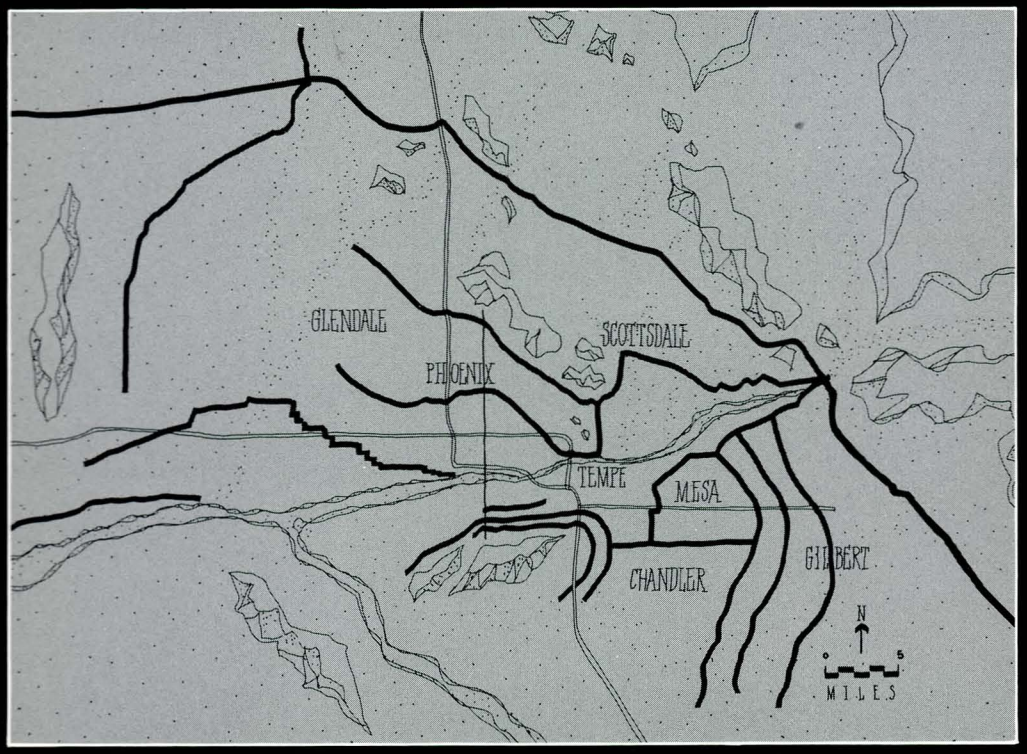
Metropolitan Canals

A Regional Design Framework



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The National Endowment for the Arts

The Junior League of Phoenix

The Salt River Project

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- City of Tempe
- City of Mesa
- City of Scottsdale
- City of Chandler
- City of Glendale
- Town of Gilbert

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Executive Summary

Introduction

This report is the final product of the Arizona State University (ASU) Metropolitan Canal Study that was funded by the National Endowment for the Arts (NEA), the Salt River Project (SRP), and seven Valley Cities (Chandler, Gilbert, Glendale, Mesa, Phoenix, Scottsdale, and Tempe). The grant was obtained in 1988 by a design team in the ASU College of Architecture and Environmental Design with the help and support of the Junior League of Phoenix, who coordinated support from many governmental entities and interested groups. From August 1988 through March 1990, SRP and these cities participated in the formulation of the regional concept and design guidelines set forth within this report. This cooperative effort, facilitated by the Junior League of Phoenix, is the beginning of a lengthy process of creating a regional canal amenity that will enhance the Valley's urban environment.

The presence of an extensive canal system flowing through several desert cities is unique. The physical elements which distinguish the Salt River Valley Canal System are:

- the massive scale and the varied land use context
- the contrast with the Sonoran Desert
- the strong linear character
- the potential for a pedestrian and bicyclist system without automobile interference
- the potential for private / public partnerships in development, and
- the identity as the Valley's most significant engineering achievement.

The Metropolitan Canal Study addresses the issue of "place-making" in a growing, relatively new suburban region of over two million people. To strengthen the process of "place-making" the study provides design guidelines that are appropriate to the uniqueness of the area. The project has the potential to redefine the current land-use patterns in the Valley, resulting in a better environment and quality of lifestyle. It concludes that "place-making" in suburban culture can be accomplished in a responsible manner. The Metropolitan Canal Study maintains that the preservation, integration and enhancement of the canal system affords the greatest opportunity to redirect suburban low-density growth and to provide a physical catalyst for the next level of improved urban environmental quality.

The choices we make today regarding these canals will affect future generations for years to come. The direction we provide must not be determined by municipal and political boundaries alone. The multiple use of the canals should be accomplished within a regional framework, which is environmentally responsible, and that ensures a quality of life beneficial to citizens of the Valley.

Regional Planning and Design Framework

The ASU Metropolitan Canal Study identifies seven areas of fundamental importance for the creation of a regional design framework. These seven fundamental urban design concepts provide the structure for the subsequent principles.

The concepts of Preservation, Integration, Accessibility, Identity, Continuity, Diversity and Safety provide a regional design framework. Using these as a basis, each Valley city should develop site-specific design guidelines. The scale and the multiple-use potential of the entire 181-mile canal system requires further in-depth canal studies and resource investments by each of the Valley cities.

Preservation

The canals have significant historic importance. Other than the street system, the canals are one of the only public open-space systems common to all Valley cities. An open water delivery system within the Valley provides an unique visual contrast to the desert environment. These unique historic, public and visual qualities, if preserved, could provide a framework for a better quality of urban living.

This study recommends enhancement and increased multiple use as the best strategy to assure that the open water system of canals will be preserved.

The preservation design principles are organized into three major categories:

- Public Realm
- Historic Artifact
- Visual Character

Integration

If the canals are not integrated with the social lives of people and the physical infrastructure of the Valley, multiple-use development of the canal system will falter, coordination will be lacking, and an opportunity for environmental enrichment will be lost. Integration implies simultaneous coordination of many factors: natural drainage washes, built streets, utilities and buildings, and invisible traditions, values, social structure and history. By coordinating enhancement of the canal system with these other systems, Valley landmarks like the Papago Buttes, Camelback Mountain, South Mountain, as well as parks, schools, and even shopping areas will be more accessible by bicycle and on foot. The landscape quality of the canal environment will also be improved for passive multi-purpose use.

Accessibility

Accessibility to the canal system is essential to reinforcing and preserving the system as a valuable public resource. Accessibility is not only physical accessibility, but visual and temporal as well. To create a truly accessible canal system the following factors should be considered:

- continuous public accessibility along the length of the canal
- barrier-free access for the handicapped
- maximum public access to the canal from adjacent land
- preservation of the existing and the definition of new view corridors of the canal water and bank
- access provided regardless of time of day.

Identity

The canals have the potential of becoming a major popular regional image for the Valley, similar to the civic parks and landmarks of other great cities. The identity of the canal is tied to its primary characteristics:

- its physical form as a linear element
- its character as an ironic juxtaposition of arid land and flowing water
- and as a realm of activities and experiences that touch both modern sensibilities like jogging and bicycling, and the historic roots of the Valley's agricultural and equestrian / western tradition.

In a region where tourism is one of the most important industries, a memorable image and a strong regional identity are essential. The canal system with a strong recognizable image can begin to develop a framework around which a higher quality of urban form can develop. This urban identity can provide a unique image for the relatively young Metropolitan Phoenix Area.

Continuity

Continuity of the canal system is important in order to reinforce the canals as a Valley-wide system. The use of the canal system as a continuous circulation system is important to unite and link all major recreation areas and other significant development nodes along the canal.

One of the major design concepts to provide continuity is unobstructed public circulation along the canal. Ideally, this public circulation path should be integrated as a joint use with other pathway requirements (i.e., maintenance roads) and it should provide as little interruption at arterial street crossings as possible. The specific design of continuous elements need not be identical throughout the entire system. However, a common framework or idea is essential if the canal system is to be perceived as one continuous system.

In addition to continuity in overall idea, a continuity of design standards from one city to the next should be implemented. One city's uniqueness might allow for responses different from another city's, but the general standards and review processes should be similar from one city to the next.

Diversity

Diversity of site and landscape development adds a visual richness to the physical environment. A specific site design should be responsive to the uniqueness of city and neighborhoods, adjacent land uses, and other special conditions while maintaining the overall canal system identity. There should be a diversity of individual site design. Also, a diversity of land uses is encouraged which provides an active public space along the canal. Active public uses such as parks, public buildings, retail and commercial uses, residential (single-family and multi-family) as well as mixed-use developments in appropriate locations will add a richness to the canal system environment.

Every design should adhere to the general principles while responding to the uniqueness of the situation (i.e., site, adjacent land uses, etc.).

Safety

Every use of the canal right-of-way should be planned to maximize public safety. The concept is to develop a safe canal environment that is accessible, popular and usable. This will require coordination with individual city standards and practices and canal owner / operators. To achieve support and advocacy for the canals, the public must be confident that concern for safety has shaped the environment. General areas of consideration - based on increased and high intensity of usage - that must be considered and resolved include:

- edge treatment of canal, especially for preventing falling into the canal and to facilitate the ability of people (and animals) to get themselves out of the canal
- appropriate surfaces for the type and amount of traffic (i.e., emergency vehicles, pedestrians, bicyclists, joggers, equestrians) as well as control of erosion
- appropriate lighting
- emergency communication, including "call boxes," and public telephones
- availability and distribution of drinking fountains, shade and seating
- canal user safety at canal and road crossings
- reliability and comprehensibility of signage
- coordination with utility public safety programs (electrical, telephone / telecommunications, gas, water, sewer, etc.).

Introduction

The Metropolitan Phoenix Area, which now occupies a major portion of the Salt River Valley, has changed from a small agriculture-based community to a major urbanized area. It includes nineteen cities and towns and has a total population of approximately 2.2 million. The most rapid population growth has occurred in a period of only about 30 years. Growth of this magnitude has brought tremendous changes to the Salt River Valley. These major changes in the character of the Valley require changes in the infrastructure that supports the urban form. The most fundamental piece of infrastructure within the desert southwest is an adequate water supply.

Water - and its controlled use - has been critical to the development of the Salt River Valley. When the Valley was an agricultural society, water was used largely for growing crops, but with rapid urbanization, new uses for that water have emerged that could represent the most striking change of all for the Valley. These new uses have spurred a re-evaluation of the canals to determine if new customers and the urban public are being properly served. As the Valley's cities urbanize, agricultural needs are diminishing. And accordingly, the more complex needs of new users will have to be accommodated in ways that maximize this precious water resource. As population densities increase, the need for open space and recreational outlets within cities will expand. The canals are a means to provide some of that needed recreational space. The space (the right-of-way) already exists, but must now be adapted and enhanced.

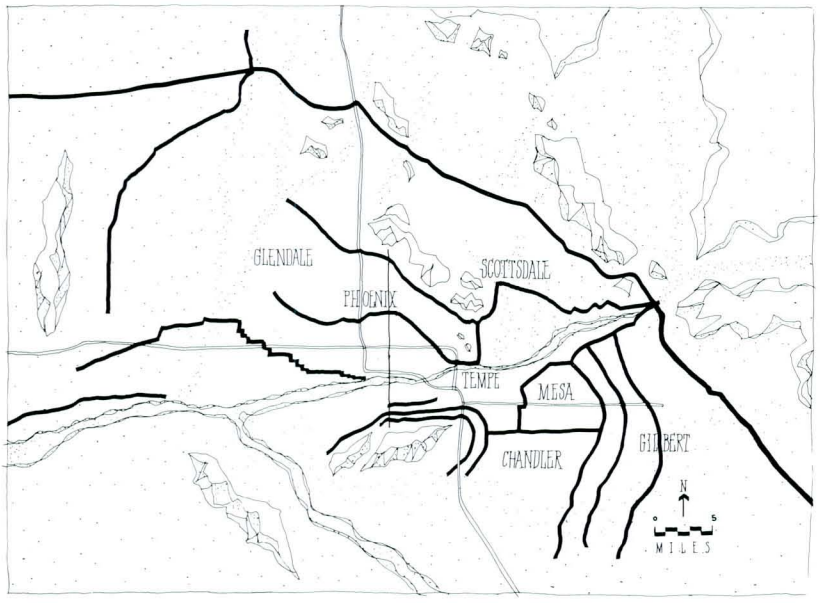


Illustration: Metropolitan Phoenix Canal System

The readily apparent need for water conservation in the Sonoran Desert underscores the rationale for the multiple-use approach to urban water courses. Currently, water flowing past neighborhoods and cities is in a sense being wasted since non-consumptive (or at least low consumptive) uses - aesthetic, promotional, and recreational - are being ignored. The canals only serve to deliver water (and in some cases assist in flood control). But, they should be subject to multiple uses as a conservation measure. Such visual resource management is consistent with the goals of other federal agencies. The end use of irrigation or household use is only one possibility; the water's aesthetic and recreational value should be exploited for maximum benefit to all citizens *before* the water reaches its end use. These uses in the long term could provide considerably more benefit than cost, with water being lost only to evaporation. At the same time as these new possibilities are being recognized, innovations in SRP's maintenance and operations procedures are being developed that will help the potential become a reality. These maintenance changes - which in the past have been a major barrier to development - will allow more public access to canal banks. With cooperation from all parties involved, the use of canal water and open space can be increased, while still fulfilling the utilitarian mission of delivering high-quality water, efficiently and economically.

In 1987, the Junior League of Phoenix, inspired by Scottsdale's Canal Bank Study, began a canal beautification project with a Valley-wide needs assessment. Its members have continued the project over the past three years by assisting in obtaining a National Endowment for the Arts (NEA) grant, and by developing a speaker's bureau to promote canal beautification and development at the grass roots level. The NEA grant monies and local matching funds were designated for a regional study of the canal system with the intent of developing regional design guidelines.

