<u>Alternative II</u>
Population Increase	4,385	33,245	46,575
School Age Children	1,180	7,725	10,785
Dwelling Units	1,170	15,385	21,300

Some of the dwelling units included above are subsidized units. A breakdown of the increase in market rate housing units by type is shown below. High density residential areas average 22 units per acre and include townhouse and apartment style units (both rental and ownership units). Low density residential areas average 5 units per acre and are primarily single family homes and townhouses.

	Increase in Market Rate Housing Units		
	Without Special Reclamation	Alternative I	Alternative II
High Density Residential	770	10,010	13,750
Low Density Residential	1,000	3,575	5,900
TOTAL	1,700	13,585	19,650

Implementation/Financing

Both Alternatives I and II require similar amounts of financing, at \$565 million and \$646 million, respectively. However, Alternative I requires more capital in Phase 1, and considerably less in Phase 2. Thus, upfront costs in Alternative I are slightly higher, but at the same time private development within the District may occur sooner as a result of these public expenditures.

ECONOMIC IMPACTS OF ALTERNATIVE DEVELOPMENT PLANS FOR RIO SALADO

Category of Impact	Future Development Without Special Reclamation	Alternative I	Alternative II
New Development Opportunities	Continued sand and gravel operations and use of Salt River as a dumping ground. Eventual building of additional levees will allow further industrial development. Industrial uses will be less employment intensive and more oriented towards warehousing, trucking and obnoxious uses.	Development of land rescued from flood plain through channelization, primarily industrial and recreational with some residential, and hotel uses. Primary impact will be on land uses on the south side of the River where the streams and lakes are placed.	Development of land rescued from flood plain on both sides of the River for industrial, office, residential, hotel, recreational and other uses.
Effect on Property Values and Tax Revenues	Property values will remain low. Property in flood plain is automatically assessed 20 to 30 percent below similar property out of the flood plain. Land rescued from flood plain less intensively developed and thus of less value. Development of industrial land protected by levees at strategic locations will increase tax ratables.	Property values of land rescued from flood plain will increase dramatically (8 to 10 times); value of adjacent to water land will increase substantially. Increase due to: 1) development of new property rescued from flood plain and 2) changes in land values adjacent to River.	Property values of land rescued from flood plain will increase dramatically (8 to 10 times); value of adjacent to water land will increase substantially. Increase due to: 1) development of new property rescued from flood plain and 2) changes in land values adjacent to River. More water in Alternative II will result in higher property values.
Cumulative Property Tax Increment	N.A.	\$290 million	\$453 million
Annual Property Tax Increment	\$9.6 million	\$35 million	\$61 million
Employment Impacts	Continued sand & gravel employment and industrial employment in less intensive industries. 28,000 new jobs from development in the District. 700 construction jobs annually.	32,000 permanent new jobs created in RSDD, primarily in industry. Creation of new jobs in center of metro area accessible to large labor force. 32,000 new jobs from development in the District. 1,800 construction jobs annually.	54,000 permanent new jobs created in RSDD in industry, retail, hotel and services. Creation of new jobs in center of metro area, accessible to large labor force. 54,000 new jobs from development in the District. 2,700 construction jobs annually.

ECONOMIC IMPACTS OF ALTERNATIVE DEVELOPMENT PLANS FOR RIO SALADO

Category of Impact	Future Development Without Special Reclamation	Alternative I	Alternative II
Flood Control	Continued periodic flooding of Salt River with resultant damage to roads, bridges, buildings, industry. Additional levees will reduce damage but may be done piecemeal leaving some areas still vulnerable to flooding.	Potential savings due from channelization from two sources: reduced flood damages and reduced flood insurance costs. Corps of Engineers estimates potential damages saved at \$133 million in a 100 year event.	Potential savings due to upstream flood control from two sources: reduced flood damages and reduced flood insurance costs. Corps of Engineers estimates potential damages saved at \$133 million in a 100 year event and \$527 million in a 500 year event.
Annual Tax Increment From Rescue of Land From Flood Plain	N.A.	\$15 million.	\$32 million.
Cumulative Tax Increment Over 25 Years	N.A.	\$128 million	\$262 million.
Regional Efficiency	Regional growth continues to occur on the edges of urban areas. Continued underutilization of vacant land in the District.	Help to reduce sprawl by opening up new land for development in the center of the region, providing housing and employment opportunities in the region and encouraging increased housing densities. Cost savings due to decreased sprawl can include: <ul style="list-style-type: none"> o infrastructure costs o air pollution costs o energy costs o personal costs 	Help to reduce sprawl by opening up new land for development in the center of the region, providing housing and employment opportunities in the region and encouraging increased housing densities. Cost savings due to decreased sprawl will include the same types of costs as under Alternative I, but will be greater: <ul style="list-style-type: none"> o infrastructure costs o air pollution costs o energy costs o personal costs
Effect on Regional Growth	Development will continue to occur away from Salt River and on the urban edges.	Difficult to quantify, but will make the area a more attractive place on a national scale, attracting incremental growth from industry locations decisions favoring Phoenix and from people's perception of Phoenix as a nice place to live.	Difficult to quantify, but will make the area a more attractive place on a national scale, attracting incremental growth from industry locations decisions favoring Phoenix and from people's perception of Phoenix as a nice place to live. More amenities will result in a greater impact on overall growth than Alternative I.

ECONOMIC IMPACTS OF ALTERNATIVE DEVELOPMENT PLANS FOR RIO SALADO

<u>Category of Impact</u>	<u>Future Development Without Special Reclamation</u>	<u>Alternative I</u>	<u>Alternative II</u>
Recreational User Benefits	Limited primarily to recreational vehicles (motor cycles, etc.)	Provides open space for recreation within easy reach of metro area population. Addresses needs identified for open space for sports, bicycling, picnicing, etc. Continuous small boating channel for canoes and kayaks. Some small lakes for water recreation.	Provides open space for recreation within easy reach of metro area population. Addresses needs identified for open space for sports, bicycling, picnicing, etc. Provides more water recreation opportunities so user benefits will be higher than Alternative I.
Sand & Gravel Operations	Sand & gravel operations continue in Salt River. Current sand & gravel employment in RSDD is 2,900.	Sand & gravel operations phased out of portions of Salt River. Sand & gravel mining operations help create landscaping within Rio Salado. Alternative sites include Aqua Fria and upstream on Salt River. These new locations may be as close to construction activity as present locations are.	Sand & gravel operations phased out of Phoenix, Mesa and Tempe portions of Rio Salado. Alternative sites include upstream on Salt River and Aqua Fria.
Tourism	Salt River remains unattractive and unappealing to visitors.	Rio Salado provides several resort hotels and recreational facilities for downtown hotels, including desert arboretum, water recreation, golf, etc.	Rio Salado has direct impact on visitation and expenditures by providing water recreation opportunities, resort/hotels, equestrian facilities for area visitors. Exposition could generate \$220 million in tourist expenditures in the area. Provides recreation facilities for hotels in downtown Phoenix.
Population and Housing	Rio Salado District continues to be largely non-residential. South Phoenix residential areas continue to offer lower priced housing	Additional housing opportunities occur from rescue of developable land from flood plain. Opens up new residential areas close to employment opportunities.	Additional housing opportunities occur from rescue of developable land from flood plain. Opens up new residential areas close to employment opportunities.

ECONOMIC IMPACTS OF ALTERNATIVE DEVELOPMENT PLANS FOR RIO SALADO

<u>Category of Impact</u>	<u>Future Development Without Special Reclamation</u>	<u>Alternative I</u>	<u>Alternative II</u>
Public Costs	Expenditures for additional levee work shared with private sector in some cases. Additional infrastructure for industrial development \$71 million	Major expenditures needed for armoring the channels and for land acquisition. Public cost estimated at \$564 million.	Major public expenditure items included grass channel, lakes, and land acquisition. Total public cost is \$646 million. ^{1/}

^{1/} Does not include the incremental cost of upstream flood control.
Source: Economics Research Associates.

At this stage of the planning process a summary cost-benefit analysis has been prepared to illustrate the relative costs and benefits for the alternatives. This evaluation is shown in the following table and attempts to show in one summation the list of costs and benefits, with special emphasis on those impacts that can be shown in monetary form. All figures are shown in current dollars and do not take account of inflation, financing costs, multiplier effects or other factors which at the current stage of planning would not materially effect the summary evaluation.

Those benefits which have been quantified include cumulative property tax revenue increases from development within the entire district and from development of land rescued from the flood plain. Construction payroll benefits shown in this table are for public construction projects only, because much of the private development would occur elsewhere within the region.

Substantial benefits will also be realized which have not been quantified at this time and which would greatly increase the benefits of each alternative. Among these are recreational user benefits, savings on flood insurance and damages, increased tourism expenditures, and increased regional efficiencies.

A particularly interesting and important project benefit is derived from the "new" land that is made available by the Rio Salado project development and the tax revenues that accrue from the development of this "new" land. This revenue could be an important factor in project financing if some of it can be captured through tax increment financing or land leasing, which is reviewed in a subsequent section of this report.

While not all-inclusive, this comparison of two key quantifiable impacts shows that in terms of the relationship of benefits to costs, Alternative II has a greater positive benefit than Alternative I.

COST/BENEFIT OF RIO SALADO
DEVELOPMENT ALTERNATIVES
(\$ millions)

	Alternative I	Alternative II
Total Project Capital Costs ^{1/}	\$565	\$646
Project Benefits		
Cumulative Property Tax Revenue (Revenue share attributed to land rescued from flood plain)	\$290 (\$128)	\$453 (\$262)
Project Construction Payrolls ^{2/}	\$430	\$485
Total of Property Tax and Project Construction Benefits	\$720	\$938

Additional Project Benefits Not Currently Quantified:

Recreational User Benefits
Tourism Expenditures Benefits
Flood Control Savings (flood insurance and damage
savings)
Regional Efficiencies Benefits

^{1/} Does not include financing costs.

^{2/} Does not take into account multiplier effect which would not
change the relative position of each alternative.

Source: Economics Research Associates.

IV. Implementation

If any plan, other than continuing current patterns of use in the Rio Salado is to be achieved, it will be the result of initiatives taken jointly by the Rio Salado Development District and bordering local governments. The implementation task has four main dimensions:

1. Securing the necessary funding and financing and discharging any debt over time through some dependable source of revenues;
2. Acquiring land and constructing the necessary public improvements and recreation facilities;
3. Controlling the type and form of private development to ensure that it capitalizes on the amenities;
4. Operating and maintaining completed facilities which remain in the public domain.

There are many options in each of these categories and the following sections outline some of them.

We have tentatively concluded that there is a preferred approach to implementation. We outline that strategy here so that both alternatives may be considered in light of how they can be accomplished. While implementing one scheme will differ in detail from the other, the broad approach will be similar.

Once the plan and financing program has been agreed to by all local governments, the Rio Salado Development District will need to assume the lead role in carrying out the improvements. Because of the integrated nature of the flood control and channel facilities, there must be a strong central body capable of managing the development effort. There is also merit in vesting many of the long term maintenance and management responsibilities in a single agency that crosses local jurisdictions so they are handled consistently. The District will need expanded powers but will also require the cooperative assistance of local governments in pursuing its task. For taking critical lands, it will require local government powers, and local development controls will help assure that private development beyond immediate action areas is complementary to the plan. Some public works and area revitalization may most appropriately be done by local governments. While the District will need to take the lead, no single agency is capable of carrying out the entire project.