The canal design guidelines have been developed by the Arizona State University team of Professors Michael Fifield, Madis Pihlak, and graduate student research associate, Sharon Southerland. Professor Edward Cook helped in obtaining the NEA grant and contributed valuable assistance in discussions of ecological issues. The team received assistance and input from the Salt River Project, the Junior League of Phoenix, and the following cities: Phoenix, Tempe, Glendale, Mesa, Scottsdale, Chandler, and Gilbert. These groups not only contributed matching funds but also gave of their time and ideas to help develop the guidelines in a series of meetings over the past year and a half. The towns of Paradise Valley, Avondale, and El Mirage also participated in some of the meetings. Other representatives were the Maricopa County Flood Control District, the Army Corps of Engineers, the Arizona Department of Water Resources, and significant user groups and adjacent landowners.

The purpose of these guidelines is two-fold. First, they define a new *urban* role for the canals. They consider the canals from a new perspective: as an official public amenity. And they examine the canals' potential in this new role. Secondly, they view the canals as a *regional* public system and explore their connections with other open spaces, city centers, neighborhoods, and public attractions. The canal system has never been viewed from this perspective. These guidelines seek to identify, to preserve and to enhance the regional character of the 181-mile canal system so that:

- any portion of the system is in some way identifiable with the whole
- the system remains amenable to regional users
- the system creates a unique image for the whole Metropolitan Phoenix Area.

Preservation and enhancement of the canals will have multiple benefits. First, the value of water will increase as it becomes more important, more useful, and more purposeful. Second, it will create and enhance open-space opportunities. The canals will become open-space corridors not only creating linear parks, but also providing access to other underutilized open spaces. The urbanized area of the Valley sorely lacks regional recreation (such as bike routes) that is not totally dominated by the automobile. The canal system can provide an excellent auto-free environment for movement from one city to another.

Third, preservation and enhancement of the canals promote the rich historical legacy of the Valley's cities. Like the canals, it has too long been ignored. In fact, any history of the Valley must include the canals as the vital link to successful agriculture and subsequent urbanization. The historical ties of a major metropolis built on the ruins of a previous civilization give depth and authenticity to the image that the canals can portray.

Focusing on the water as an amenity, taking advantage of the recreational open space provided, and promoting historical ties have the potential to make a strong and unique regional image for the Valley that has a physical, functional base.

The Salt River Valley Canals

The Salt River Reclamation Project was created by an Act of Congress on June 17, 1902. However, the history of irrigation canals within the Salt River Valley originates with the Hohokam Indians centuries ago.

The Prehistoric Canal System

The Hohokam Indians occupied the riverine areas of central and southern Arizona from approximately 100 B.C. to 1450 A.D. During the first 800 years, the Hohokams established a sedentary, agriculture-based society. During this time, they also built a system of irrigation canals to spread the Salt River's waters beyond its banks. After the year 700, Hohokam society changed significantly, with new forms of art and architecture appearing. Major expansion of the irrigation system occurred between 700 and 1450 with a final system of over 300 miles of major canals and 950 miles of smaller canals (Doyle, 1987) connecting Hohokam villages with the Salt River's water source. Following the slope of the land toward the south and west, the canals spread across an area similar to today's Phoenix Metropolitan Region. Such an extensive system, which required substantial and sophisticated water management practices, is not known to have existed anywhere else in North America.

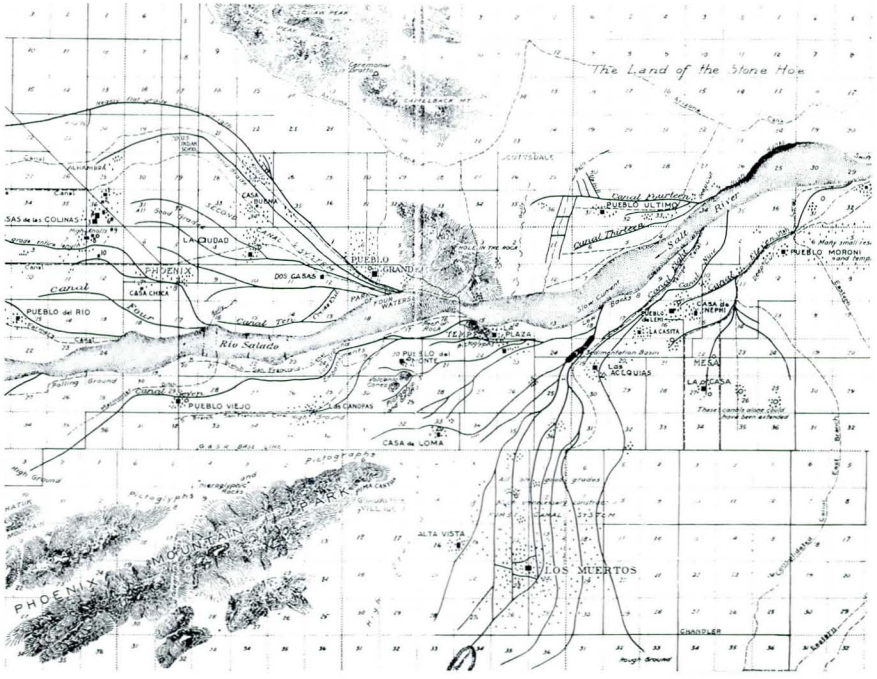


Illustration: Prehistoric Canal System
Courtesy of the Salt River Project

The prehistoric canals were basin-shaped, clay-lined channels ranging from four to ten feet across, with some (at Pueblo Grande) reaching 80 feet across (Doyle, 1987). From the Salt River, main canals branched into feeder channels that supplied the smaller laterals. Assuming the desert ecology was similar to undisturbed areas of today, the canal banks were dotted with cottonwoods, willows, native grasses, and farther from their banks, with mesquite and palo verde bosques.

From the late 1300s, practices of the Hohokam began to show a period of change, unrest, and decline, and by 1450 the Hohokam culture had mysteriously disappeared. Speculation on the reasons for this disappearance includes flood, famine, war, and significant change in the lifestyle and values of the people. Years later, other migrating Indians, finding ruins and the canal system that was left, gave their predecessors the name "Ho Ho Kam" - the people who have gone, and many of the Hohokam canals remained as ruins, "ribbons of brown soil" (Doyle, 1987) winding away from the Salt River. Today very few of these original canals remain. Evidence of these prehistoric residents and their canals can still be seen at the Pueblo Grande Museum, the Park of the Four Waters, and the Park of the Canals. All of these attractions border on modern canals, emphasizing the close ties between historic and modern water routes.

The Modern Era

The modern history of Phoenix does not begin until the late 1860s. In 1867, when Jack Swilling traveled from nearby Wickenburg through the Salt River Valley, he envisioned agricultural use of the flat valley floor if only it had a water supply. By 1868, the Swilling Irrigation Canal Company had been formed and had constructed a canal system using remnants of the Hohokam canals. The mythological phoenix bird was adopted by the first white settlers as a symbol of their community which grew out of the "ashes" of the previous Hohokam civilization.

Using the Jeffersonian National Land Survey to lay out parcels, surveyors soon began to create the gridiron framework that still serves the metropolitan area today. The arterial road grid is characteristically rectilinear without acknowledging topographical features or local values. From the start, the gridiron ignored the topography that the canals followed and did not reflect, in the layout of streets or subsequent development, the canals' historical importance to the people.

Over the next 25 years, life for the early settlers was a continual struggle for an adequate, dependable water supply. Floods, droughts, and disputes over water rights caused many farmers to give up and leave the Valley during the late 1800s. But those who stayed were destined to prosper. By the turn of the century, most of the canals in use today had been constructed. The population of Phoenix had reached over 5,500 and the cities of Mesa, Tempe, Glendale, and Phoenix had been incorporated. With the 1902 National Reclamation Act in place, the federal government became involved in sponsoring and organizing the construction of Roosevelt Dam. In 1903, the Salt River Valley Water Users' Association was created to manage the water supply that would result from damming the river. With a pledge of their land, these Valley farmers borrowed money from the federal government to build the dam and to buy out the individual canal companies, organizing what would become today's Salt River Project (SRP). The construction of the Theodore Roosevelt Dam (the largest masonry dam in the world) was completed in 1911, assuring a permanent water supply for years to come. A year later, in 1912, Arizona became a state. To this day, the Bureau of Reclamation (U.S. Federal Government) still owns many of the canals and adjacent rights-of-way, and the Salt River Project manages and operates those within its geographical boundary.

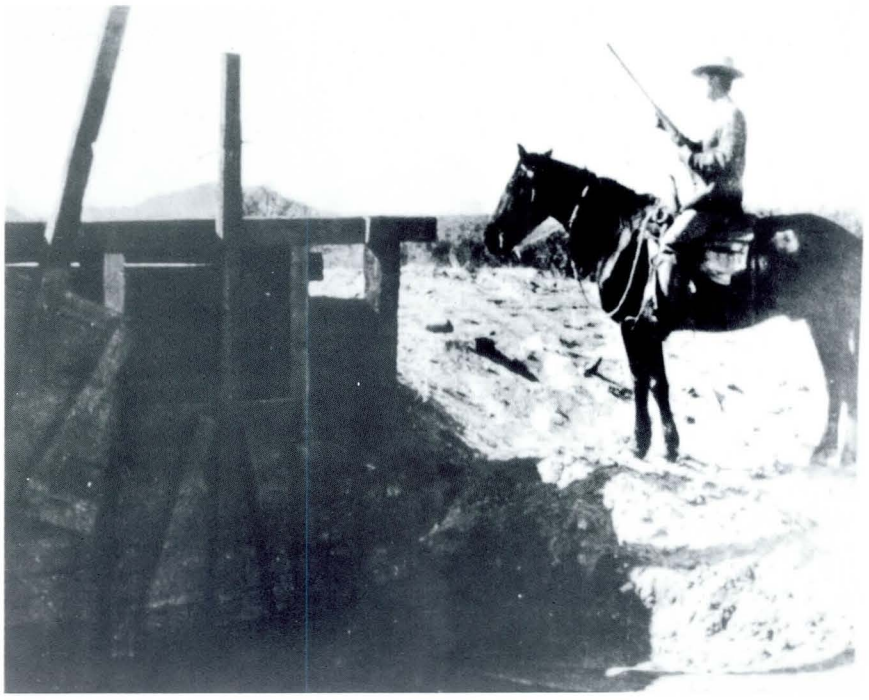
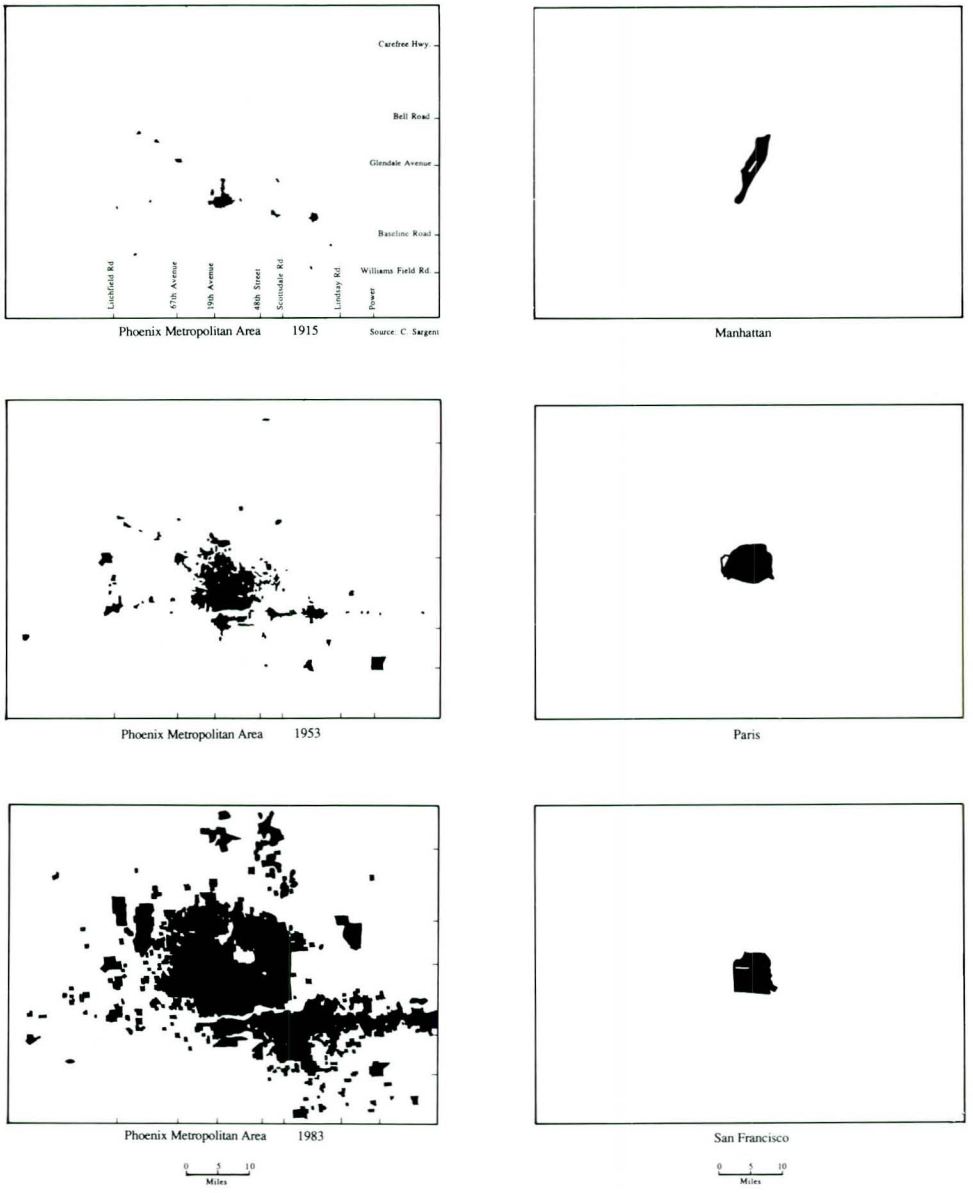


Photo: Early View of Water as Precious Commodity
Courtesy of the Salt River Project

Photo: Early View of Maintenance of a Canal
Courtesy of the Salt River Project

Early Urbanization

From its beginning in 1917, the Salt River Project - as a geographical entity - has remained relatively unchanged. For many years the growth of the Valley's cities has been an infill process on already irrigated lands, a pattern resembling the earlier prehistoric settlement. With the addition of new irrigation districts extending irrigated lands both east and west of the Project, the Valley's farmers and businessmen settled permanently. Phoenix continued to grow and by 1920 had almost 30,000 residents. This figure more than doubled by 1940 to a population of 65,000. That year also marked a change in the Valley's economy from an agricultural base to an industrial base. Land was still very cheap, contributing to low population density and a consequent reliance on the automobile. By 1950 the post-war boom raised the population to over 105,000; by 1960 it reached 440,000. The regional population of the Valley is now just over 2.2 million, and Phoenix has grown into the tenth largest city in the U.S.