This section presents an analysis of the funding sources available to Rio Salado and evaluates them in terms of potential magnitude and appropriateness for this project. It does not evaluate each alternative land use plan from the standpoint of financing, because not enough detail on the timing of public improvement or development is known at this stage to develop a detailed financing plan. It does examine the public costs required and appropriate funding sources.

A financing plan for a major public works project of this magnitude should provide the following:

- o generate a large amount of capital upfront
- o generate cash flow
- o provide a long and stable source of funds.

Cost

The costs of development of Rio Salado may be funded through varying sources. The relationship of these cost categories to potential funding sources is shown in Table 1. The riverbed costs are obviously costs which must be allocated to the cost of Rio Salado, and are the most critical to the project. The riverbank costs also include expenditures critical to Rio Salado development, such as the creation of lakes and waterways and land acquisition, but also include some costs, such as preparation of land for the state fairground and for private development, which might be shifted to the private sector or to other sources. The allocation of these service costs has implications for funding mechanisms required and the levels of investment needed.

Funding Sources

The categories of revenue sources which we have examined include the following:

- Property Taxes
- Sales Tax Revenue
- Local Personal Income Tax
- Corporate Income Tax
- Excise Taxes
- Utility Taxes

Table 1

PROJECT COSTS IN RELATION TO POTENTIAL FUNDING SOURCES

<u>Category</u>	<u>Types of Cost Items Included</u>	<u>Allocation</u>	<u>Potential Funding</u>
1. Riverbed	Waterways and lakes flood control (channels, sediment basin, levees) Land Acquisition	Capital costs which can be directly allocated to Rio Salado project.	General obligation bonds, tax increment financing.
2. Riverbank	Lakes Parkways Land Acquisition and preparation for development Parks, golf courses Low cost housing State Fairgrounds Relocation	Some costs directly allocated to Rio Salado development costs, some may be allocated to ongoing programs and funding sources. For example State Fairgrounds is not a Rio Salado cost but should be borne by the State.	General obligation bonds, tax increment financing, pari-mutual tax (State Fairgrounds), excise taxes. Federal grants, (housing, transportation, etc.) Municipal budgets for parks and recreation, etc.
3. Public Services-One Time Costs	Schools Police & Fire Equipment Relocation Housing programs	Relocation costs directly allocated to Rio Salado development. Additional public services such as police and schools, are impacts from Rio Salado development and may be supported by the normal growth in taxes.	Increases in city project funds through property taxes, excise taxes, sales taxes, federal and state programs.
4. Operating Costs	Maintenance of parks, roads, lakes, etc. Police, fire, schools	Maintenance of flood control channels and lakes directly allocated to Rio Salado. Operating costs of magnet school not allocated to Rio Salado.	User fees, municipal and school district budgets.

Source: Economics Research Associates.

Pari-mutual Tax
Commuter Tax
Lotteries
Business Contributions
Amusement Tax
Land Leases
Grants and Loans

A summary of these mechanisms is indicated by the data in Tables 2 and 3. Data in these tables summarize most of the key characteristics of these funding sources, including amount of revenue available, advantages and disadvantages of each potential source, and implementation requirements.

In addition to these sources of funds we also reviewed the potential bonding alternatives for the Rio Salado, including general obligation bonds, revenue bonds, special assessment bonds and tax increment bonds, as shown in Table 4.

The following text describes those tax sources and revenue mechanisms that appear to hold the most promise for revenue generation and use in the implementation of the project.

General Obligation Bonding

The bonding capacity and current bonded indebtedness of Maricopa County, Phoenix, Tempe and Mesa are shown in Table 5, and indicate that each has a significant amount of unused bonding capacity. While in many cities and counties current indebtedness is close to or at the bonding limit, the opposite appears to be the case here. In Maricopa County alone, unused bonding capacity totals \$765 million.

Sales Tax

Small sales (transaction privilege) tax increases represent substantial revenue potentials. A one percent levy on county-wide retail sales would realize a minimum of \$92 million per year.^{1/} However, because the county cannot levy a sales tax, the various municipalities

^{1/} Based on retail sales figures only. The sales (transaction privilege) tax is also levied on certain services.

Table 2

FUNDING SOURCES FOR RIO SALADO

<u>Category</u>	<u>Characteristics</u>	<u>Current Use of Funds</u>	<u>Advantages</u>	<u>Disadvantages</u>	<u>Implementation</u>
Property Taxes	Property taxes are levied on land and improvements and on business personal property by the State, County, cities, school districts, special districts, community colleges.	County Treasurer dispenses funds to all taxing entities for government operations, interest payments, etc.	Land based tax which can capture increment from development.	Property taxes are under severe public scrutiny & growth limits.	Rio Salado D.D. does not currently have taxing authority. Establishment of RSDD as a <u>special district</u> with taxing powers is desirable. Requires approval of current property owners. Otherwise, funds would have to come from county or from individual jurisdictions for projects within their boundaries.
Sales Tax Revenue	Levied on goods and some services by State and some cities and towns.	State sales tax goes to general fund, state aid to education, and to cities and towns. City sales tax may be earmarked for a specific use.	Stable source of revenue.	Inherently regressive.	County cannot levy a sales tax. Individual cities could levy a sales tax earmarked for RSDD.
Income Tax	Levied by State on income for individuals, estates, and trusts.	15% to Revenue Sharing Fund for cities and towns, balance to General Fund.	Potentially less regressive than general sales tax.	-----	Not appropriate for Rio Salado.
Corporate Income Tax	Levied by State on income of businesses doing business in Arizona.	Revenue Sharing Fund and General Fund.	-----	Discriminatory against certain businesses and specific consumers.	Not appropriate for Rio Salado.
Excise Tax	Special sales tax applied to specific retail items. In Arizona this includes but is not limited to:	-----	Provides stable flow of funds.	-----	Cities may impose excise taxes on goods & services not already pre-empted by the State, through a vote of City Council.

Table 2

FUNDING SOURCES FOR RIO SALADO

<u>Category</u>	<u>Characteristics</u>	<u>Current Use of Funds</u>	<u>Advantages</u>	<u>Disadvantages</u>	<u>Implementation</u>
	Tobacco & alcohol tax	Unemployment compensation and state school aid fund.	Luxury tax, somewhat related to ability to pay.	-----	Alcohol and tobacco taxes are pre-empted by the State. Municipalities may not tax these items.
	Room tax levied in some cities.	In Phoenix used for Civic Center funding.	-----	-----	-----
Utility tax	Taxes on electric, gas, telephone, and water companies.	State General Fund.	-----	Tax yield small; public acceptance questionable	Not appropriate
Pari-mutual tax	Tax on handle of dog and horse racing.	As county fairs award & promotion fund; State General Fund.	-----	-----	Possible source of funds for State Fairgrounds in RSDD?
Commuter tax	Charges those who work in a community but who do not live there.	None existing.	Tends to shift municipal costs to those who benefit from the city services.	Discourages economic development.	Not appropriate.
Lotteries	State-run method of tapping human gambling instincts.	Transportation Fund & State Fiscal Emergency Fund.	Voluntary form of taxation.	-----	Funds can be earmarked for specific uses.
Business contributions	Direct contribution by businesses & merchants directly benefitting.	-----	Logical source of revenue where businesses are clear beneficiaries.	-----	-----
Amusement Tax/ World's Fair	State or local tax on ticket sales, rides, amusements, & shows at a World's Fair or State Fair in RSDD.	See sales tax revenue.	Taxes actual users of RSDD facilities & events.	Not a continual source of revenue.	Amusements are currently taxed under the state sales tax.
Land Lease Revenues	Leasing of publicly owned land acquired by the District to private developers.	None existing.	Captures increment in land values from Rio Salado improvements.	Requires acquisition of large amounts of land.	Requires cooperation of State Land Trust and municipalities to acquire land.
Grants and Loans	Federal, state, non-profit grants or loans for specific projects.	-----	Does not effect local tax burdens.		Source of funds for schools, transportation, recreation, flood, control, etc.

Table 3

REVENUE POTENTIAL FROM FUNDING SOURCES FOR RIO SALADO PROJECTS

	For Each Increment	Annual Dollar Increment	Existing Secondary Levy	Incidence of Taxation	Statutory Situation (Authority)	Longterm Stability of Funds		Comment
						Flow	Growth	
<u>Property Tax 1/</u>								
County-wide	per each 1 cent levy on secondary values ^{2/}	\$ 603,347	\$0.16 per \$100 assessed value ^{1/}	property owners	existing	yes	yes	Taxes levied on secondary values are subject to voter approval but are not subject to growth limits. County support of Rio Salado is said to be high.
Phoenix	per each 1 cent levy on secondary values ^{2/}	\$ 270,620	\$0.79 per \$100 assessed value	property owners	existing	yes	yes	
Tempe	per each 1 cent levy on secondary values ^{2/}	\$ 41,900	\$0.63 per \$100 assessed value	property owners	existing	yes	yes	
Mesa	per each 1 cent levy on secondary values ^{2/}	\$ 46,100	\$0	property owners	existing	yes	yes	
RSDD Special District	per each 1 cent levy on secondary values ^{2/}	\$ 12,500 in year 1	none	property owners	special districts must be approved by vote of property owners within proposed district	yes	yes	Good potential source of funds if property owners favor creation of a special district.
<u>Sales (Transaction Privilege) Tax</u>								
County-wide	per each 1% of county sales	\$92,000,000 ^{3/}	no county levy. state levy is 4%	retail business operators partly pass through	state, cities and towns may levy taxes	yes	yes	county cannot levy sales tax
Phoenix	per each 1% of sales	\$68,200,000 ^{4/}	1%	retail sales except food items	existing	yes	yes	city sales taxes can be earmarked for specific purposes

Table 3 (continued)

REVENUE POTENTIAL FROM FUNDING SOURCES FOR RIO SALADO

	For Each Increment	Annual Dollar Increment	Existing Levy	Incidence of Taxation	Statutory Situation (Authority)	Longterm Stability of Funds		Comment
						Flow	Growth	
<u>Sales (Transaction Privilege) Tax</u>								
Tempe	per each 1% of sales	\$ 9,200,000 ^{A/}	1%	retail sales except food	existing	yes	yes	city sales taxes can be earmarked for specific purposes
Mesa	per each 1% of sales	\$14,200,000 ^{A/}	1%	retail sales except food	existing	yes	yes	city sales taxes can be earmarked for specific purposes
<u>Room-Tax</u>								
County-wide	per each 1% of sales	\$4,400,00	no county levy	hotel operators	county does not have authority	yes	yes	
Phoenix	per each 1% of sales	NA	.5%	hotel operators	existing			Phoenix room tax is dedicated to the Phoenix Civic Center
Tempe	per each 1% of sales	NA	yes	hotel operators	existing	yes	yes	
Mesa	per each 1% of sales	NA	none	hotel operators	Mesa does not have a room tax but could have one	yes	yes	

Table 3 (continued)

REVENUE POTENTIAL FROM FUNDING SOURCES FOR RIO SALADO

	For Each Increment	Annual Dollar Increment	Existing Levy	Incidence of Taxation	Statutory Situation (Authority)	Longterm Stability of Funds		Comment
						Flow	Growth	
<u>World's Fair Tax</u>	5% tax on ticket sales, rides, etc. at proposed World's Fair	\$4.8 million one time revenue source	4% state sales tax on amusements.	World's Fair visitors	Amusements already taxes by state under sales tax	no	no	One-time tax on World's Fair
Land Leases Within District	10% of land value	Alternative 1 - \$37 million Alternative 2 - \$60 million, annually in Year 25		Property leased for private development	yes	yes	yes	District must acquire property

- 1/ For purposes of this analysis, only secondary assessed values and tax rates have been used. Taxes levied for secondary purposes include all property taxes levied for payment of bonds, special district levies and voter approved overrides. The average total tax levy in the District on both primary and secondary assessments is \$10 per \$100 assessed value.
- 2/ The tax rates in Arizona are expressed in terms of dollars per \$100 assessed value. For this analysis, a 1 cent levy means a 1 cent levy per \$100 assessed value.
- 3/ Based on 1981 County retail sales of \$9.2 billion. (Source: Arizona Statistical Review.) Since the sales tax is levied on some services as well as retail sales, this figure understates the annual dollar increment from a county wide sales tax.
- 4/ Based on FY 1980-81 local sales tax levies reported in the Sales Tax Survey, March 1982, by the League of Arizona Cities and Towns.
- 5/ Assumes 6 million visitors each spend \$16 at the Fair.