Size Comparisons: Growth of Low-Density Metro Phoenix Area - Sizes of Other Cities in 1990

The Canals and Urban Form

Despite the dominance of the arterial road grid, the canals functioned as informal linkages and as barriers, thus affecting urban form. At one time or another, most cities used their canals as city limits and village boundaries, a practice which continues today. And while canals provided pathways between adjacent neighborhoods, they also acted as barriers between them. Minor streets ended in cul-de-sacs or turned into frontage roads when they met a canal. In one particular area, between Camelback Mountain and the Arizona Canal, the canal skewed the grid in a manner that is not on the normal north-south axis. This section of Phoenix was once a large citrus grove that depended on the Arizona Canal for irrigation and these streets express the importance of this historical connection.

In the past, some buildings and homes faced the canals. Those that did not face the canals often had easy access to the canals through back and side gates; and some eliminated fences altogether. Neighborhoods often provided additional public access points from alleys and from cul-de-sacs. This is still evident in some parts of Phoenix's Arcadia District. However, after 1960, such relationships with the canal became the exception. Overall orientation of new development was to the grid and not the canals.

In the first half of this century, people were more directly involved with the canals for their lifestyle and livelihood, and used them more for orientation and giving directions than they do now. Because of the uniqueness of the canals' departure from the grid, they functioned much more as landmarks at that time than they do today.

Photo: Early View of Canal
Courtesy of the Salt River Project

Physical Description

The operation of the canal system was turned over to the Salt River Valley Water Users Association in 1917. Canals at that time were smaller than those seen today. They had a trapezoidal cross-section, and were for the most part unlined. They were bordered by roads on both sides and were often shaded by grasses, willows, large cottonwoods, and salt cedars. They remained central to people's lives not only because of their economic benefit but also they encouraged social interactions. Canals were places to gather for informal conversations while watching children play. They were ever-changing, lively environments that offered children endless opportunities on hot afternoons. They were places that fostered self-discovery, environmental awareness, physical achievement, and social fulfillment. They were pathways for transportation, for driving, strolling and even floating, connecting neighborhoods and farms. Their cool oases of shade and water offered relief and were a perennial attraction in hot dusty settlements devoid of air conditioning or swimming pools. Neighborhoods and farms were laced with ditches that - on a smaller scale - encouraged active participation in water management among adults and exploratory play among children.

Photo: View of Canal with Shade Trees
Courtesy of the Salt River Project

A Period of Change

In the late 1950s and the 1960s, however, a series of events caused a drastic change in attitudes toward canal use and form. The apparent importance of canals in people's lives diminished markedly as newcomers to the Valley failed to recognize any connection between their daily lives and the water flowing past their backyards. Rules governing access to the canals changed in the 1960s as did the way in which those rules were reinforced by SRP and the various cities. A major influx of new residents in the Valley stimulated a new concern for safety. Parents demanded that ditches and canals be covered to prevent drownings. Despite the added cost and with the help of the federal government, many ditches and laterals were placed underground gradually over the twenty-year period, 1955-1975.

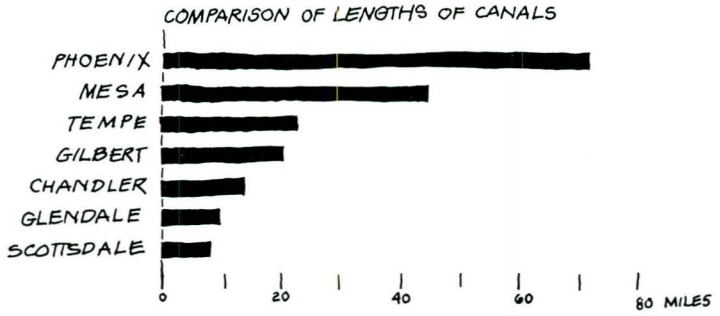
Many physical changes took place in the 1960s: tiling ditches, lining most canals with gunnite (sprayed concrete), and removing all vegetation including large cottonwoods that bordered many canals and ditches along streets. Two concerns prompted these changes: safety and a new interest in conserving water by eliminating seepage and thirsty plant roots.

In the mid-1960s the U. S. Bureau of Reclamation, Salt River Project, and local governments joined forces to draft formal Recreation Agreements that would permit certain types of recreation on canal banks and would specifically prohibit other types of use. At the same time, two other important activities occurred. Volunteers began developing the Sun Circle Trail - 110 miles of horseback riding trail (including horse bridges) encircling the Valley along the canal banks. This is still in use today and is the State Parks' primary trail system. Also, Maricopa County Parks and Recreation produced a study suggesting that a chain of "canal parks" be built adjacent to canals. Some of the parks built as a result of this effort were Canal Park, Cortez Park, Granada Park, Herberger Park, Kiwanis Park, and part of Papago Park. These parks were adjacent to the canals and used canal water for park lagoons. However, they were not well integrated with the canals and most failed to provide direct access to canal banks.

In the mid-1960s, passive types of recreation became increasingly popular as the Salt River Project received many complaints about the dangers of open water and the nuisance of dust and noise created by cars and motorcycles on canal banks. The Recreation Agreements stopped people from driving on canal banks, swimming in the canals, or engaging in other unsafe activities. At this time, public swimming pools became more prevalent within the Valley and many homes had private pools, so the attraction once held by the canals diminished considerably.

Another physical change occurred in the 1960s and 1970s: people moved to the Valley in greater numbers causing housing subdivisions to spring up on what had once been farm land. Homes adjacent to canals disregarded them, separated physically and visually with six-foot-high concrete block walls. Neighborhoods, which used city water for irrigation, developed in a manner that was oblivious to the canals just beyond their backyards. During this time, SRP tiled ditches in an agreement with respective cities, and plans were developed to enclose canals with high chain-link fences, or to bury them in large pipes. But exorbitant costs prevented the latter from taking place.

Today we still have 181 miles of open canals (not including the Central Arizona Project) running through desert, farms, neighborhoods, and city centers. They are generally quite clean, devoid of trash or vegetation. They provide open access for passive uses by the public and are occasionally used by fishermen, joggers, horseback riders, and strollers. Some neighborhoods make more use of their canals than others. Thanks to SRP's and other operators' diligent care of the canals, no major clean-up expense is required to proceed with beautification and development projects. Many cities encounter long-term expensive clean-up periods before they can begin developing their previously neglected waterfronts. Instead these canals are clean, efficient channels for water conveyance. Actually, SRP's solution to the problems of safety, nuisance uses, and vandalism has been effective in discouraging negative uses, while allowing in an informal way for public access and passive uses.



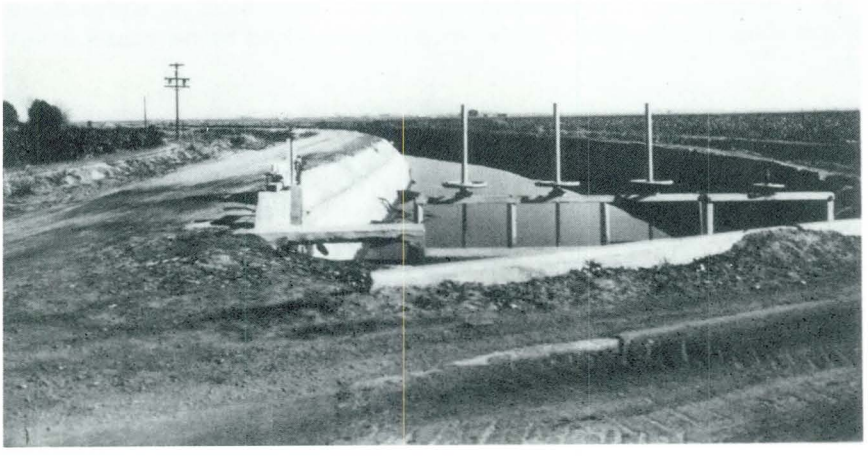


Photo: Typical Canal Today
Courtesy of the Salt River Project

Recent Developments

In the past few years, a grass-roots movement led by the Junior League of Phoenix has generated renewed interest in using the canals in more active ways. Cities are taking another look at the canals as existing amenities that could be used for recreational, cultural, and commercial purposes. At this point, the canals are at least mentioned in most cities' General Plans or Parks and Recreation Plans. Some projects along canal banks have already been completed, while others are in the planning stages.

Scottsdale completed a Master Agreement with Salt River Project (in May 1989) allowing improvements to be made on the canal right-of-way in conjunction with other city improvements - this is the first such agreement between SRP and a city. In downtown Scottsdale a new office / retail project, the Scottsdale City Centre, integrates building and canal by means of landscaped pathways along the bank and a pedestrian bridge over the canal linking the building to the street. In the planning stages is a renovation of the Safari Hotel that would also integrate with the Arizona Canal. Recently, the City of Scottsdale approved $5.7 million in capital improvement funds for a pilot project on a one-mile stretch of the Arizona Canal in the downtown area.

In Phoenix, the Arizona Biltmore Hotel has included the Arizona Canal as an integral part of its landscaping and overall design for a long time. The City of Phoenix has preserved some of its prehistoric canals through the Pueblo Grande Museum and the Park of Four Waters. Both parks border the modern-day Grand Canal where it meets the Old Cross-Cut Canal. Negotiations are currently underway to make improvements to the Pueblo Grande Museum using the water of the Old Cross-Cut Canal. Phoenix's Park and Recreation Department has taken advantage of canal routes for bike paths near the new Cross-Cut Canal, along the Arizona Canal between Cortez and Granada Parks, and along portions of the Highline Lateral near South Mountain. Phoenix planners have recently begun looking at the potential for a pilot project on a canal in their city and have formed a task force to select appropriate locations.

In Mesa, local citizens have worked hard to establish the Park of the Canals, which is an active archaeological site that contains canals from three different eras, and another canal-related park is in the planning stages. Mesa and Chandler are currently working together on landscaping the Western Canal (a lateral which is the boundary between these cities) as a connection between a neighborhood park and a junior high school. Along the Consolidated Canal, Chandler is planning a multi-use development, and their city residents have approved $1.6 million in bond money (May 1989) for developing linear parks along the Western and Consolidated Canals.

Tempe has made a pedestrian connection across the Western Canal linking two public schools, their parks, and adjacent neighborhoods. The Western Canal is also a popular recreation corridor running between the Tempe YMCA, the Ken MacDonald Golf Course, and Kiwanis Park. A study of Tempe's canals has begun recently, and Tempe is currently in the process of forming a Master Agreement with Salt River Project.

The Town of Gilbert's General Plan designates the canals as a part of the Town's planned network of open space including a bicycle and pedestrian circulation system. Also, any development adjacent to the canals must, as a condition of zoning, landscape the canal bank and provide an eight-foot-wide concrete bicycle path. In addition, an 80-acre park which incorporates the Western Canal has been developed and discussions are taking place for a another 80-acre park.

On the other side of the Valley, Glendale has completed a master plan for the Grand Canal Park which will cover approximately 60 acres. This linear park will connect with the New River Floodway near the Glendale Airport. The Glendale portion of the Arizona Canal Diversion Channel (ACDC) has been modified to become a wide swale that will serve both as flood control and park. In areas to the east of Glendale, the ACDC will be a large rectangular open concrete box approximately twenty-one-feet deep. In certain areas (around Central Avenue and around the Biltmore) it will be underground.

The ACDC is an important flood control project along the north bank of the Arizona Canal from 75th Avenue to 39th Street. Construction began in 1986 and is scheduled to continue until 1992. It will have a significant effect upon urban design in the City of Phoenix, and for that reason has been the subject of a great deal of study and concern. The U.S. Army Corps of Engineers is working with the city and local neighborhood groups to lessen the anticipated negative impact of the project on neighbors and canal bank users.

Salt River Project also has plans for incorporating the Grand Canal in the design of its new Papago Park Center. This plan is intended to be an example for others of ways to conserve water and to integrate the canal with new development.

All of these projects are a testimony to renewed interest in the canals as public amenity. Cities are not only looking at possibilities for their own future projects, but are also cooperating with each other to produce *regionally* sensitive projects. Salt River Project representatives have necessarily been active participants in these developments. A growing consensus recognizes that through increased use of the canals and their surrounding areas citizens can once again take advantage of a long-ignored asset in our desert community.