Table 4

BONDING ALTERNATIVES FOR RIO SALADO

<u>Category</u>	<u>Characteristics</u>	<u>Advantages</u>	<u>Disadvantages</u>
General Obligation (GO) Bonds	Secured by issuer's pledge of full faith, credit and taxing power - issued only by state, county, cities, and special districts.	Spreads costs of public facility over entire community.	Requires voter approval.
Revenue Bonds	Payable only from revenues derived from operation of facilities such as user fees, land leases, rental payments, etc.	Not subject to statutory debt limits.	
Special Assessment Bonds	Payable from proceeds of assessments on property owners who directly benefit.	Equity is high.	Limited marketability and higher interest charges.
Tax Increment Financing	Payable from increases in tax revenues collected on property within the TIF district. May be exercised by cities, counties, or entities specifically empowered by the Arizona Legislature to do so.	Increment directly related to improvement/development of the District.	Draft legislation to permit Tax Increment Financing has not yet been adopted by State Legislature. TIF also requires constitutional amendment. Tax increments may be insufficient in early years to cover debt requirements.

Source: Economics Research Associates.

Table 5

BONDING CAPACITY AND CURRENT BONDED INDEBTEDNESS
OF MARICOPA COUNTY, PHOENIX, TEMPE, AND MESA
AS OF JUNE 30, 1982
(Millions)

	<u>Current Indebtedness</u>	<u>Bonding Limit</u>	<u>Unused Capacity</u>
Maricopa County	\$ 35 ^{1/}	\$800	\$765
Phoenix ^{2/}	\$548	\$779	\$231
Mesa ^{3/}	\$ 45	\$120	\$ 75
Tempe ^{4/}	\$ 48	\$ 16	\$ 32

^{1/} As of June 30, Maricopa County had \$85 million in bonds outstanding and \$50 million available in the debt retirement fund, for a current indebtedness of \$35 million.

Source: Maricopa County Finance Department.

^{2/} Source: Annual Financial Report, June 30, 1982, City of Phoenix.

^{3/} Source: Budget and Research Department, City of Mesa.

^{4/} Source: City of Tempe Annual Financial Report, June 30, 1982

Source: As noted above and Economics Research Associates.

within the county would have to levy these taxes. A one percent levy on sales by Phoenix, Mesa, and Tempe alone would realize \$91 million annually, which could be earmarked for Rio Salado. City sales taxes and excise taxes may be earmarked for specific uses such as Rio Salado. State excise taxes may also be earmarked for specific uses. The sales tax in other areas of the county is often used for large capital projects, especially transportation.

Land Lease Revenues

The practice of leasing publicly owned land by municipalities or special public development entities to private development entities is increasing nationwide. The stimulus for this has been twofold: first, state and federal initiated tax reform movements are threatening municipal budgets and are forcing cities to look to new sources of revenues; second, the increasing shortage of prime vacant or underdeveloped land in urban areas is focusing attention on the remaining development sites -- many of which are publicly owned.

The advantages to the public sector in leasing out land for private development are as follows: first, ground leases can generate substantial annual lease revenues often above what could be realized if the property were taxed as privately owned; second, the public land owner will retain ultimate control of the land through the lease and will be able to control the type of development project that is built on the site; third, in some cases, public amenities will be developed on-site with private financing. The disadvantages are that: too many controls over the development concept and the lease can result in fewer bids by the private developer; and the landowner could potentially lose the fee interest in the land if the leasehold interest is subordinated to the developers' lender as mortgage security and the developer defaults on both the rent and mortgage payments.

There are several advantages to the private developer in leasing public land for the purposes of commercial development: first, a ground lease can reduce the amount of equity that must be put into the deal; and second, sites are often particularly desirable if public infrastructure such as parks are being planned in the area. There are also disadvantages to developers in leasing publicly owned property: first, competition with

other developers for the leasehold interest can increase upfront development costs; second, deal negotiations can often be lengthy and complicated; and third, leasehold mortgage financing can be difficult to obtain.

In determining the appropriate rent levels for leasing public land, several techniques may be used:

- a) Let the marketplace decide through a preliminary bidding process.
- b) Estimate land value through the appraisal method and use a simple rule of thumb that rent will approximately equal the amount a developer would pay if the land were purchased with institutional financing.
- c) Use a capitalization technique, where total land value times the desired return on project cost equals desired rent level. For example, rent capitalization rates for early 1982 projects in Boston are averaging about 13.5 percent.

In determining land lease revenue potentials for Rio Salado, it has been assumed that property between the parkways is owned by the District and is leased to private developers at the rate of 10 percent of its market value annually. Land lease revenues to the District could be substantial, as seen below. (For more detail see Tables C-9 and C-10 in Appendix C.)

Estimated Annual Land Lease Revenues

	<u>Year 10</u>	<u>Year 25</u>
Alternative I	\$6 million	\$37 million
Alternative II	\$4 million	\$60 million

The bonding capacity of these revenues is estimated at \$124 million under Alternative I and \$196 million under Alternative II. However, changes in assumptions as to the timing of both development and bonding may change these somewhat. The bonding capacity of Alternative I here is close to that of Alternative II under the assumption that development will occur sooner in Alternative I because flood control is in place sooner.

Tax Increment Financing

Tax increment financing is a method of linking the funding of redevelopment efforts with the anticipated returns to the tax increment district in the form of property taxes. In practice, a district is defined in which the proceeds of a bond issue will be used to stimulate redevelopment efforts. The current real estate tax yield for all properties within the district is calculated and the contribution of these taxes to the taxing jurisdictions is frozen at that level. As development occurs, properties in the district will be revaluated and general appreciation realized due to the overall improvement of the district. The incremental difference in the tax yield from the district flows into a fund which is pledged to the retirement of the bonds that were used to stimulate the process. Once the bonds are retired, the tax yield in subsequent years flows directly to the taxing jurisdictions within the District.

Tax increment financing is relatively new as a method of financing urban revitalization and is not currently allowed under Arizona law. However, tax increment legislation is under consideration in one Arizona legislature and is likely to be adopted. This proposed legislation has been written with Rio Salado in mind and would allow a tax increment district to cross municipal boundaries.

While tax increment financing has not yet been approved, it is potentially an excellent tool for financing at least part of Rio Salado. A preliminary evaluation of tax increment financing showed that in both alternatives, the tax increment is substantial but is not enough to cover all the development costs associated with such a large scale project. As is generally true, the tax increments build up over time as development occurs. In order to be successfully used, the rate of construction and subsequent increases in property value must be accurately projected. Preliminary estimates of the tax increments which could be used to offset debt service costs are shown in below (also see Tables 3 and 4 in Appendix C.

Estimated Net Property Tax Revenue
Increment From New Development

	<u>Annual in Year 25</u>	<u>Cumulative Over 25 Years</u>
Alternative I	\$34,710,000	290,309,000
Alternative II	\$60,904,000	452,980,000

Summary

In analyzing these funding sources and revenue streams, several things become apparent:

- o The timing of both public investments and private development are critical to determining the potential bonding capacities of tax increment financing, and sufficient detail on these items is not available to adequately test this concept.
- o Financing of Rio Salado will have to be developed using a combination of funding sources; no one source of funds is sufficient to finance such a large and complicated project.
- o Tax increment financing could be used to cover part of the Rio Salado development costs. However this method must be combined with other revenue sources to finance the level of projected costs.
- o There is a lot of revenue potential available in the region from a variety of sources, including sales taxes, bonding, land lease revenues, and District tax increments.

At a minimum, it will be necessary to acquire land for the drainage courses, lakes and public recreation facilities along Rio Salado. A small amount of this land is currently in the public domain, but most will need to be acquired. After costly public investments in flood control and amenities, property values of adjacent land will rise dramatically--at least four to eight times current values. Since this rise in values is solely the result of public actions, it is equitable to recapture the added value to help pay for the public improvements. This argues for an early land acquisition program by public bodies that extends considerably beyond the boundaries of the public recreation and flood control facilities.

The area of land to be acquired publicly is considerably different between Alternatives I and II. However, each scheme will require a mix of four acquisition techniques:

1. Land Pooling - Lands currently in the local and state government inventory should be conveyed to the Development District upon adoption of the plan. In addition, any properties in tax default should be offered to the District on a preferential basis. This land will provide at least a small amount of capitalization for the District.
2. State Land Trust - It may be possible to acquire some of the lands through trades made by the State for other lands it has in its inventory. This is an advantageous method since it would reduce the dollar outlays necessary for land assembly. However, if the Development District is to benefit from public control, an agreement must be struck with the Trust to allow its lands to be pooled with others acquired by the District. Also necessary is an agreement on sharing of land value increases between the two bodies.
3. Purchase - Whenever possible, lands should be purchased from current owners at prices not exceeding their appraised values. Lands may be leased back to owners until needed to allow current usage to continue and to provide early revenues for district operations.
4. Taking - Where other methods prove impossible, lands may need to be taken by the District with the approval of the local Council in the city in which they are located. If other methods are aggressively pursued, taking should prove necessary in only a small number of cases.

With lands acquired, the major construction effort will need to be coordinated by the District. Construction of several elements--the drainage ways, the parkways, water-bodies and some of the recreation facilities, among them--will need to be managed centrally. However, beyond these and as a general policy, the District should seek to have ultimate developers or owners design in detail and build the public facilities directly associated with their projects. Thus, local roads, utilities and parks in residential and industrial areas should be constructed by private developers to meet specifications set by the District and local governments.

Regardless of how much of the construction is able to be decentralized, a project of enormous scale will remain in the hands of the District. The District organization will need to be structured to handle such a task, probably with all improvements in each geographic district handled by a single staff team. That way, public and private projects can be coordinated in terms of design and timing.

While the preferred approach is to acquire all lands adjacent to the public improvements, there are several alternatives which may prove to have potential for carrying out specific parts of the plan. Their advantage is that they reduce the public financing requirements for land acquisition and construction. They are:

1. Joint District-Private Ventures - Development agreements (contracts) can be entered into between current land owners and the District. The owners may agree to develop their lands for the uses specified in the plan according to a timetable while conveying to the District lands needed for public facilities and floodway improvements and making payments for the flood controls. The District would, in turn, agree to construct the public facilities according to a timetable. Such ventures hinge on current owners' willingness to follow the plan and meet the financial terms necessary, or their willingness to sell to a developer who is interested in participating. They are also only possible in areas with large scale block ownership.

2. Land Resubdivision - Where land ownership is fragmented, it is inequitable to expect any individual owner to dedicate the lands necessary for public facilities, or to pay for flood control improvements that will also benefit many adjacent owners. In such cases, an alternative to public acquisition is a scheme of land subdivision. Under such, all lands within a cordon

would be combined and replotted to fit the plan, with areas necessary for public improvements reserved. Private owners would be entitled to the resubdivided land in proportion to the assessed value of their lands before they were pooled. New legislation would undoubtedly be necessary for such a system. It has similar virtues to joint ventures--obviating the need for public land assembly.

3. Special Districts - Rather than undertaking the project centrally, it may be possible to create a series of special flood control and recreation districts, leaving existing owners to develop their lands. The costs of acquiring public lands and constructing local facilities would be levied against owners in each district, and a majority vote of owners would be needed to create a district. This scheme would probably only be feasible if the floodway, central spine of recreation facilities and major improvements such as the parkways were detached and funded separately. In general, it is easier to contemplate such a scheme for Alternative I than II.

Each of these schemes, of course, has a direct bearing on the financing approach chosen. As we have noted, recapture of the rise in land values will probably be necessary to finance the cost of public improvements. If land remains in private hands, this recapture will need to occur through some form of special benefit taxation.

If advance acquisition of the lands bordering the central core of recreation facilities and water courses is important as a source of revenues, it also provides the means to control private redevelopment in the District. Without such control, development could occur piecemeal, without logic to adjacencies, and the full potential of the District would be unrealized.

Private development lands can be disposed of by sale or lease with covenants or clauses in the lease agreement governing the development standards to be met. Detailed guidelines for private development must be developed as one of the first implementation steps. All development on lands held by the District should be submitted to design review by a board of professionals charged with ensuring that such high standards of siting, landscaping and building design are met.

Wherever possible, leasehold is the preferred manner of disposition, for several reasons. It allows for escalation of lease rates in line with future rises in land values as the Rio Salado District becomes recognized as highly desirable. It provides for long term control over the use of land and any changes to structures on it. It offers a separate and stable means for funding operating and maintenance costs of amenities in the District. And, not to be overlooked, at some future date when leases expire, the District would have the option of releasing or taking over properties for redevelopment or continued use.

Leaseholds are becoming common for commercial and industrial lands, although they pose some problems in residential development, including possible public resistance. Thus, it may be necessary to sell some or all lands planned for residential usage.

This control over private development will occur outside the system of local zoning and subdivision controls. Rather than attempt to adapt or change current zoning categories to meet the special circumstances of the Rio Salado, we would suggest that the area be declared a "special development district". All development would then be subjected to site plan review where the main criterion will be how well the master plan is served by the development. The review function could be delegated by local governments to the District or a joint design review board. However structured, one-stop permitting should be possible.

Operations and Maintenance

Beginning when the first lands are acquired, the District will need to assume a growing responsibility for property management, facility operation and maintenance. How the District's role is parcelled from that of local governments and other existing authorities will require a great deal of discussion centered on the specifics of facilities. However, organizationally, maintenance functions will probably need to be managed by a separate group from the development tasks, since the management skills required are quite different for each.

One possibility worth contemplating is the creation of a separate Rio Salado Operating Corporation responsible for holding completed facilities, operating and maintaining them. The organization could perform such services on contract for the District, and local governments. It would inject the interests of long term maintenance into the original construction decisions.

Implementation of either alternative will require legislative action at all levels of government--city, county, and state. Most of these concern the establishment of powers available for use by the Development District. Others deal with expanding the flexibility and authority of the State Land Trust, potentially an important partner in the implementation process. In addition, each jurisdiction will need to make official changes to the zoning maps, and, in some instances to the zoning text, to conform to the final Master Plan, once adopted.

Rio Salado Development District Authority

We recommend that the State establish a revolving loan fund from which the Development District may borrow capital for the early acquisition of land. This is needed to deal with the lag time for receipt of other revenues, such as tax increments. A means to acquire the land needed before prices rise dramatically is essential.

The current restriction against the use of State funds until an upstream dam is "fully operational" would also need to be eliminated. The use of State resources, whether through grants, loans, or property transactions, is crucial even during the first ten years of Alternative II while dams would be under final design and construction. The Development District will also need to be granted some form of tax increment authority, since it is very unlikely that existing property owners would support the creation of a special taxing district.

The authority to issue revenue bonds for the sizeable early capital needs is also needed. Revenue bonds would enable the District to pledge future revenues to service the debt. As a companion to this, the current five-year limitation on notes the District might enter into needs to be lifted or significantly lengthened.

Local municipalities should be asked to provide the District with eminent domain authority for that land area within and including the parkways in Alternative II and other areas designated for acquisition on the north riverbank in Alternative I. The need to seek out City Council

approvals on a case by case basis would lengthen the acquisition process and threaten the success of timely land assembly. A mutually agreeable set of criteria could be established to insure the cities that such authority would only be exercised as a last resort. Finally, each jurisdiction should be asked to provide the Development District with design review authority in all zoning or development proposals which lie within its overall boundaries. Although new controlled development through land acquisition is planned to concentrate close to the river itself, development proposals beyond this narrow band could greatly affect the project's overall success.

State Land Trust

The Governor's Task Force, set up to review the operations of the State Land Trust, has made several recommendations for changes in the selling, leasing, and trading practices of this agency. Some of these recommendations would have a direct impact on the Rio Salado implementation strategy. Failure to carry them out would jeopardize the development of a working partnership between the District and the State Land Trust. Such a partnership could produce significant savings in land acquisition costs and generate increased revenues for both entities.

We support, therefore, the Task Force's recommendation to remove rules which restrict the Land Trust from crossing County lines in land trades. We also support allowing the Trust to enter into longer term leases with tenants and to charge rents on a more flexible basis. This flexibility might include charging lower than market rents at first as an incentive to attract tenants to the area before the physical environment is significantly improved.

It would also be quite helpful if the Trust were allowed to convey property to the District at a negotiated price which might be below the highest bid at auction or even below the market value. Clearly such transfers could be in the public interest, especially when recreation lands are involved.

In addition to those recommendations of the Task Force, it would be important to establish a mechanism whereby the State Land Trust may share its lease or sales revenues with the District. Otherwise, ownership of developable land by the State is not attractive, since the increments on the land values could not be collected. Finally, an increase in the size of this agency's legal staff is critical as the number of land transactions implied in this development scenario greatly exceeds the five or six per year that can now be managed.

Appendices

Appendix A - Water

TABLE 1
RIO SALADO-PHOENIX
DOMESTIC WATER USE ALTERNATIVE 1 - PHASE 1 & 2

Land Use	# Units Per AC	Occupancy Per Unit	Total Acres		Estimated Occupancy		GPD/ Capita Day	Avg. Daily Demand (MGD)		Avg. Annual Demand (Ac ft)		Total
			PH 1	PH 2	PH 1	PH 2		PH 1	PH 2	PH 1	PH 2	
High Density Res	15	2.1	15	160	473	5040	150	0.07	0.76	78	851	929
Low Density Res	4	2.8	--	415	--	4648	180	--	0.84	--	941	941
Office	10(est)	5(est)	--	80	--	4000	25	--	0.10	--	112	112
Industrial Park	1(est)	20(est)	170	230	3400	4600	30	0.10	0.14	112	157	269
Mixed Ind & Off	5(est)	15(est)	--	75	--	5625	27	--	0.15	--	168	168
Institutional	--	50	5	--	250	--	100	0.03	--	34	--	34
Resort/Hotel	--	15	--	75	375	--	125	0.05	--	53	--	53
Fairgrounds	1000	--	210	--	1000	--	20	0.02	--	22	--	22
Mixed Ind/Off/Res	--	10	120	345	1200	3450	60	0.07	0.21	78	235	313
Commercial	6	4	5	35	120	840	40	--	0.04	--	45	45
Comm Recreation	--	20	--	--	--	--	50	--	--	--	--	--
Golf	--	400	160	320	400	800	30	0.01	0.02	11	22	33
Water Garden	--	50	100	--	5000	--	20	0.10	--	112	--	112
Totals										500	2531	3031

Table A-1

TABLE 2
 RIO SALADO-TEMPE, MESA & S.R. INDIAN COMMUNITY
 DOMESTIC WATER USE ALTERNATIVE 1 PHASE 1 & 2

Land Use	# Units Per AC	Occupancy Per Unit	Total Acres		Estimated Occupancy		GPD/ Capita Day	Avg. Daily Demand (MGD)		Avg. Annual Demand (Ac ft)		Total
			PH 1	PH 2	PH 1	PH 2		PH 1	PH 2	PH 1	PH 2	
High Density Res	15	2.1	15	90	473	2835	150	0.07	0.43	78	482	560
Low Density Res	4	2.8	--	30	--	336	180	--	0.06	--	67	67
Office	10(est)	5(est)	--	--	--	--	35	--	--	--	--	--
Industrial Park	1(est)	20(est)	35	145	700	2900	30	0.02	0.09	22	101	123
Mixed Ind & Off	5(est)	15(est)	--	--	--	--	27	--	--	--	--	--
Institutional	--	50	--	20	--	1000	100	--	0.10	--	112	112
Resort/Hotel	--	15	55	40	825	600	125	0.10	0.08	112	90	202
Mixed Ind/Off/Res	--	10	--	--	--	--	60	--	--	--	--	--
Commercial	6	4	--	10	--	240	40	--	0.01	--	11	11
Comm Recreation	--	20	--	10	--	200	50	--	0.01	--	11	11
Equestrian Rec	--	20	90	--	1800	--	50	0.09	--	101	--	101
Totals										313	874	1187