The Present Opportunity

Regional Context of the Canal System

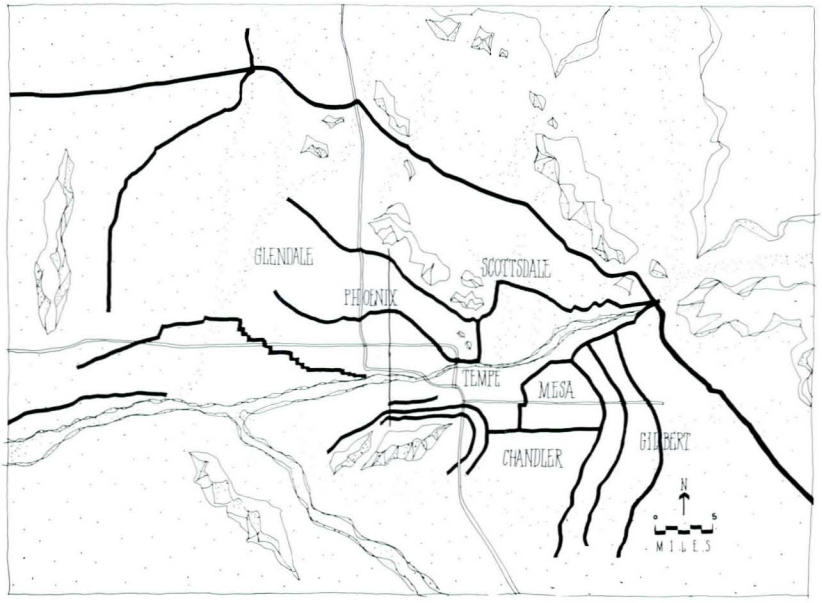
The canal system exists within a mixed urban and agricultural context. This land-use pattern and the prevailing pattern of natural systems affect how the canal system is used and perceived by the public.

The physical form of the Valley is an alluvial basin, occupying approximately 2,000 square miles. Its boundaries are the White Tank Mountains to the west, the Bradshaw Mountains to the northwest, the Superstition Mountains to the east, and the Estrella Mountains and Buckeye Hills to the south and west. The dry Salt River bed bisects the urban area. Prior to construction of dams and the creation of the canal system, the Salt River flowed perennially.

Approximately 1,040 square miles of the valley are now incorporated. Projections indicate that urbanization will spread to occupy the entire valley soon after the turn of the century. The current development density is low, when compared to most other large metropolitan areas. Projections indicate that the current population of approximately 2.2 million will reach 3.25 million by 2000.

The Canal System

This study addresses 181 linear miles of canals and laterals operated by SRP and other smaller canal operators. The study does not address the Central Arizona Project (CAP) Canal, but considers its recommendations to be appropriate despite the fact that the CAP has greater limitations for use and is controlled by a different agency. This study focuses upon canals and major laterals because they represent the most visible and usable component of the canal system. It recommends that other components, such as ditches and rights-of-way for piped segments, be integrated to provide a more comprehensive public-use network.



Valley Cities

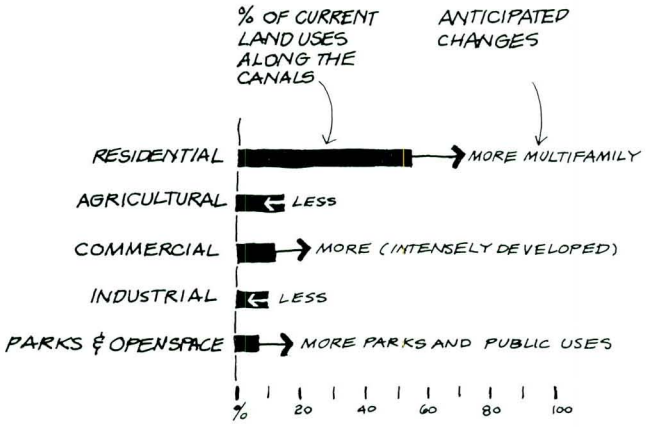
Each of the Valley cities, to some extent, depends upon water provided by the canal system, but until recently the canal system has not been an important part of planning for future community needs. Each city regulates land use adjacent to the canal rights-of-way. Several cities have initiated canal master plans to take full advantage of the canals as an amenity. Scottsdale has also entered into a master agreement with SRP to facilitate future development utilizing canal rights-of-way. Other cities are currently negotiating similar agreements.

In some cities, canals act as city boundaries. This presents a unique opportunity for joint development efforts. The canals may also serve as gateway or entry features if developed properly.

Land Use

The relationship between the canal system and adjacent land use is important. Each must recognize and take full advantage of the existence of the other. Canals pass through virtually every type of land use throughout the valley. Different land uses, and sometimes even different local situations, require varied responses.

An analysis of existing and proposed land uses adjacent to canals indicates a predominance of residential uses.



Transportation

Transportation is one of the most critical issues that the Valley faces in terms of future urban growth and development. An extensive network of freeways, improved public transportation, and the grid system of arterial streets will form a network for movement throughout the Valley.

The canal system is well suited for use as an alternate transportation corridor. Canal banks currently support, on a limited basis, passive recreational activities such as hiking, jogging, horseback riding, and some bicycling, but they do not function as transportation corridors or as links to existing transportation systems. In most cases, where canals cross existing transportation systems (e.g., freeways, arterial streets or railway lines), the latter act as barriers to continuous public access.

Parks and Open Space

Throughout the Valley a variety of parks and open spaces exist. Desert parks have been preserved in their natural state because of their inherent recreational and aesthetic value. In some cases, physical constraints precluded urban development of such parks. Parks have been developed primarily for active and passive recreation uses, and in some cases, for drainage functions. Other areas have remained undeveloped but may still be considered usable as public open space. The canal system fulfills some of the recreational needs of Valley residents by providing open-space corridors for passive recreational use. Future use will increase as improvements take place and awareness of the canals grows.

Waterfront and Waterway Precedents

The canal banks of the Metropolitan Phoenix Area differ from projects in other cities in terms of their scope and varied environments. No one project can provide a precedent but many projects address some of the same aspects facing the Valley's canal development. Among these aspects are:

- linearity
- linkages
- recreational trails at water's edge
- urban focus on waterfronts
- auto-free pedestrian environments
- implementation strategies.

The canal banks of the Metropolitan Phoenix Area differ from all other precedents (other than the Hohokam canals) because of their context - water moving within a series of modern desert cities - and because they present a significant engineering achievement with prehistoric ties.

Waterfront revitalization has been popular for over the past fifteen years in part because increased concern for the environment (in the 1970s) led to a re-examination of cities' relationships to their natural environments. Many examples of water-related redevelopment are now available, ranging from recreational trails through suburban and rural areas to highly urbanized harbor fronts. Many projects encompass both urban and suburban environments due to the length of their respective waterways.

Canals around the world have a common history of being built for utilitarian purposes - transport, flood control, or irrigation - that eventually became obsolete or redundant. Often after a period of decline and neglect, the canals have been restored or revived for new purposes - aesthetic, historical, romantic, and / or recreational. In the case of the Salt River Valley canals, a change in purpose has occurred as the Valley has urbanized and as agricultural irrigation needs have decreased.

Eight water-related projects have been selected for further study as precedents. They vary greatly in scope, history, and focus, but each has some possible application to the ASU Metropolitan Canal Study. They have been divided into categories of urban, linear recreational, and projects in progress.

Urban Precedents

San Antonio Paseo del Rio (*River Walk*)

San Antonio capitalizes upon a natural amenity, the San Antonio River, as a symbol and public image for the city. Its location within the central business district and the scope of the River Walk (three-and-a-half miles of channelized river in a "horseshoe" configuration) have proven to be manageable. The below-grade aspect of the river, approximately twenty feet below street level, not only provides a cooler microclimate but also gives the river park an identity and a feeling of enclosure. The concentration of development makes the channelized river, though only fifty feet wide, a memorable experience. The most important aspects of the River Walk design are: its distinct identity created through design continuity and its contrast with the rest of the city; its manageable scale; and its memorable name. In a tribute to its success, many subsequent waterfront projects throughout the U.S. have looked to San Antonio for inspiration.

Canals of Venice, Italy

Venice, Italy provides an historical precedent for canals in an urbanized environment. The city's only vehicular transportation system is based on canals. The Grand Canal is the most famous of the city's many canals: its reverse-curve configuration permits maximum frontage of buildings on the water. The canals, in some areas, are bordered with pedestrian walkways and, in others, are tangent to the walls of buildings. Raised bridges allow boats to pass underneath, creating a continuous network for water travel.

The Rideau Canal, Ottawa, Canada

The Rideau Canal in Ottawa, Ontario, completed in 1832, has a long history including commercial and military transport of goods and passengers. Today it is part of a large recreational network consisting of linear loops that connect parks, golf courses, and visitor attractions. Its waters provide a spectacular backdrop for government buildings in Canada's capital and a striking processional corridor for special public events. Its waterway and multiple-use pathways are especially popular with pleasure boaters, cyclists, skaters, and cross-country skiers. Authorities in Ottawa have made a special effort to maintain public access - physical and visual - to its water's edge and to public buildings along the shoreline. Extensive bikeways are significant because of their generous ten-foot width.

Canals of the Netherlands and New Towns

The canals of the Netherlands represent a water management system integral to the nation's existence. The Dutch polders represent approximately 500 years of land-use planning. In the past 30 years, planning has focused on multiple use and ways to cope with the pressures of Europe's most densely-populated country, while preserving its agricultural productivity. Dutch new towns exemplify regional planning where the canal's function transcends water management or agricultural productivity. Instead the canals now accommodate urban, recreational, and natural uses and in some cases act as wildlife corridors. At the same time, urban design issues show how new neighborhoods and city centers can focus upon the canals, thereby gaining maximum multiple-use benefits. Dutch new towns provide an important precedent regarding safety and liability issues.

Linear Recreation Precedents

The Highline Canal

The Highline Canal is an irrigation canal that meanders through the southern and eastern suburbs of Denver, Colorado, including Littleton and Aurora. An unpaved country lane lies adjacent to this 12-20 foot-wide unlined canal, bordered by large cottonwoods. The character of the canal is in keeping with surrounding residential land uses, and adjacent homeowners consider the canal to be a valuable asset. The entire canal extends approximately 90 miles. Approximately nineteen miles running through Arapahoe County have recently been designated a National Recreational Trail. A formal multiple-use agreement has been drawn up by the Denver Water Board and the South Suburban Parks and Recreation District. This canal provides a successful example of mixing passive recreation and utilitarian uses in both suburban and rural areas. In addition, it provides an example of intergovernmental cooperation for a facility similar to many parts of the Salt River Valley canal system.

Indian Bend Wash

Indian Bend Wash, in Scottsdale, Arizona, is a good example of a flood control project that offers much more than a utilitarian solution. It demonstrates the potential for multiple uses within an area. Approximately seven miles in length, it contains four linear city parks offering a wide array of recreational facilities to local and regional users. It has played an important role in revitalizing south Scottsdale and has contributed to maintaining and raising land values in the area. The park, whose design has received national awards, draws the interest of engineers and designers from across the nation, and is very popular and well used by local residents.

Projects in Progress

Rio Salado, Tempe, Arizona

The Rio Salado project, currently under construction in Tempe, Arizona, makes use of the Salt River, a dry riverbed that is subject to releases of excess water from upstream reservoirs. It converts the floodway into a linear park, approximately five miles long, having a series of lakes and streams bordered by recreational trails, playing fields, and other recreational facilities. At the same time it maintains utilitarian flood control capabilities. It connects with the park and flood control system of the Indian Bend Wash and with Papago Park to the north. This project serves as a precedent for implementation strategies, as it represents the coordination of many private and public entities, including Salt River Project, Arizona Department of Transportation, and the Maricopa County Flood control District. This park will be a regional destination park with a location central to the Phoenix Metropolitan Area. It exemplifies public / private partnerships, citizen advisory boards, and other implementation strategies.

Guadalupe River, San Jose, California

A nine-mile section of the Guadalupe River in south San Jose, California, is being developed as a multiple-use corridor that combines recreation and flood control. It may also serve to preserve or restore wildlife habitat and local historic resources. It will be a continuous park / trail network that will maintain the natural character of the river and encourage natural processes to dominate. The initial planning phases of this project stressed environmental sensitivity.

A Vision of the Future

Introduction

Individuals have referred to the Metropolitan Canal Project in various ways - most people see it simply as "canal beautification." Some see it as providing a "regional open-space recreational system." And still others view it as improving public circulation and linkages from one destination to another. Of course it does address all of these considerations, but these are not its primary goal. The fundamental purpose of the Metropolitan Canal Project is to *provide a regional design framework that will establish a positive identity and memorable image for the Metropolitan Phoenix Area, and that will in turn enhance the public realm by serving and uniting communities in the area.*

Decisions affecting the canal system must reflect the collective value system upheld by citizens living and working within the Valley. They must not address individual agendas or isolated concerns but instead must focus upon major issues affecting the quality of life and the environment throughout the entire Valley and region. To make those decisions requires appreciating the history of the canals (mentioned previously), viewing the evolution of urban form in the Valley as an outgrowth of national issues, understanding factors that have influenced current patterns of development within the Valley, and identifying the implications of and for the Valley's future development.

This project addresses "place-making" in a fast growing, relatively new suburban region. To strengthen that process, the project provides design guidelines that are appropriate to the uniqueness of the area. It strives to alter the current land-use patterns within the Valley by encouraging increased pedestrian use of canals throughout the largely automobile-oriented region. The project strives as well to consider the needs of future generations within the Valley along with the impact of increased world population and diminishing resources. It concludes that "place-making" throughout the Valley can be accomplished in a responsible manner. It insists that preservation, integration and enhancement of the canal system can redirect suburban development away from its fixation upon the automobile and avert those problems that characterize low-density, automobile-oriented regions.