Table A-2

TABLE 3
RIO SALADO-PHOENIX
DOMESTIC WATER USE ALTERNATIVE 2 - PHASE 1 & 2

Land Use	# Units Per AC	Occupancy Per Unit	Total Acres		Estimated Occupancy		GPD/ Capita Day	Avg. Daily Demand (MGD)		Avg. Annual Demand (Ac ft)		Total
			PH 1	PH 2	PH 1	PH 2		PH 1	PH 2	PH 1	PH 2	
High Density Res	15	2.1	50	290	1575	9135	150	0.24	1.37	267	1535	1802
Low Density Res	4	2.8	--	590	--	6608	180	--	1.19	--	1333	1333
Office	10(est)	5(est)	20	70	1000	3500	25	0.03	0.09	34	101	135
Industrial Park	1(est)	20(est)	155	440	3100	8800	30	0.09	0.26	101	291	392
Mixed Ind & Off	5(est)	15(est)	--	200	--	15000	27	--	0.41	--	459	459
Institutional	--	50	12	70	600	3500	100	0.06	0.35	67	392	459
Resort/Hotel	--	15	--	235	--	3525	125	--	0.44	--	493	493
Fairgrounds	--	1000	175	--	--	1000	20	--	0.02	--	22	22
Mixed Ind/Off/Res	--	10	70	300	700	3000	60	0.04	0.18	45	202	247
Commercial	6	4	5	65	120	1560	40	0.01	0.06	11	67	78
Comm Recreation	--	20	--	40	--	800	50	--	0.04	--	45	45
Exposition	--	500	--	80	--	500	20	--	0.01	--	11	11
Golf	--	400	--	480	--	1200	30	--	0.04	--	45	45
Domed Stadium	--	10000	--	250	--	--	10	--	0.01	--	11	11
Equestrian Center	--	20	--	30	--	600	20	--	0.01	--	11	11
Water Garden	--	50	25	25	1250	1250	20	0.03	0.03	28	28	56
Totals										553	5046	5599

Table A-3

TABLE 4
 RIO SALADO TEMPE, MESA & S.R. INDIAN COMMUNITY
 DOMESTIC WATER USE ALTERNATIVE 2 - PHASE 1 & 2

Land Use	# Units Per AC	Occupancy Per Unit	Total Acres		Estimated Occupancy		GPD/ Capita Day	Avg. Daily Demand (MGD)		Avg. Annual Demand (Ac ft)		Total
			PH 1	PH 2	PH 1	PH 2		PH 1	PH 2	PH 1	PH 2	
High Density Res	15	2.1	20	100	630	3150	150	0.09	0.47	101	526	627
Low Density Res	4	2.8	--	590	--	6608	180	--	1.19	--	1333	1333
Office	10(est)	5(est)	--	--	--	--	25	--	--	--	--	--
Industrial Park	1(est)	20(est)	--	595	--	11900	30	--	0.36	--	403	403
Mixed Ind & Off	5(est)	15	--	--	--	--	--	--	--	--	--	--
Institutional	--	50	--	10	--	500	100	--	0.05	--	56	56
Resort/Hotel	--	15	30	45	450	675	125	0.06	0.08	67	90	157
Mixed Ind/Off/Res	--	10	--	35	--	350	60	--	0.02	--	22	22
Commercial	6	4	--	25	--	600	40	--	0.02	--	22	22
Comm Recreation	--	20	10	95	200	1900	50	0.01	0.10	11	112	123
Golf	--	400	--	320	--	800	30	--	0.02	--	22	22
Equestrian	--	20	25	--	--	500	50	--	0.03	--	34	34
Totals										179	2620	2799

Table A-4

TABLE 5
 RIO SALADO
 NON-POTABLE WATER USE ALTERNATIVE 1 - PHOENIX

Feature	Acreage		Water Use Rates (ft/yr)				Total Feature Water Use in AF/Yr				
	PH 1	PH 2	Evaporation	Seepage	Irrigation		PH 1	PH 2	Total Applied	Return Flow	Net Total
					Applied	Return flow					
Lakes & Channels	5	150	6.25	0.11	--	--	32	954	986	17	969
Canals	--	33	6.25	0.11	--	--	--	210	210	4	206
Streams & Tributaries	--	31	6.25	0.11	--	--	--	197	197	3	194
Park	120	350	--	--	5.6	2.3	672	1960	2632	1081	1551
Trails	--	640	--	--	5.6	2.3	--	3584	3584	1472	2112
Exposition	210(1/2)	--	--	--	5.6	2.3	588	--	588	242	346
Golf Course	160	320	--	--	5.6	2.3	896	1792	2688	1104	1584
Water Garden	50	50	--	--	5.6	--	280	280	560	--	560
Islands	40	400	--	--	5.6	2.3	224	2240	2464	1012	1452
Parkway	3	24	--	--	5.6	2.3	17	134	151	62	89
Totals							2709	11351	14060	4997	9063

Table A-5

TABLE 6
 RIO SALADO
 NON-POTABLE WATER USE ALTERNATIVE 2 - TEMPE, MESA & S.R. INDIAN COMMUNITY

Feature	Acreage		Water Use Rates (ft/yr)				Total Feature Water Use in AF/Yr				
	PH 1	PH 2	Evaporation	Seepage	Irrigation		PH 1	PH 2	Total Applied	Return Flow	Net Total
					Applied	Return flow					
Lakes & Channels	10	42	6.25	0.11	--	--	64	267	331	6	325
Canals	--	33	6.25	0.11	--	--	--	206	206	4	202
Streams & Tributaries	--	16	6.25	0.11	--	--	--	102	102	2	100
Grass Channel	--	350	--	--	5.5	2.2	--	1925	1925	770	1155
Park	95	440	--	--	5.6	2.3	532	2464	2996	1231	1765
Trails	--	345	--	--	5.6	2.3	--	1932	1932	794	1138
Golf Course	--	--	--	--	5.6	2.3	--	--	--	--	--
Water Garden	--	--	--	--	--	--	--	--	--	--	--
Islands	50	110	--	--	5.6	2.3	280	616	896	368	528
Parkway	3	21	--	--	5.6	2.3	17	118	135	55	80
Totals							893	7630	8523	3230	5293

Table A-6

TABLE 7
 RIO SALADO
 NON-POTABLE WATER USE ALTERNATIVE 2 - PHOENIX

Feature	Acreage		Water Use Rates (ft/yr)				Total Feature Water Use in AF/Yr				
	PH 1	PH 2	Evaporation	Seepage	Irrigation		PH 1	PH 2	Total Applied	Return Flow	Net Total
					Applied	Return flow					
Lakes	74	372	6.25	0.11	--	--	463	2325	2788	49	2739
Channels	--	--	6.25	0.11	--	--	--	--	--	--	--
Canals	--	--	6.25	0.11	--	--	--	--	--	--	--
Streams	--	--	6.25	0.11	--	--	--	--	--	--	--
Grass Channel	--	350	--	--	5.5	2.2	--	1925	1925	770	1155
Park	334	990	--	--	5.6	2.3	1870	5544	7414	3045	4369
Resort/Hotel	--	235	--	--	5.6	2.3	--	1316	1316	541	775
Fairgrounds	175(1/2)	--	--	--	5.6	2.3	490	--	490	201	289
Golf Course	--	480	--	--	5.6	2.3	--	2688	2688	1104	1584
Water Garden	25	25	--	--	10.0(est)	--	250	250	500	--	500
Exposition	--	80	--	--	5.6	2.3	--	448	448	184	264
Totals							3073	14496	17569	5894	11675

Table A-7

TABLE 8
 RIO SALADO
 NON-POTABLE WATER USE ALTERNATIVE 2 - TEMPE, MESA & S.R. INDIAN COMMUNITY

Feature	Acreage		Water Use Rates (ft/yr)				Total Feature Water Use in Af/Yr				
	PH 1	PH 2	Evaporation	Seepage	Irrigation		PH 1	PH 2	Total Applied	Return Flow	Net Total
					Applied	Return flow					
Lakes	37	387	6.25	0.11	--	--	235	2461	2696	47	2649
Channels	--	--	6.25	0.11	--	--	--	--	--	--	--
Canals	--	--	6.25	0.11	--	--	--	--	--	--	--
Streams	--	--	6.25	0.11	--	--	--	--	--	--	--
Grass Channel	--	185	--	--	5.6	2.2	--	1036	1036	426	610
Park	85	329	--	--	5.6	2.3	476	1842	2318	952	1366
Totals							711	5339	6050	1425	4625

Table A-8

Table 9

SUMMARY OF WATER USES
RIO SALADO PROJECTAlternative 1
Phase 1

	Domestic Use		Non-Potable Use			
	Af/yr	Gpm	Peak Gpm	Af/yr	Gpm	Peak Gpm
Phoenix	501			2709	1682	3364
Tempe, Mesa & S.R.	313			893	554	1108
Sub-Total	814			3602	2236	4472
Phase 2						
Phoenix	2531			11351	7038	14076
Tempe, Mesa & S.R.	874			7630	4731	9462
Sub-Total	3405			18981	11769	23538
TOTAL	4219			22583	14005	28010

Alternative 2
Phase 1

Phoenix	553			3073	1905	3810
Tempe, Mesa & S.R.	179			711	441	882
Sub-Total	732			3784	2346	4692
Phase 2						
Phoenix	5046			14496	8988	17976
Tempe, Mesa & S.R.	2620			5339	3310	6620
Sub-Total	7666			19835	12298	24596
TOTAL	8398			23619	14644	29288

RIO SALODO PROJECT
NON POTABLE WATER USE RATE FACTORS

1. Evaporation 6.25 ft/yr
2. Seepage (Clay lined) 0.11 ft/yr
3. Greenbelt Irrigation
 - Bermuda Lawn (Application Rate) 5.5 ft/yr
 - Return Flow to Groundwater 2.2 ft/yr
4. Useful Factors
 - 1 cfs = 448.8 gpm
 - 1 cfs = 0.65 mgd
 - 1 cfs = 724 Af/yr
 - 1 Af/d = 226 gpm
 - 1 gpm = 1440 gpd
 - 1 gpm = 0.526 mg/yr
 - 1 gpm = 1.61 Af/yr
 - 1 cfs = 1.98 Af/d
 - 1 Af/d = 0.5 cfs
 - 1 Af/yr = 0.62 gpm
 - 1 Af/yr = 0.0014 cfs
 - 1 mgd = 694.4 gpm
 - 1 mgd = 1120.2 Af/yr

Annual Operation & Maintenance
Costs for Water System

PROBLEM: Determine annual costs for pumping, maintenance and operation of the water system for both Schemes 1 and 2.

CRITERIA & ASSUMPTIONS:

- 1 Acft/yr = 0.62 gpm (Avg. flow)
- Condition 1 Assumes:
 1. Schemes 1 & 2 served totally by groundwater wells
 2. Average depth to groundwater approx. 200'
 3. Water to fill lakes will need no further pressure
 4. Water to irrigate grass, etc..., will require an additional 80 psi (or 185 feet) of pressure
- Condition 2 Assumes:
 1. Schemes 1 & 2 will be served by groundwater and effluent
 - A. Phase 1 of both Schemes by groundwater
 - B. Phase 2 of both Schemes by effluent
 2. Avg. depth to groundwater approx. 200'
 3. Avg. depth to effluent approx. 50'
 4. Water to fill lakes will need no additional pressure (i.e. gravity system)
 5. Grass & park irrigation will require an additional 80 psi (or 185 ft) of head
- Cost of Water Acquisition
 1. Cost of Land- Unknown - Depends on ownership (state, federal, private, etc...), type of agreement, (i.e. lease, outright purchase, condemnation, land swap, etc...)
 2. Groundwater - Cost of land only
 3. Leachate - Cost of Treatment - Assume \$100/Acft for treatment (blending & flow) a note: part of this cost may be covered by the state superfund or federal money for landfill cleanup.
 4. Cost of Effluent - Estimate of treatment only - Secondary plus primary use \$200/Acft. a note: part of this cost may be shared by the municipality responsible for treatment.

EQUATIONS:

1.) *H.P. = (GPM x H)/(3960 x eff.)

Where: H = Head

eff. = 0.7 (Assumed)

*Community Water System: Source Book
by: Joseph Ameen

2.) *Annual Cost of Pumping (A.C.)

$$\$ = 365 \text{ days} \times 24 \text{ hrs/d} \times 0.746 \text{ kw-hr/H.P.} \times \text{H.P.} \times \text{cost/kw-hr}$$

Where: Cost/kw-hr = \$0.085

*(From: SRP Consumer Information
Call.)

Combining 1) & 2)

$$\text{Annual Cost} = \frac{\text{gpm} \times \text{H}}{3960 \times 0.7} \times 365 \times 24 \times 0.746 \times 0.085$$

$$\$ = \text{gpm} \times \text{H} \times 0.2004 \quad \text{or} \quad \frac{\text{gpm} \times \text{H}}{4.99} *$$

Appendix B - Costs

COST NOTES:

1. unit cost to armor the channel (\$4. million) includes both sides of the channel and the riverbed bottom
2. all land to be acquired only represents 2/3 of what is now in private hands; 1/3 would be acquired through land exchanges
3. operating costs have not been included for such things as the State Fairground, the Stadium, equestrian centers, cultural institutions, and a few others as they would become the responsibility of a non-profit or profit making entity.
4. trails on the riverbank in Alternative I are wide, park-like strips with bicycle and pedestrian paths and generous landscaped grassy areas on either side.
5. major utilities construction cost in both schemes do not conform with normal costs per acre due to the necessity of relocating high power transmission lines
6. the cost of operating bus service includes the cost of acquiring the equipment, depreciated over the years.
7. the operating cost for trash, sewage, etc. is only calculated based on the number of new housing units.
8. hotel acreages vary because some have extensive open space associated with them for recreational purposes; only one in Tempe has conference facilities.
9. figures for the construction of low cost housing includes the cost of building new units at \$54,000 per unit and assisting homeowners at \$15,000 avg. per unit through grants to repair or rehabilitate their houses.
10. housing programs under services includes other loan and grant programs to assist renters, homeowners in neighborhood revitalization and increasing the homeownership rate.
11. housing programs under operating costs only includes the cost of administration for all housing and neighborhood revitalization programs.

ALTERNATIVE I

(8-1)

Cost Estimate Summary
Acquisition, Construction, and One Time Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	\$22,440,000	\$28,400,000	---	---
River Banks	80,934,000	13,620,000	---	---
Services	<u>32,343,250</u>	<u>190,250</u>	<u>---</u>	<u>---</u>
Totals	\$135,717,250	\$33,210,250	---	---

Phase 2:

River Bed	\$105,200,000	\$14,240,000	---	\$13,000,000
River Banks	182,690,000	26,460,000	\$27,200,000	---
Services	<u>14,983,000</u>	<u>794,500</u>	<u>2,401,000</u>	<u>---</u>
Totals	\$302,873,000	\$41,494,500	\$29,601,000	\$13,000,000

Total - Phase 1 and Phase 2 = \$564,896,000

ACQUISITION, CONSTRUCTION, AND ONE TIME COST

(8-2)

RIVERBED DEVELOPMENT--ALTERNATIVE I

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Waterway	1 2	400,000/mi.	8.4A	3,360,000	5.6A	2,240,000				
Armored Channel	1 2	4 mil./mi.	3 mi. 8.5 mi.	12,000,000 34,000,000	3.2 mi. 3. mi.	12,800,000 12,000,000			3.2 mi.	13,000,000
Armored Islands	1 2	106,000/A	40A 400A	4,240,000 42,400,000						
Horse Trails	1 2	40,000/A	35A	1,400,000						
Land Acquisition	1 2		160A 848A	4,800,000 25,440,000	165	6,600,000				

ACQUISITION, CONSTRUCTION, & ONE TIME COST

(B-3)

RIVERBANK DEVELOPMENT - ALTERNATIVE I.

ITEM	Phase Phase 2	Unit Cost.	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Lakes	1 2	90,000/A	5 A 150 A	450,000 13,500,000	10 A 30 A	900,000 2,700,000	50 A	4,500,000		
Secondary Channel & Streams	1 2	400,000/mi	9 mi	3,600,000	5.7 mi	2,280,000				
Tributaries	1 2	200,000/mi	4 mi	800,000	1 mi	200,000				
Parks	1 2	30,000/A	120 A 350 A	3,600,000 10,500,000	95 A 35 A	2,850,000 1,050,000	165 A	4,950,000		
Equestrian Center	1 2	6,000/A	50 A	300,000	90 A	540,000				
Trails	1 2	40,000/A	1160	46,400,000						
Public Golf Course	1 2	3mil. ea.	1 (95A) 1 (250A)	3,000,000 3,000,000						
State Fairground	1 2	26,000/A	210 A	5,460,000						
Cultural Institutions	1 2		5 A	15,000,000						
Neighborhood Improvements	1 2	22,400/A	655 A 550 A	14,724,000 12,320,000						
Parkways	1 2	1.3mil/mi.	1 mi (14A) 8 mi (116A)	1,300,000 10,400,000	1 mi. 4.5 mi (65A)	1,300,000 5,850,000	2.5 mi	3,250,000		
Low Cost Housing	1 2			16,800,000 7,400,000						
Land Acquisition - Public Use	1 2		237 A 1033 A	7,110,000 36,320,000		2,120,000				
Land Acquisition - Private Use	1 2		188 A 589 A	6,580,000 16,440,000	95 A 230 A	3,440,000 8,400,000	149	6,960,000		
Site Preparation- Private Use	1 2	26,000/A	285 A 835 A	7,410,000 21,710,000	95 A 230 A	2,470,000 5,980,000	290	7,540,000		

ACQUISITION, CONSTRUCTION, & ONE TIME COST

(B-4)

SERVICES - ALTERNATIVE I

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Buses	1 2									
Police	1 2	50/A	295 A 1,380 A	14,750 69,000	115 A 270 A	5,750 13,500	290 A	14,500		
Fire	1 2	100/A	295 A 1,380 A	29,500 138,000	115 A 270 A	11,500 27,000	290 A	29,000		
Major Utilities	1 2	200/A	295 A 1,380 A	59,000 276,000	270 A	9,023,000 54,000	290 A	58,000		
Elementary Schools	1 2	4 mil. ea.	3	12,000,000 30,000,000			1/2	2,000,000		
Magnet School (with furn. + equip.)	1 2									
Trash, Sewage, etc.	1 2									
Housing Programs	1 2			1,700,000 1,000,000	15 fam.	60,000				
Land Acquisition	1 2		15A 15A	450,000 600,000	2A	160,000	5	300,000		
Pumps & Wells	1 2			90,000 900,000		90,000 540,000				

(B-5)

ALTERNATIVE I

Cost Estimate Summary
Operating Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	\$210,000	\$177,000	---	---
River Banks	478,775	163,400	---	---
Services	<u>676,125</u>	<u>165,625</u>	<u>---</u>	<u>---</u>
Totals	\$1,364,900	\$506,025	---	---

Phase 1 Total = \$1,870,925

Phase 2:

River Bed	\$1,541,000	\$177,000	---	---
River Banks	3,733,525	401,550	327,250	---
Services	<u>11,174,625</u>	<u>1,639,875</u>	<u>887,750</u>	<u>---</u>
Totals	\$16,449,150	\$2,218,425	\$1,215,000	---

Phase 2 Total = \$19,882,575

OPERATING COSTS

(B-6)

RIVERBED DEVELOPMENT--ALTERNATIVE I

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Waterway	1 2									
Armored Channel	1 2	500/A	300A 1,462A	150,000 731,000	354	177,000				
Armored Islands	1 2	1,500/A	40A 400A	60,000 600,000						
Horse Trails	1 2									
Phase I Carryover	2			210,000		177,000				

RIVERBANK DEVELOPMENT - ALTERNATIVE I

OPERATING COSTS

(B-7)

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Lakes	1	1,500/A	5A	7,500	10A	15,000				
	2		150A	225,000	30A	45,000	50A	75,000		
Parks	1	1,500/A	120A	180,000	95A	142,500				
	2		350A	525,000	35A	52,500	165A	247,500		
Secondary Channel, Streams & Tributaries	1									
	2	1,500/A	158A	237,000	80A	120,000				
Trails	1									
	2	1,500/A	1,160A	1,740,000						
Public Golf Course	1	1,500/A	95A	142,500						
	2		230A	345,000						
Cultural Institutions	1									
	2									
Neighborhood Improvements	1	225/A	635A	142,875						
	2		550A	123,750						
Parkways	1	5,900/mi	1 mi.	5,900	1 mi.	5,900				
	2		8 mi.	47,200	4.5 mi.	26,550	2.5	14,750		
Low Cost Housing	1									
	2									
Phase 1 Carryover	2			490,575		157,500				

OPERATING COSTS

(8-8)

SERVICES - ALTERNATIVE I

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Buses	1 2			320,000		110,000				
Police	1 2	125/A	295A 1380A	36,875 172,500	115A 270A	14,375 33,750	290A	36,250		
Fire	1 2	250/A	295A 1380A	73,750 345,000	115A 270A	28,750 67,500	290A	72,500		
Major Utilities	1 2	100/A	295A 1380A	29,500 138,000	115A 270A	11,500 27,000	290A	29,000		
Elementary Schools	1 2	1.5mil./ea.	3	4,500,000			1/2	750,000		
Magnet School	1 2	2000/student	2000	4,000,000						
Trash, Sewage, etc.	1 2			447,500		172,500		112,500		
Housing Programs	1 2			500,000 200,000						
Water Acquisition	1 2			135,000 2,270,000		45,000 1,526,000				
Water Pumping	1 2			65,000 300,000		20,000 209,500				
Phase 1 Carryover	2			140,125		54,625				

(B-10)

ALTERNATIVE II

Cost Estimate Summary
Acquisition, Construction, and One Time Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	\$35,520,000	\$4,800,000	\$80,000	\$17,080,000
River Banks	52,122,000	7,360,000	---	---
Services	<u>1,910,000</u>	<u>12,146,000</u>	<u> </u>	<u> </u>
Totals	\$89,552,000	\$24,306,000	\$80,000	\$17,080,000

Phase 2:

River Bed	\$160,250,000	\$57,680,000	\$270,000	\$23,700,000
River Banks	134,306,000	44,100,000	26,270,000	10,600,000
Services	<u>52,220,000</u>	<u>564,000</u>	<u>4,406,750</u>	<u> </u>
Totals	\$346,776,000	\$102,344,000	\$30,946,750	\$34,300,000

Total - Phase 1 and Phase 2 = \$646,384,000

ACQUISITION, CONSTRUCTION, AND ONE TIME COSTS

(B-11)

RIVERBED DEVELOPMENT - ALTERNATIVE II

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Waterway, Lakes and Ponds	1	90,000/A	74 A	6,660,000	20A	1,800,000				
	2		526A	47,340,000	130A	11,700,000			150A	13,500,000
Grassed Channel, Parks, and Islands	1	60,000/A	260A	15,600,000	40A	2,400,000				
	2		1340A	81,020,000	385A	23,100,000			170A	10,200,000
Golf Courses (public)	1 2	7 mil. ea.			1	7,000,000				
Sediment Basin	1 2	14 mil. ea.								14,000,000
Drop Structures	1	1.5 mil. ea.	2	3,000,000					2	3,000,000
	2		3	4,500,000						
Pumps, Wells, Etc.	1	80,000 ea.	4	360,000	1	80,000	1	80,000	1	80,000
	2				12	1,080,000	3	270,000		
Land Acquisition	1		220 A	6,600,000	13 A	520,000				
	2		913 A	27,390,000	370 A	14,800,000				