A Memorable Regional Image

The "special" character of any urban area is the product of its distinct characteristics and attributes. Special places, districts, or cities can evoke positive memories - New York's majestic skyscrapers and tranquil Central Park; San Francisco's cable cars and Golden Gate Bridge; Paris's Champs Elysees and the Eiffel Tower - contribute to the unique flavor that each city possesses. Within these cities, the architecture and landscape have evolved from - and reflect - the historical and cultural values of their citizens. Each of these cities - like any great city - is memorable because it has a "sense of place" arising from historic as well as contemporary influences. Collectively, these evoke a powerful emotional response. Each "special place" is memorable because it has its own distinctive identity. The canal system has the potential to be an important contributor to the Valley's memorable regional image.

An Appropriate Regional Identity

Like many other new and rapidly growing American cities, the Metropolitan Phoenix Area lacks a distinctive identity. Located in a flat valley where land is relatively inexpensive, the region has developed primarily along major arterials forming a gridiron pattern that extends into the desert in every direction. The metropolitan area lacks traditional urban design elements such as strong geographical edges, a major body of water, or significant districts. Nor does it have elements identified by Kevin Lynch as contributing positively to the urban environment: paths, districts, edges, landmarks and nodes. In addition, it lacks the historical diversity and mixed uses identified by authors such as Jane Jacobs as contributing to a "richness" of urban experience. As a result of these factors, the Metropolitan Phoenix Area lacks a strong regional identity.

Like Albuquerque or Dallas, the Metropolitan Phoenix Area does not have a strong identity in part because it lacks the traditional urban design elements contributing to a "sense of place." Landmarks are few, nodes are far apart, edges are undefined, districts are rare, and the only paths are the railroad and the grid system of homogeneous streets and freeways. Although Phoenix and its surrounding cities do have significant amenities and places of interest, they are isolated one from the other. Among these are South Mountain Park within the Phoenix city limits (the largest municipal park in the world); Scottsdale's "Fifth Avenue" containing block after block of art galleries, shops, and restaurants; and Tempe's "Old Town" adjacent to Arizona State University where a pedestrian-oriented redevelopment project has successfully revitalized a declining commercial area. Scottsdale and Phoenix also have some of the best desert resorts in the world. But they are all too dispersed and isolated to create - collectively - a distinctive regional identity.

"Place-Making" and Multiple-Use Districts

Like many cities in the western United States - Los Angeles, Las Vegas, Albuquerque, and even Dallas - the cities in our Valley lack distinctive multiple-use districts. In older cities, the suburban ideal of large lots with houses surrounded by open space was the outgrowth of a longing for the rural life and a desire to escape from the old inner city. In newly developed cities in the western United States, however, suburban areas have been planned from the beginning - and not as a reaction to congested conditions in the urban area. As such, they lack those urban elements that might give them an identifiable image, including pedestrian-oriented multiple-use districts, nodes and defined figural space. Their low density - a product of inexpensive land costs and rapid expansion due to a lack of geographical or political boundaries - discourages the development of urban elements that contribute to significant "place-making." And, they lack the "sense of place" that is created by densely-populated multiple-use districts.

Urban Form and the Arterial Street Grid

Currently the only urban design element that is consistent throughout the entire Valley is the gridiron pattern of streets. However, the gridiron has become such a dominant element that it allows few opportunities for "place-making." A product of the U.S. Land Ordinance of 1785 created by Thomas Jefferson, the one-mile grid system was established to identify all lands on the central and western plains. It facilitated opening up the West to development, established an easy means to determine land ownership, and encouraged rampant land speculation. Despite its historical advantages, the grid layout here and elsewhere has numerous negative attributes. The product of a national policy, the grid has resulted in a system that is best suited to identifying and controlling land use. Determined by a federal mandate, it does not acknowledge features - such as the canals - that deviate from its rigid framework.

Creating "Special Places" that are People-Oriented

Before the wide-spread use of the automobile, the traditional pedestrian-scaled city block was the most important formal urban element. With the advent of the automobile, however, street traffic became a dominant consideration, resulting in public policies that emphasized the road network in lieu of the pedestrian-oriented block. Further development of the automobile industry and the need to move traffic more efficiently caused the gridiron street plan to evolve into a hierarchy of street systems. Eventually this led to large isolated blocks comprised of buildings surrounded by parking lots. The automobile culture with its demand for mobility, parking, streets and freeways thus weakened the traditional, pedestrian-oriented urban environment. This is especially evident in the land-use pattern within the Valley where shopping centers and parking lots dominate arterial street crossings. Residential neighborhoods stand in isolation at the center of the squares formed by the grid. Canals pass through these one-mile sections, but typically they are viewed in the same disregard as alleys - to which most developments turn their backs. These canals have the potential to become people-oriented "special places" that are free from automobiles and common to all Valley cities. As such they might develop a positive image and serve to reclaim the Valley from the dominance of the automobile.

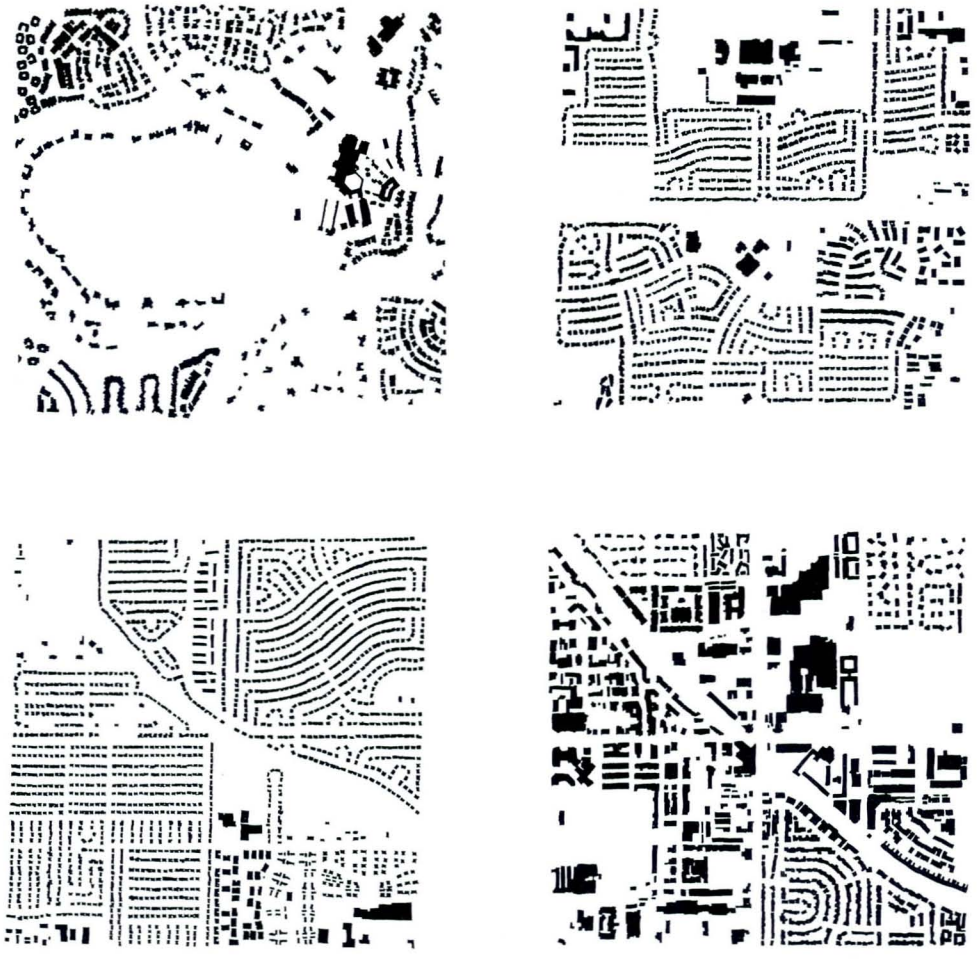


Illustration: Figure / Ground of Existing Developments Adjacent to Canals Showing Potential For Intervention

Natural Resources and Urban Form

In a world of diminishing natural resources and increasing population, a balanced transportation system and appropriate built form are essential for the long-term economic viability of the region. The Metropolitan Canal Project might succeed in redirecting development in a manner that requires no new automobile-oriented infrastructure. Increased density in selected locations will increase opportunities for pedestrians while decreasing pollution along with consumption of energy and materials.

By contrast, continued automobile-oriented, low-density development will undoubtedly exacerbate the problem of diminishing resources. Such low-density development requires: greater infrastructure (e.g., roads, utilities), more materials to construct buildings and infrastructure, more energy to produce the additional materials, and increased transportation use (leading to more fuel for automobiles, more fuel for delivery of building materials to non-centralized locations, more pollution produced by automobiles and trucks used in delivery of materials to the suburbs). In addition, greater infrastructure requires more exposed impervious surfaces (such as asphalt for additional streets and parking lots). This results in increased temperatures, water table decline, increased ground-water pollution as rain washes automobile pollution off roadways, and interruption of adjacent ecological habitats. Finally, low-density development contributes to less efficient land use, increased costs to maintain the greater amount of land, increased costs to maintain buildings because of their greater surface area, and potential depletion of common open space for the use of all of our citizens.

Cultural Legacy

As the Valley changes from an agricultural community to a multi-centered urban community, the need for open canals - as a source for irrigation - can arguably be questioned: water can be more efficiently conveyed in underground pipes where maintenance is cheap, evaporation is reduced, and safety issues are few. However, the open canals represent one of the only significant built forms in the Valley. Common to all cities and historically important, they have been the Valley's lifeblood and the source of its existence. Without the canals, urban development would not have been possible. The canals are an invaluable resource that should be preserved and enhanced. They stand as a testimony to our past and as an asset for all future generations to witness, understand and appreciate.

Opportunity

The canals that crisscross the Valley offer a compelling opportunity for "place making." They provide a means for establishing a much needed common identity, while also addressing other important considerations of urban planning. The canals must be maintained as open channels in perpetuity and their continuity as a system must remain intact. They must be preserved and enhanced by applying regional criteria that are appropriate to all areas and that transcend the desires of individual cities. Design guidelines which are essential for the preservation, integration, and enhancement of the canals are outlined in detail in the next chapter.

The Consequences of Design Enhancement

Preservation, integration and enhancement of the Metropolitan Canal System will cause a gradual but inevitable change in land-use patterns, ultimately diminishing the dominance of the grid. The canals will no longer be seen as back alleys. They will be seen instead as "special places," unique to the Valley and to the United States. No other metropolitan area in this country can boast of 362 miles of public waterfront property (comprising both sides of 181 linear miles of canals). The canals will become a desirable location for all types of people-oriented uses. Public areas, parks, hotels, restaurants, shops, and housing will border the canals, competing for prime locations and adding value to nearby properties.

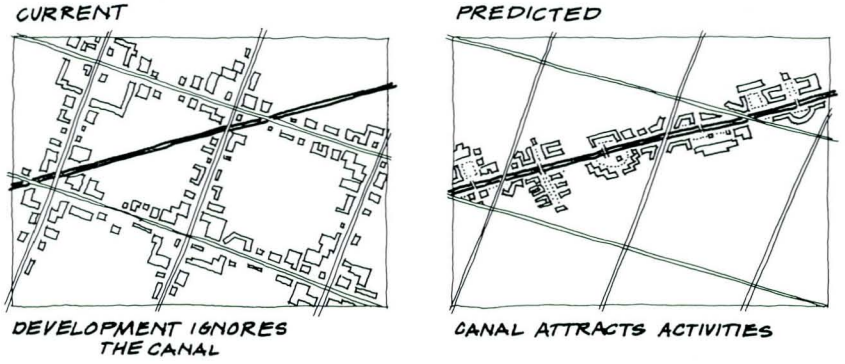


Illustration: Predicted Changes in Land Uses

The Vision: A Long-Range Regional Plan

As this brief overview has shown, canal improvement does not consist merely of beautification: multiple use of the canals could begin to reorder development within the Valley. The automobile and mile-square grid have limited our perspective, causing us to overlook the tremendous potential of this valuable resource. Change will be incremental, however, occurring over a long period of time as isolated canal improvement projects slowly take place. A new hotel here, a new shopping center there, an urban park or regional bicycle trail will begin - collectively - to change the urban form of the Valley. Vacant land adjacent to the canals will be built up, and existing developments will be modified to take advantage of their waterfront location. Cities may feel pressured to revise their General Plans, and thereby to modify the land-use mix of the 1990s to accommodate greater use of the canal system. Someday, the high value of the land adjacent to the canals will inspire building efforts that we can only imagine - becoming distinctive "special places." Ultimately, the land adjacent to the canals will be transformed from a setting for isolated one-story detached buildings to multiple-use nodes. These nodes may consist of two-, three-, and possibly four-story buildings that contribute to an active and vibrant public life. They also may be linked by landscaped sections of canal banks supporting passive recreational activities such as walking, bicycling, jogging and horseback riding. With these adjacent multiple uses, the canals will seem memorable and will contribute to the distinctive image of the Valley.

The choices we make today regarding these canals will affect future generations of visitors and inhabitants for years to come. Therefore, the direction we provide must not be determined by municipal and political boundaries: it must take place at a regional scale in a manner that is environmentally responsible for both today and tomorrow. Above all, the choices that we make and the direction we provide must ensure a quality of life that will benefit all of the citizens of the Valley.

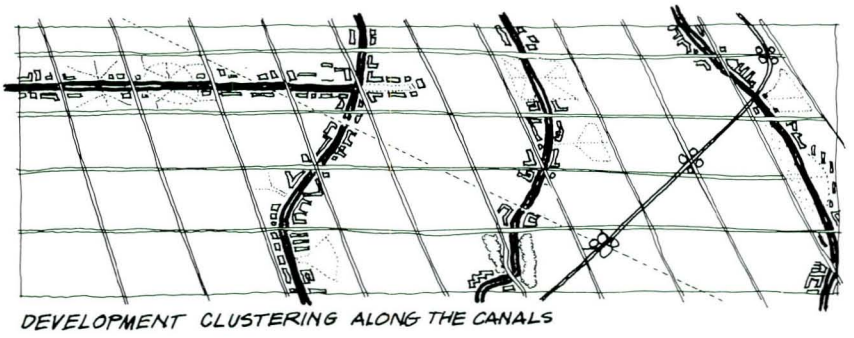


Illustration: Future Vision of Intensified Land Uses Adjacent to the Canals

Design Principles

The seven urban design concepts of *Preservation, Integration, Accessibility, Identity, Continuity, Diversity* and *Safety* provide a regional design framework. From these general concepts, each Valley city should develop site-specific design guidelines. The scale and the multiple-use potential of the entire 181-mile canal system requires further study and resource investments by each of the Valley cities.

Preservation

- Public Realm
- Historic Artifact
- Visual Character

Integration

- Landscape
- Built Environment
  - Regional
  - City Level

Accessibility

Identity

Continuity

Diversity

Safety

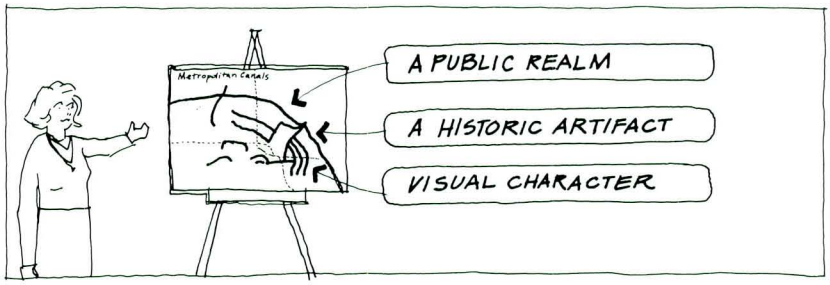
Preservation

The canals have significant historic importance. Other than the street system, the canals are one of the only public open-space systems which is common to all Valley cities. An open water-delivery system within the Valley provides a unique visual contrast to the desert environment. These unique historic, public and visual qualities, if preserved, could provide a framework for a better quality of urban living.

This study recommends enhancement and increased multiple use as the best strategy to ensure that the open water system of canals will be preserved.

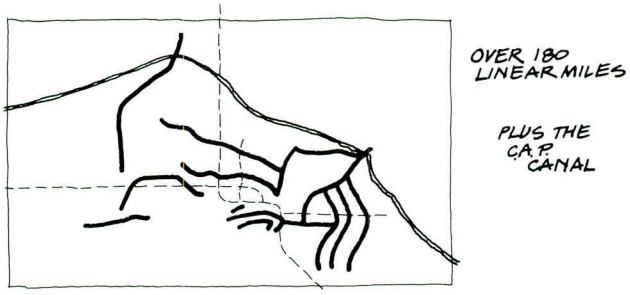
The preservation design principles are organized into three major categories:

Public Realm **Historic Artifact** **Visual Character**



Public Realm

Maintaining the canal system as a regional public area will ensure the greatest benefit for the most people.



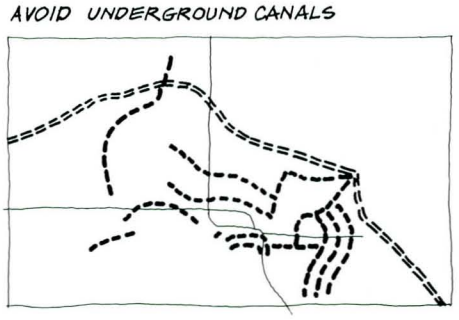
A LARGE PUBLIC REALM

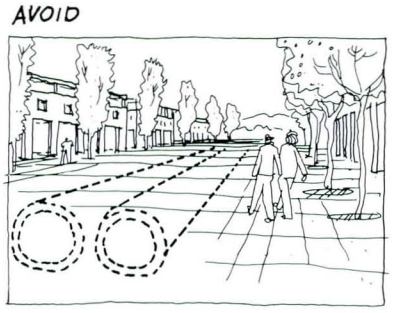
1. Principle: Preservation of the Public Realm

The canal right-of-way should be preserved as part of the public realm.

2. Principle: Open Waterways

The canal water surface should be preserved as part of the public realm. Therefore, placing canals or laterals underground should be avoided.



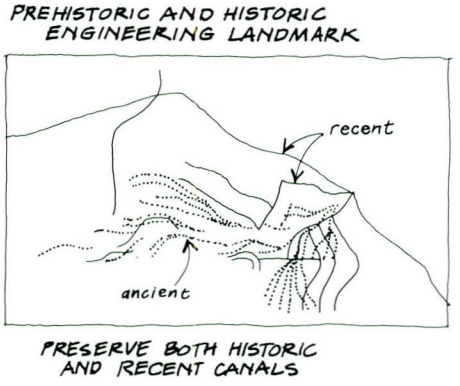


3. Principle: Surface Treatment / Open Space

If unique circumstances occur and undergrounding is unavoidable, preserve the canal right-of-way for public open space.

Preservation as a Historic Artifact

Within a developing urban region, the preservation of historic elements creates "value added" attributes. The canals represent the longest-standing human-made features in the Valley that tie together several civilizations. In an urban area where "everything is new," this rich cultural landscape should be preserved and made even more important.



1. Principle: Preservation of Historic Elements

Preserve the historic context of Hohokam canals and the original modern canals. Significant historic elements (such as Arizona Falls, Park of the Canals, Arizona Biltmore area and Pueblo Grande) should be preserved as important educational features.

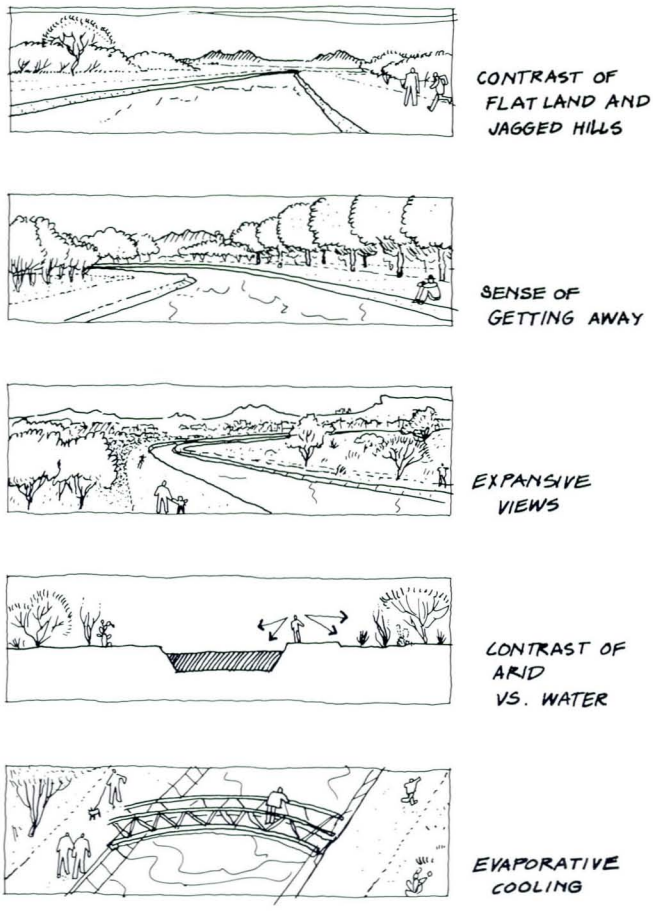
Photo: Early Canal Users at Arizona Falls on the Arizona Canal
Courtesy of Arizona Department of Library, Archives and Public Records

Preservation of Visual Character

The public view of canal water flowing through the desert may potentially serve as a civic feature. Some of the most memorable images of the Valley are canal views. Views of the canals reinforce the canal system as a significant public resource. Views from the canals of significant natural features preserve the geographical relationship of important landmarks in the Valley.

1. Principle: Views of the Canal

Public views of the canals should be preserved.



2. Principle: Views from the Canals

Maintain existing views from canals toward significant natural features such as Camelback Mountain. Views from the canals toward significant natural features can increase awareness of the positive aspects of the natural desert environment. Views may be panoramic or focused on nearby natural or built landmarks. Preservation may require view corridor delineation, height restrictions, and other site planning guidelines.

Photo: View from the Canal of Papago Buttes
Courtesy of the Salt River Project

Integration

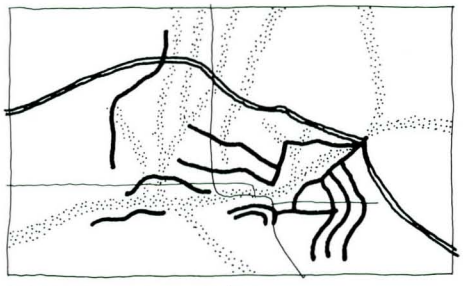
Unless the canals are integrated into the social lives of people and the physical infrastructure of the Valley, multiple-use development of the canal system will falter, coordination will be lacking, and the opportunity for environmental enrichment will be lost. Integration implies simultaneous coordination of many factors: natural (like drainage washes); built (like streets, utilities and buildings); or conceptual (like traditions, values, social structure and history). By coordinating enhancement of the canal system with these other factors, Valley landmarks, like the Papago Buttes, Camelback Mountain, South Mountain, as well as parks, schools, and even shopping areas, will be more accessible by canal. The landscape quality of the canal environment will also improve for passive multi-purpose use.

The massive scale of the canal system and its presence in prime locations in over ten Valley cities creates opportunities to coordinate public and private projects. To realize these multiple-use opportunities requires a broad view of the canals' role within the Valley, their potential impact, and the forces which affect, limit and stimulate their future use.

The following integration principles are divided into two general categories: Landscape and Built Environment.

Landscape

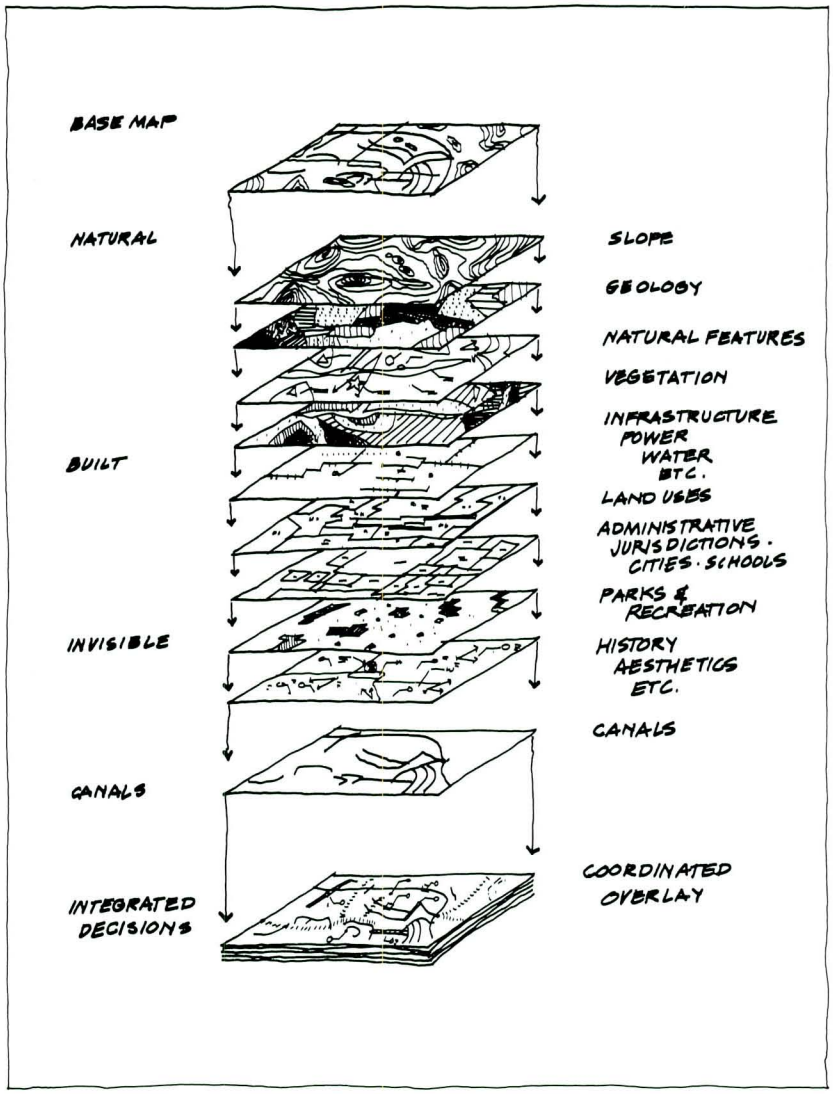
The natural landscape along the canal system should acknowledge the desert context and incorporate appropriate arid region landscape design principles. This would include comprehensive outdoor water conservation measures.



INTEGRATE THE CANALS WITH REGIONAL ECOLOGY

1. Principle: Integration with other Systems

Coordinate the development of the canals to integrate with natural and physical systems while protecting and increasing access and awareness of the natural environment and its features.