ACQUISITION, CONSTRUCTION, AND ONE TIME COSTS

(B-12)

RIVERBANK DEVELOPMENT - ALTERNATIVE II

ITEM	Phase Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Lakes	1 2	90,000/A	60A	5,400,000	5A	450,000				
Parks	1 2	30,000/A	70A 330A	2,100,000 9,900,000	65A 145A	1,950,000 4,350,000	40A	1,200,000		
Equestrian Center	1 2	6,000/A	30A	180,000	25A	150,000				
Wildlife Preserve	1 2	20,000/A							400A	8,000,000
Public Golf Course	1 2	3mil. ea.	2 (440A)	6,000,000			1 (220A)	3,000,000		
State Fairground	1 2	2,400/A	175	3,920,000						
Cultural Institutions	1 2									
Neighborhood Improvements	1 2	22,400/A	400A 45A	8,960,000 1,008,000						
Parkways	1 2	1,300,000/mi	3 mi (43.8A) 18 mi (262.8A)	3,900,000 23,400,000	1 mi (14.6A) 8 mi (116.8A)	1,300,000 10,400,000	2 mi (29A)	2,600,000	2 mi (29A)	2,600,000
Low Cost Housing	1 2			14,800,000 6,810,000						
Land Acquisition - Public Use	1 2		172A 675A	5,160,000 20,250,000	20A 123A	800,000 4,920,000				
Land Acquisition - Private Use	1 2		191A 666A	5,742,000 21,978,000	40A 284A	1,600,000 11,760,000	201A	11,540,000		
Site Preparation - Private Use	1 2	26,000/A	290A 1,130A	7,540,000 29,380,000	470A	12,220,000	305A	7,930,000		

ACQUISITION, CONSTRUCTION, AND ONE TIME COSTS

(8-13)

SERVICES - ALTERNATIVE II

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Buses	1 2									
Police	1 2	50/A	600A 1,700A	30,000 60,000	40A 470A	2,000 23,500	305A	15,250		
Fire	1 2	100/A	600A 1,200A	60,000 120,000	40A 470A	4,000 47,000	305A	30,500		
Major Utilities	1 2	200/A	600A	120,000 10,240,000	470A	120,000 94,000	305A	61,000		
Elementary Schools	1 2		5	20,000,000			1	4,000,000		
Magnet School (renov., equip. + furn.)	1 2		1	20,000,000						
Trash, Sewage, etc.	1 2									
Housing Programs	1 2			1,700,000 600,000	15 Fam.	60,000				
Land Acquisition	1 2		30A	1,200,000	5A	400,000	5A	300,000		

ALTERNATIVE II

(B-14)

Cost Estimate Summary
Operating Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	\$511,000	\$90,000	---	---
River Banks	212,700	5,900	---	---
Services	<u>1,154,000</u>	<u>378,000</u>	<u>---</u>	<u>---</u>
Totals	\$1,877,700	\$473,900	---	---

Phase 1 Total = \$2,351,600

Phase 2:

River Bed	\$3,310,000	\$1,192,500	---	\$480,000
River Banks	1,574,025	278,100	\$401,800	11,800
Services	<u>16,820,500</u>	<u>2,270,250</u>	<u>1,620,000</u>	<u>600,000</u>
Totals	\$21,704,525	\$3,740,850	\$2,021,800	\$1,091,800

Phase 2 Total = \$28,558,975

OPERATING COSTS

(B-15)

RIVERBED DEVELOPMENT - ALTERNATIVE II

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Waterway, Lakes and Ponds	1	1,500/A	74A	111,000	20A	30,000				
	2		526A	789,000	130A	195,000			150A	225,000
Grassed Channel, Parks, and Islands	1	1,500/A	260A	390,000	40A	60,000				
	2		1,340A	2,010,000	385A	577,500			170A	255,000
Golf Courses	1	1,500/A								
	2				220A	330,000				
Sediment Basin	1 2									
Drop Structures	1 2									
Pumps, Wells, Etc.	1 2									
Trails	1 2	500/mi.	20 mi	10,000						
Phase 1 Carryover	2			511,000		90,000				

RIVERBANK DEVELOPMENT - ALTERNATIVE II

OPERATING COSTS

(B-16)

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Lakes	1 2	1,500/A	60A	90,000	5A	7,500				
Parks	1 2	1,500/A	70A 330A	105,000 495,000	145A	217,500	40A.	60,000		
Public Golf Course	1 2	1,500/A	440A	660,000			220A	330,000		
Cultural Institutions	1 2									
Neighborhood Improvements	1 2	225/A	400A 45A	90,000 10,125						
Parkways	1 2	5,900/mi.	3 mi. 18 mi.	17,700 106,200	1 mi. 8 mi.	5,900 47,200	2 mi.	11,800	2 mi.	11,800
Low Cost Housing	1 2									
Phase 1 Carryover	2			217,700		5,900				

OPERATING COSTS

(B-17)

SERVICES - ALTERNATIVE II

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
Buses	1 2			320,000		110,000				
Police	1 2	125/A	600 A 1,200 A	75,000 150,000	40 A 470 A	5,000 58,750				
Fire	1 2	250/A	600 A 1,200 A	150,000 300,000	40 A 470 A	10,000 117,500				
Major Utilities	1 2	100/A	600 A 1,200 A	60,000 120,000	40 A 470 A	4,000 47,000				
Elementary Schools	1 2	1.5 mil. ea.	5	7,500,000			1	1,500,000		
Magnet School	1 2	2,000/student	2,000	4,000,000						
Trash, Sewage, etc.	1 2			812,500		30,000 225,000		120,000		
Housing Programs	1 2			500,000 150,000						
Water Acquisition	1 2			307,300 2,843,200		71,000 1,067,800				
Water Pumping	1 2			136,400 371,100		28,700 99,300				
Phase 1 Carryover	2			654,000		378,000				

PRIVATE DEVELOPMENT AREAS - ALTERNATIVE II

USE	TOTALS				WITHIN PARKWAY AND WITHIN FLOODPLAIN				WITHIN PARKWAY AND OUTSIDE FLOODPLAIN				OUTSIDE PARKWAY AND WITHIN FLOODPLAIN				OUTSIDE PARKWAY AND OUTSIDE FLOODPLAIN			
	Phx	Mesa	Tempe	S.R.	Phoenix	Mesa	Tempe	S.R.	Phoenix	Mesa	Tempe	S.R.	Phoenix	Mesa	Tempe	S.R.	Phoenix	Mesa	Tempe	S.R.
Commercial	70	0	25	0	15				45								10		25	
C. Rec.	40	0	75	30	20		30		10		15	30					30			
Hotel/Resorts	235	15	60	0	225	15	55												5	
Golf	275	150	0	0	125				150	150										
Ind.	595	50	370	175	65	25	160	75		25		100	240		55		290		155	
I.O.	200	0	0	0	155												45			
I.O.R.	370	0	35	0	185				125								60		35	
OFF	90	0	0	0	90															
H.D.R.	345	0	120	0	105		120		145				5				90			
L.D.R.	590	440	150	0	20		150			240			155				415			
Exposition	80	0	0	0	80															
Domed Stadium	250	0	0	0									250							

WITHOUT SPECIAL RECLAMATION OF THE RIO SALADO

(B-19)

Cost Estimate Summary
Acquisition, Construction, and One Time Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	---	\$12,800,000	---	---
River Banks	\$8,860,000	4,290,000	\$7,370,000	---
Services	<u>228,900</u>	<u>9,046,900</u>	<u>14,000</u>	<u>---</u>
Totals	\$9,088,900	\$26,136,900	\$7,384,000	---

Phase 1 Total = \$12,609,800

Phase 2:

River Bed	---	\$12,000,000	---	---
River Banks	\$3,720,000	6,050,000	\$5,770,000	---
Services	<u>343,350</u>	<u>70,350</u>	<u>21,000</u>	<u>---</u>
Totals	\$4,063,350	\$18,120,350	\$5,791,000	---

Phase II Total = \$27,974,700

Total - Phase 1 and Phase 2 = \$70,584,500

WITHOUT SPECIAL RECLAMATION

Acquisition, Construction,
and One Time Costs

(8-20)

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
RIVERBED:										
Armored Channel	1 2	4 mil./mi.			3.2 mi. 3 mi.	12,800,000 12,000,000				
RIVERBANK:										
Lakes	1 2	90,000/A			10 A 30 A	900,000 2,700,000				
Parks	1 2	30,000/A			95 A 35 A	2,850,000 1,050,000		0 2,400,000		
Equestrian Center	1 2	6,000/A	50 A	300,000 0	90 A	540,000 0				
Public Golf	1 2	3 mil. ea.	1	3,000,000 0			1	3,000,000 0		
Roads/Parkway, Trails	1 2			1,000,000 2,600,000		0 2,300,000	2.5 mi. 2.5 mi	3,250,000 3,250,000		
Land Acquisition (Public Use)	1 2		14 A	560,000 1,120,000			28 A 28 A	1,120,000 1,120,000		
Land Acquisition (Private Use)	1 2		100 A	4,000,000 0						
SERVICES:										
Police	1 2	50/A	654 A 981 A	32,700 49,050	134 A 201	6,700 10,050	40 A 60 A	2,000 3,000		
Fire	1 2	100/A	654 A 981 A	65,400 98,100	134 A 201 A	13,400 20,100	40 A 60 A	4,000 6,000		
Utilities	1 2	200/A	654 A 981 A	130,800 196,200	201 A	9,026,800 40,200	40 A 60 A	8,000 12,000		

WITHOUT SPECIAL RECLAMATION OF THE RIO SALADO

(B-2)

Cost Estimate Summary
Operating Costs

Phase 1:

	<u>Phoenix</u>	<u>Tempe</u>	<u>Mesa</u>	<u>Salt River Indian Community</u>
River Bed	---	\$150,000	---	---
River Bank	\$148,400	157,500	\$314,750	---
Services	<u>310,650</u>	<u>63,650</u>	<u>19,000</u>	<u>---</u>
Totals	\$459,050	\$371,150	\$333,750	---

Phase I Total = \$1,163,950

Phase 2:

River Bed	---	\$300,000	---	---
River Bank	\$160,200	298,400	\$449,500	---
Services	<u>776,625</u>	<u>159,125</u>	<u>47,500</u>	<u>---</u>
Totals	\$936,825	\$757,525	\$497,000	---

Phase II Total = \$2,191,350

WITHOUT SPECIAL RECLAMATION

OPERATING COSTS

(B-22)

ITEM	Phase 1 Phase 2	Unit Cost	PHOENIX		TEMPE		MESA		SALT RIVER INDIAN COMM.	
			Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
RIVERBED:										
Armored Channel	1 2	500/A				150,000 150,000				
RIVERBANK:										
Lakes	1 2	1,500/A			10 30	15,000 45,000				
Parks	1 2	1,500/A			95 35	142,500 52,500	80	0 120,000		
Equestrian Center	1 2									
Public Golf	1 2	1,500/A	95	142,500			200	300,000 0		
Roads/Parkway	1 2			5,900 11,800		0 5,900		14,750 14,750		
Trails	1 2	1,500 A				0 37,500				
SERVICES:										
Police	1 2	125/A	654 981	81,750 122,625	134 201	16,750 25,125	40 60	5,000 7,500		
Fire	1 2	250/A	654 981	163,500 245,250	134 201	33,500 50,250	40 60	10,000 15,000		
Utilities	1 2	100/A	654 981	65,400 98,100	134 201	13,400 20,100	40 60	4,000 6,000		
PHASE I CARRYOVER	2			459,050		371,150		333,750		

Appendix C - Economics

Table C-1

ESTIMATES OF LAND ABSORPTION POTENTIALS WITHIN
THE RIO SALADO DEVELOPMENT DISTRICT
(acres)

Use	Alternative I			Alternative II		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Light Industrial	400	625	1,025	500	900	1,400
Low Density Residential ^{2/}	--	720	720	--	1,200	1,200
High Density Residential ^{1/}	65	390	455	75	580	655
Office	10	100	110	30	150	180
Retail	10	100	110	5	225	230
Commercial Recreation	25	50	75	25	85	100
Hotel	400 rooms	1,200 rooms	1,600 rooms	400 rooms	2,400 rooms	2,800 rooms

^{1/} Average density is 22 units per acre.