AN INTEGRATED APPROACH TO DECISIONS

2. Principle: Arid Region Landscape

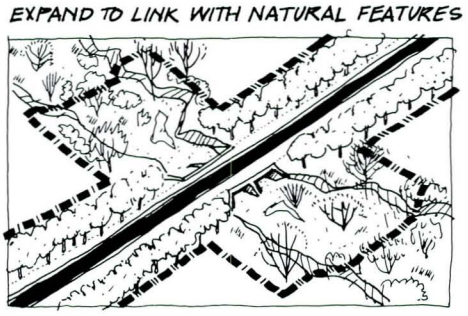
Water conservation should be a primary objective in landscape design for the canal banks. Plants should be selected for functional and aesthetic purposes and be ecologically fit. Landscape elements should be low maintenance and cost effective from a long-term perspective.

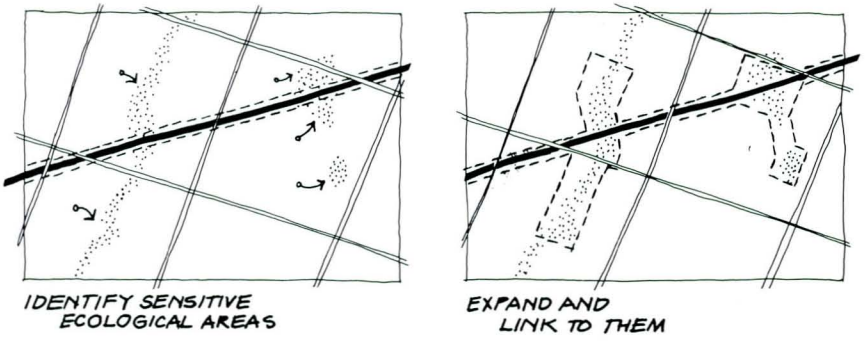
3. Principle: Education Programs and Interpretive Centers

Interpretive centers and displays should exist along the canal banks to encourage learning about the natural, historic and built environment. Wherever possible they should be located near schools.

4. Principle: Existing Adjacent Natural Areas

Where adjacent to significant natural areas, the landscape of canal banks should create linear habitats, buffers, and link the canal system to special natural patches or other features such as drainage washes, buttes, desert preserves or other natural areas.





5. Principle: Appropriate Water Use in Intensely Developed Pedestrian Areas

Intensely developed pedestrian areas may justify modest increases in water use for such elements as plants and low-water-use fountains.

Built Environment

Regional Integration

1. Principle: Integration of Canals with Regional Systems

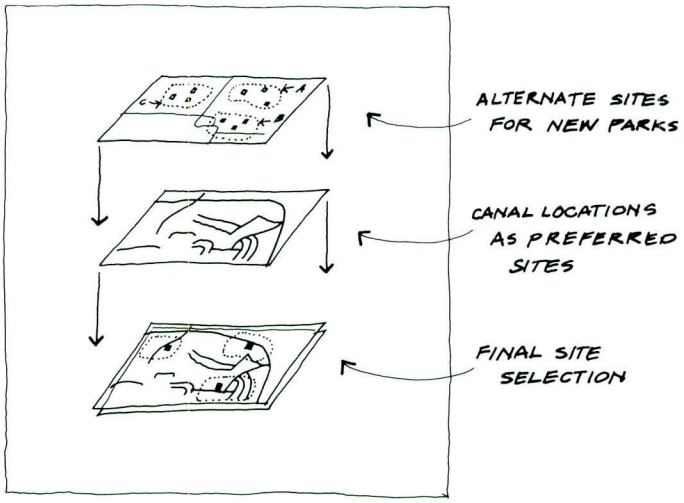
All regional built systems (e.g., freeway system, major streets, flood control, and Arizona Canal Diversion Channel) should be integrated with the canals, allowing continued canal bank access and circulation.

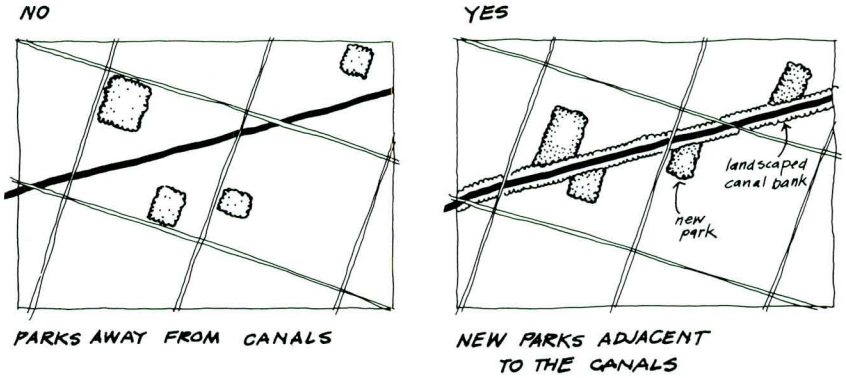
2. Principle: Canal and Adjacent Developments

Canal system improvements should be integrated with adjacent site development.

3. Principle: Canals and Parks

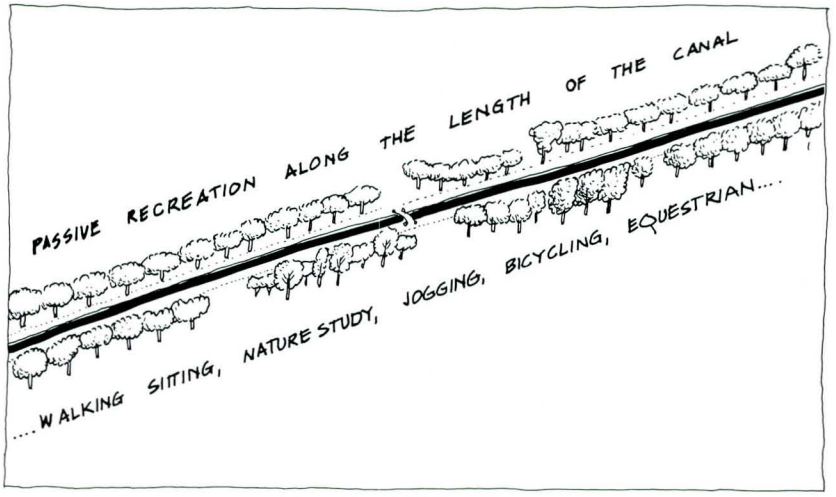
Ideally, new park development should occur next to the canal.





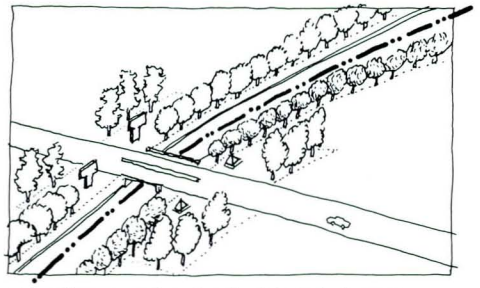
4. Principle: Appropriate Canal Bank Activities

Appropriate passive canal bank activities include walking, sitting, nature appreciation, recreational bicycling, jogging and horseback riding.



5. Principle: Canals as City Boundaries

When a canal divides two cities, the cities should coordinate their canal improvements and canal recreation plans to avoid unnecessary duplication or inconsistency of improvements.



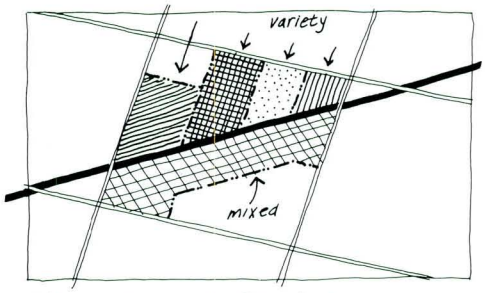
CITY BOUNDRIES AS A COORDINATION PROBLEM

City Level Integration

1. Principle: General Land-Use Policy Adjacent to Canals

Land-use policy should encourage public and semi-public uses on new sites or redeveloped sites with canal frontage. This will increase public awareness of the canals and promote them as an amenity for employees, users, and the public. These land uses include:

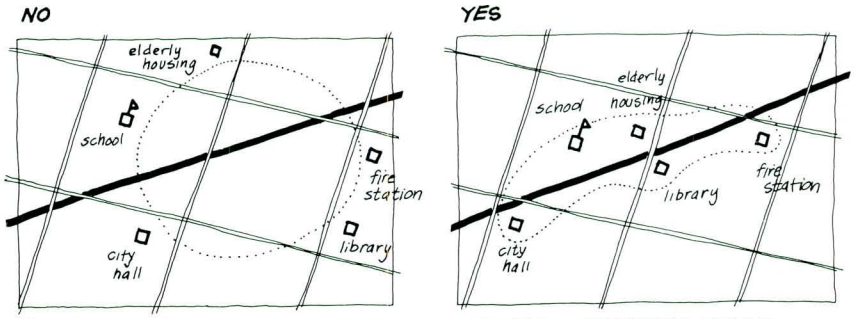
- parks
- retail (shopping and restaurants)
- offices
- multi-family housing
- mixed-use developments
- research parks
- resorts / hotels



VARIETY OF LANDUSES AND MIXED LAND USES ALONG THE CANAL

2. Principle: Public Building Site Selection

Public buildings such as city halls, fire stations, libraries, recreation and social service centers, and schools should select as a preferred location sites adjacent to a canal. The community benefits by having a pedestrian and bicycle route to such buildings and as an amenity for employees. Canal locations can increase bicycle and pedestrian access to schools without crossing arterials.

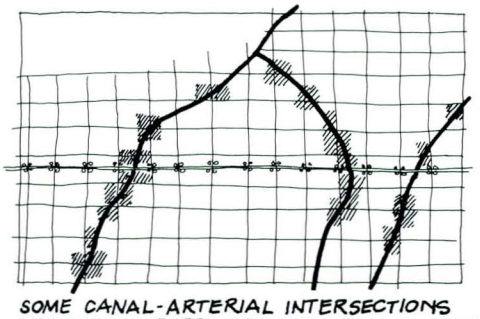


TOO FAR APART

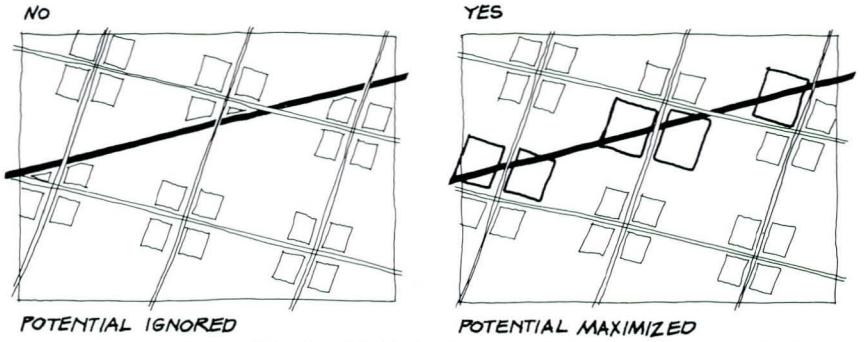
LINKED COMMUNITY IMAGE ALONG THE CANAL

3. Principle: Siting Commercial Activities

Preferred location for office, retail, and neighborhood shopping is clustered at the intersection of the canal and arterials. In many cases, this is also close to the intersection of two arterial roadways. Increased visibility will promote greater use of canals by commercial users.



SOME CANAL-ARTERIAL INTERSECTIONS HAVE MORE POTENTIAL FOR DEVELOPMENT THAN OTHERS



POTENTIAL IGNORED

POTENTIAL MAXIMIZED

CANAL-ARTERIAL INTERSECTIONS PROVIDE DEVELOPMENT OPPORTUNITIES

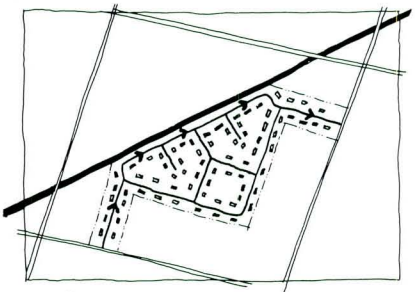
4. Principle: Integration With Other Transportation Modes

Canal / arterial intersections are appropriate locations for supplementary bus stops, bicycle pathway facilities and other pedestrian improvements.

5. Principle: Local Streets and Canal Frontage

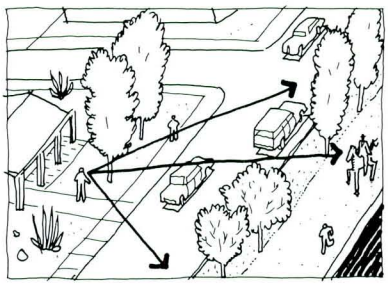
New developments could include low-speed (25 mph) frontage "parkway" roads to buffer adjacent land uses from the canal, to increase neighborhood access to canals, and to create canal views.

ACCEPTABLE



CANAL SIDE ROAD INTEGRATES DEVELOPMENT WITH THE CANAL

ACCEPTABLE

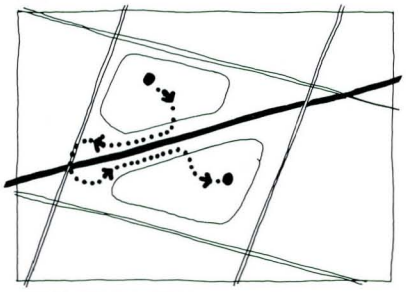


A CANAL SIDE ROAD MAKES THE CANAL VISIBLE TO THE COMMUNITY

6. Principle: The Role of Pedestrian Bridges

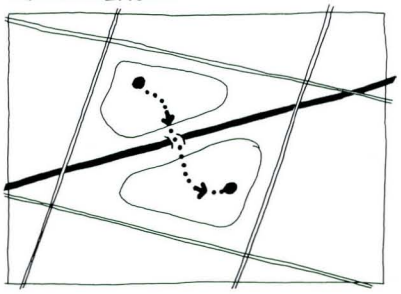
"Mid-block" pedestrian bridges can link neighborhoods separated by a canal. In addition to connections at arterial crossings, additional canal bridges - approximately one per one-mile section (more in intensely developed areas) - are needed to integrate and link neighborhoods across the canal and to increase convenient access to facilities adjacent to the canal and to increase access for safety and security. Bridges also provide a local landmark and alternate views of the canal.