^{2/} Average density is 5 units per acre.

Source: Economics Research Associates.

Table C-2

AREAS DEVELOPED FOR PRIVATE USE
(Acres)

Use	Future Development Without Special Reclamation			Alternative I			Alternative II		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Light Industrial	700	1,050	1,750 ^{1/}	265	530	795	190	1,080	1,270
Low Density Residential	80	120	200	0	715	715	0	1,180	1,180
High Density Residential	14	21	35	65	390	455	20	605	625
Office	0	0	0	10	85	95	25	125	160
Retail	12	18	30	5	45	50	5	90	95
Commercial Recreation	0	0	0	10	102 ^{2/}	20	10	105	115
Hotel	22	33	55	55 ^{3/}	54 ^{4/}	60	56 ^{5/}	107 ^{6/}	15
Resort Hotel	0	0	0	0	115 ^{5/}	115	0	295 ^{8/}	295
TOTAL	828	1,242	2,070	410	1,895	2,305	255	3,490	3,755

^{1/} Includes light and heavy industry.

^{2/} Includes 10 acres on Salt River Indian Community which is not taxable.

^{3/} One conference hotel.

^{4/} One hotel.

^{5/} Two resort hotels.

^{6/} One hotel.

^{7/} Two hotels.

^{8/} Four resort hotels.

Source: Carr-Lynch Associates and Economics Research Associates.
2945A

Table C-4

RIO SALADO TAX INCREMENT FINANCING MODEL-ALTERNATIVE 2

VERSION 1.8 1/21/83

PARAMETERS

RATIO OF ASSESSED VALUE TO CONSTRUCTION COST	N.A. :1
ANNUAL INDUCED APPRECIATION FROM DEVELOPMENT	5 %
STARTING TAX RATE (PER \$100 VALUE)	10.00 \$
ANNUAL RATE OF TAX INCREASE	0 %
LAG FROM CONSTRUCTION TO TAX COLLECTION	1 YEAR
INTEREST RATE FOR BOND ISSUES	N.A. %
AMOUNT OF BOND ISSUE (\$000)	N.A. \$
MATURITY OF BOND(S) FIRST ISSUE	N.A. YEARS
SECOND ISSUE	N.A. YEARS
REINVESTMENT RATE FOR CARRY FORWARD ACCOUNT	N.A. %

(ALL FIGURES IN \$000'S)

YEAR/ PHASE	NEW ASSESSED VALUE INCREMENT	CUMULATIVE ASSESSED VALUE INCREMENT	TAX RATE (/ \$00)	CUMULATIVE TAX INCREMENT
1/I	500	500	10.00	0
2/I	500	1025	10.00	50
3/I	1000	2076	10.00	103
4/I	1000	3180	10.00	208
5/I	1000	4339	10.00	318
6/I	3000	7556	10.00	434
7/I	5000	12934	10.00	756
8/I	7000	20581	10.00	1293
9/I	7000	28610	10.00	2058
10/I	9000	39040	10.00	2861
11/II	14000	54992	10.00	3904
12/II	18000	75742	10.00	5499
13/II	32000	111529	10.00	7574
14/II	37000	154105	10.00	11153
15/II	41000	202810	10.00	15411
16/II	37000	249951	10.00	20281
17/II	28000	290448	10.00	24995
18/II	28000	332971	10.00	29045
19/II	28000	377619	10.00	33297
20/II	23000	419500	10.00	37762
21/II	23000	463475	10.00	41950
22/II	23000	509649	10.00	46348
23/II	23000	558132	10.00	50965
24/II	23000	609038	10.00	55813
25/II	23000	662490	10.00	60904
TOTALS	436000	662490		60904
		CUMULATIVE TOTAL		452980

SOURCE: ECONOMICS RESEARCH ASSOCIATES

Table C-5
CONSTRUCTION EMPLOYMENT IMPACTS

	Future Development Without Special Reclamation			Alternative I			Alternative II		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Total Cost of Construction (000)									
Public ^{1/}	42,610	27,975	70,585	137,830	292,370	430,200	95,600	389,830	485,430
Private ^{2/}	238,000	357,000	595,000	238,400	1,128,700	1,367,100	158,300	2,020,300	2,178,600
Total Cost	280,610	384,975	665,585	376,230	1,421,070	1,797,300	253,900	2,410,130	2,664,030
Construction Payroll (000) ^{3/}	140,305	192,488	332,793	188,115	710,535	898,650	126,950	1,205,065	1,332,015
Employment (Person Years) ^{4/}	7,015	9,624	16,639	9,406	35,527	44,933	6,348	60,253	66,601
Average Employment	702	642	--	941	2,368	--	635	4,020	--

^{1/} Carr-Lynch Associates. Does not include cost of construction of upstream dams.

^{2/} ERA estimates based on acres developed by use.

^{3/} Estimated at 50 percent of construction expenditures.

^{4/} Based on an average annual salary of \$20,000.

Source: Economics Research Associates.

Table C-6

LEVELS OF NEW EMPLOYMENT BY INDUSTRY
IN RIO SALADO^{1/}

Category	Future Development Without Special Reclamation		Alternative I		Alternative II	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2 ^{1/}
	Industry	10,500	26,250	7,950	23,850	6,600
Office	0	0	600	5,700	2,100	9,600
Retail	540	1,350	225	2,250	225	4,500
Hotel	225	225	225	450	170	1,515
TOTAL	13,765	27,825	9,000	32,250	9,095	53,715

Note: Based on the following employee per acre factors:
 industry - 30 (15 per acre without special reclamation);
 office - 60; retail - 45. Hotel employment is estimated at 56
 employees per 100 rooms.

^{1/} Represents cumulative employment levels at the end of each phase.

Source: Economics Research Associates.

Table C-7

PRIVATE AREAS DEVELOPED WITHIN THE CURRENT FLOOD PLAIN
(Acres)

Use	Alternative I			Alternative II		
	Phase 1	Phase 2	Total	Phase 1	Phase 2	Total
Industrial	170	245	415	205	430	635
Low Density Residential	0	370	370	0	325	325
High Density Residential	0	145	145	20	285	305
Office	0	55	55	30	80	110
Retail	0	0	0	5	10	15
Commercial	10	10	20	10	40	50
Hotel	50	0	50	5	0	5
Resort Hotel	0	55	55	0	295	295
Private Golf	<u>0</u>	<u>120</u>	<u>120</u>	<u>0</u>	<u>425</u>	<u>425</u>
TOTAL	230	1,000	1,230	275	1,890	2,165

Source: Carr-Lynch.

Table C-8

INCREASE IN POPULATION, SCHOOL AGE
CHILDREN, AND DWELLING UNITS

	<u>Population</u>	<u>School Age Children</u>	<u>Dwelling Units</u>
Alternative 1			
Phase 1	4,985	1,300	2,395
Phase 2	28,260	6,425	12,990
TOTAL	33,245	7,725	15,385
Alternative 2			
Phase 1	4,550	1,605	1,940
Phase 2	42,025	9,180	19,360
TOTAL	46,575	10,785	21,300

Source: Economics Research Associates.

RIO SALADO LAND LEASE MODEL-ALTERNATIVE 1
 VERSION 1.0 1/20/83
 PARAMETERS

ANNUAL LEASE PAYMENTS BASED ON 10 % OF LAND VALUE

=====

(ALL FIGURES IN \$000'S)

YEAR/ PHASE	NEW		
	VALUE OF LAND LEASED	INCREMENT OF LEASE PROCEEDS	CUMULATIVE LEASE PROCEEDS
1/I	0	0	0
2/I	600	60	60
3/I	600	60	120
4/I	1000	100	220
5/I	2000	200	420
6/I	4000	400	820
7/I	6000	600	1420
8/I	12000	1200	2620
9/I	12000	1200	3820
10/I	12000	1200	5020
11/II	21000	2100	7120
12/II	21000	2100	9220
13/II	21000	2100	11320
14/II	21000	2100	13420
15/II	21000	2100	15520
16/II	21000	2100	17620
17/II	21000	2100	19720
18/II	21000	2100	21820
19/II	21000	2100	23920
20/II	21000	2100	26020
21/II	21000	2100	28120
22/II	21000	2100	30220
23/II	21000	2100	32320
24/II	21000	2100	34420
25/II	21000	2100	36520

TOTALS	365200	-----	36520
	CUMULATIVE TOTAL		341820

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SOURCE: ECONOMICS RESEARCH ASSOCIATES

RIO SALADO LAND LEASE MODEL-ALTERNATIVE 2
 VERSION 2.0 1/20/83
 PARAMETERS

ANNUAL LEASE PAYMENTS BASED ON 10 % OF LAND VALUE

=====

(ALL FIGURES IN \$000'S)

YEAR/ PHASE	NEW		
	VALUE OF LAND LEASED	INCREMENT OF LEASE PROCEEDS	CUMULATIVE LEASE PROCEEDS
1/I	600	60	60
2/I	600	60	120
3/I	1200	120	240
4/I	1200	120	360
5/I	1200	120	480
6/I	1300	130	610
7/I	6000	600	1210
8/I	8000	800	2010
9/I	8000	800	2810
10/I	14000	1400	4210
11/II	19000	1900	6110
12/II	34000	3400	9510
13/II	47000	4700	14210
14/II	51000	5100	19310
15/II	57000	5700	25010
16/II	52000	5200	30210
17/II	37000	3700	33910
18/II	37000	3700	37610
19/II	32000	3200	40810
20/II	32000	3200	44010
21/II	32000	3200	47210
22/II	32000	3200	50410
23/II	32000	3200	53610
24/II	32000	3200	56810
25/II	32000	3200	60010

TOTALS	600100	-----	60010
	CUMULATIVE TOTAL		540860

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SOURCE: ECONOMICS RESEARCH ASSOCIATES