NO



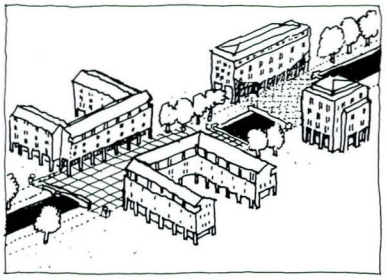
ADJACENT NEIGHBORHOODS ARE ISOLATED

RECOMMENDED



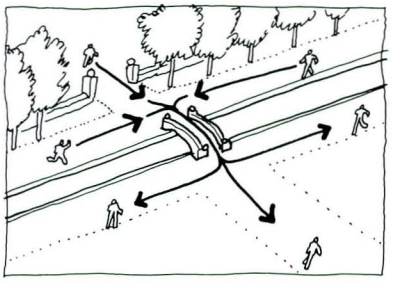
CONNECTING ADJACENT NEIGHBORHOODS WITH BRIDGES

NOT ACCEPTABLE



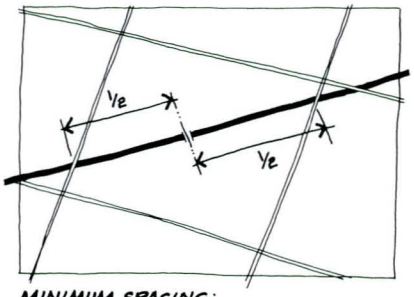
PLAZAS OVER THE CANAL

RECOMMENDED



PEDESTRIAN BRIDGES DRAMATICLY INCREASE OPTIONS FOR USERS

RECOMMENDED

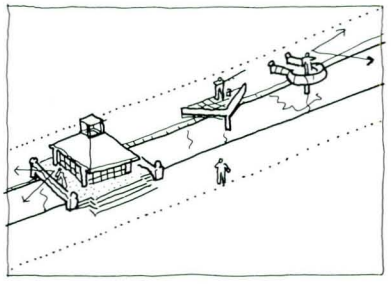


MINIMUM SPACING: APPROXIMATELY MID"BLOCK"

7. Principle: Canal Pedestrian Bridge Design Opportunities

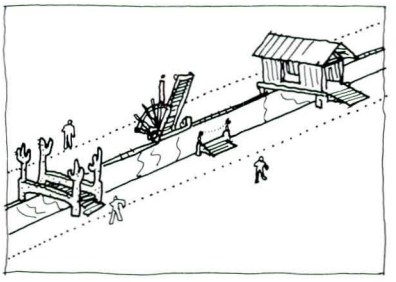
Canal pedestrian bridges can become special landmarks. The bridges may be one-of-a-kind art pieces or they may provide locations for displaying public art. They should be limited in width so they are narrower than the canal. Bridges should not have buildings on them.

CONDITIONAL



PAVILION BRIDGES - OVERLOOKS

ACCEPTABLE

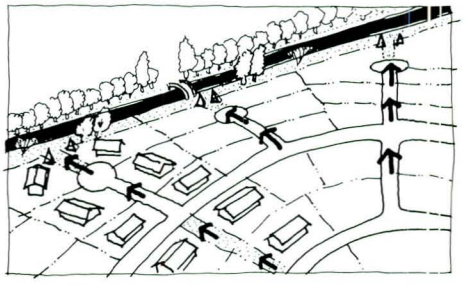


ARTIST DESIGNED - HISTORIC - MUSEUM PIECES

8. Principle: Integrating Existing Neighborhoods with the Canal

Within existing neighborhoods, potential canal access points (cul-de-sacs, alleys, streets and utility rights-of-way) should be preserved and developed into neighborhood access points.

CANAL ACCESS VIA A CUL-DE-SAC IN AN EXISTING HOUSING AREA



INTEGRATE EXISTING NEIGHBORHOODS WITH THE CANAL

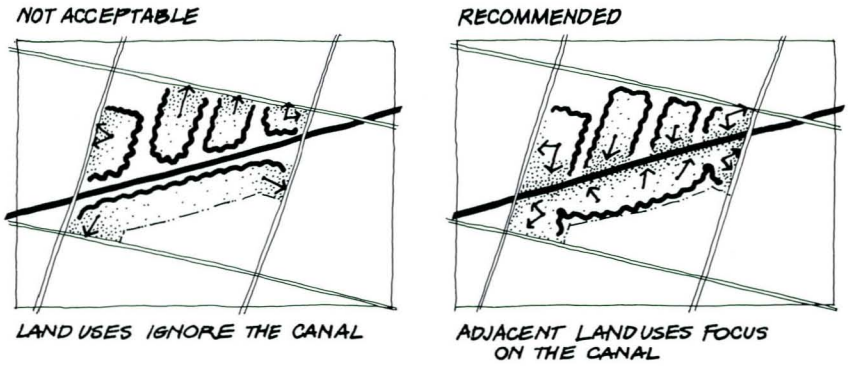
Site Level Integration

1. Principle: Existing Land Uses and the Canal

The site planning of many existing public and semi-public uses, such as schools, churches, offices and neighborhood shopping centers, has ignored the canal. New landscape elements and the removal of solid fences where appropriate could provide the easiest way for existing land uses to integrate with canal multiple uses.

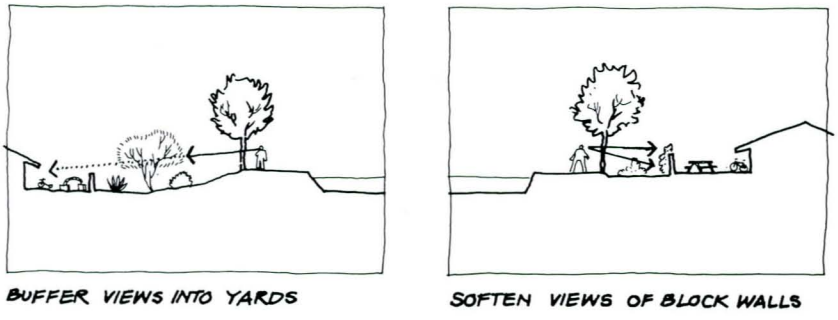
2. Principle: Adjacent Land Uses and Site Orientation

Public spaces within private developments should be located adjacent to the canal in order to achieve integration with the public system of the canal.



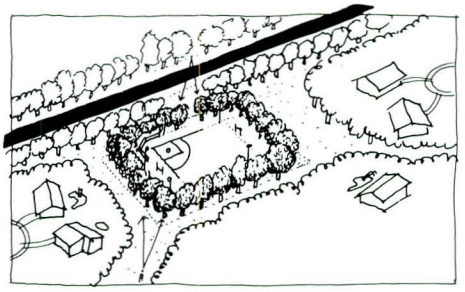
3. Principle: Privacy Requirements of Existing Single-Family Homes

The canal landscape improvements should consider the privacy requirements of existing adjacent residents. This is especially important where existing homes are lower than the canal bank. New trees and shrubs should be selected for their ability to screen views or existing block walls, and to provide privacy.



4. Principle: Park Design - Buffering Active Recreation

Recreation planners should emphasize passive recreation along the canals, and should cluster active recreation within adjacent parks. Adjacent active recreation elements such as soccer fields or baseball diamonds should be physically buffered from the more passive canal multiple uses.

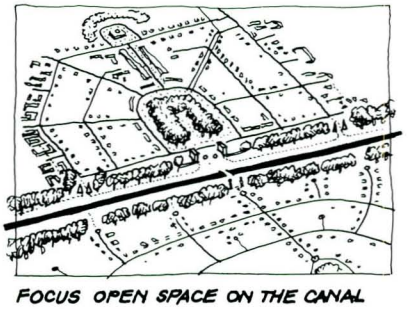


BUFFER ACTIVE RECREATION FROM THE CANAL AND ADJACENT LAND USES

5. Principle: Focus on the Canal in New Housing Development

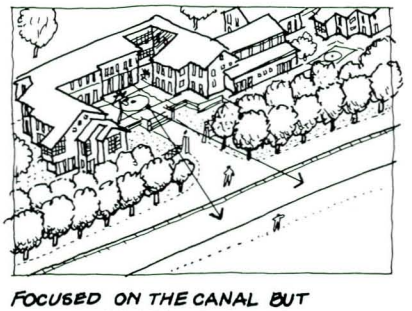
The preferred relationship between multi-family housing and the canal is to focus major views onto the canal and to create a semi-private zone. A buffer between the housing units and the canal right-of-way should be provided.

YES



FOCUS OPEN SPACE ON THE CANAL

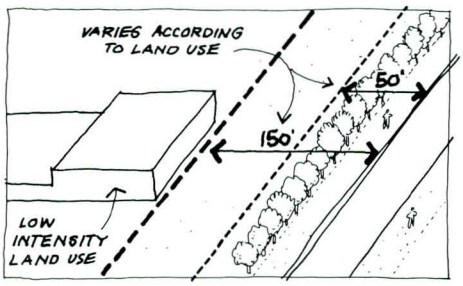
YES



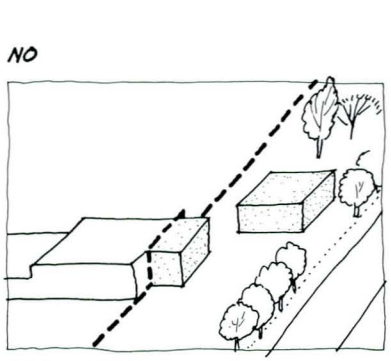
FOCUSED ON THE CANAL BUT BUFFERED FROM IT

6. Principle: Setback and "Build-To" Requirements

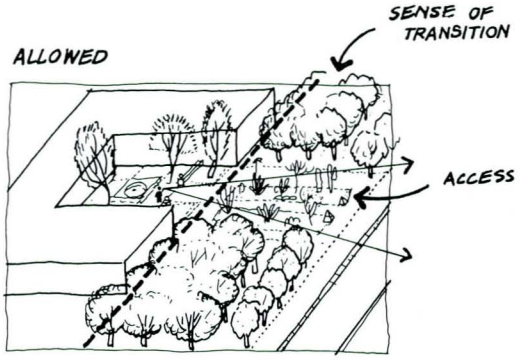
Each municipality should establish minimum building setback requirements from the canal water edge. Approximately 50' to 150' should be appropriate depending on the land use, location, and municipality. The setback zone buffers the canal from adjacent development and enlarges the area of influence of the canals' passive recreation function.



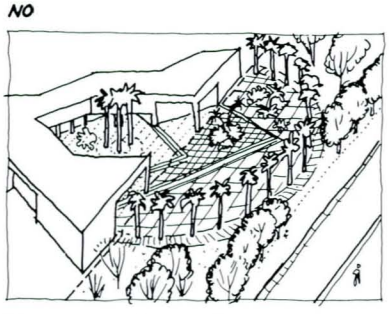
RECOMMENDED BUILDING SETBACK FOR AREAS WITH LOW INTENSITY OF DEVELOPMENT (LOW F.A.R)



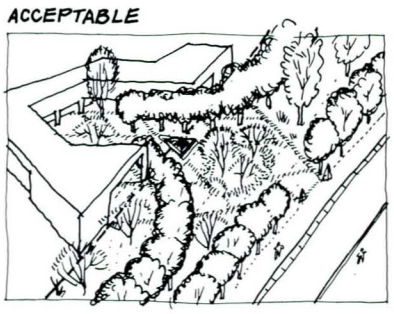
NO BUILDINGS NO EXTENSIONS INTO THE SETBACK



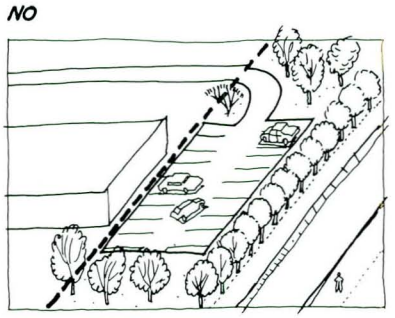
VIEWS OF THE CANAL THROUGH THE SETBACK



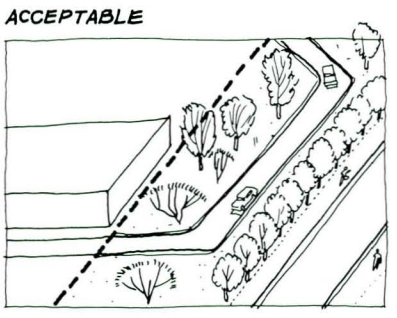
LOSS OF CANAL BANK CONTINUITY



SITE INTEGRATED WITH LOW WATER USE LANDSCAPING

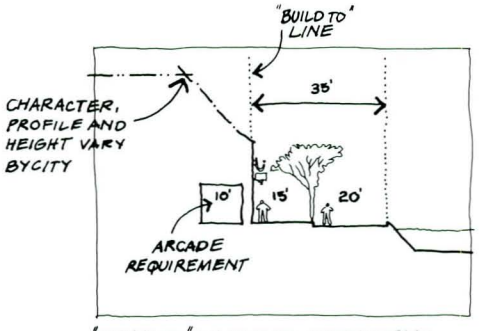


PARKING IN THE SETBACK

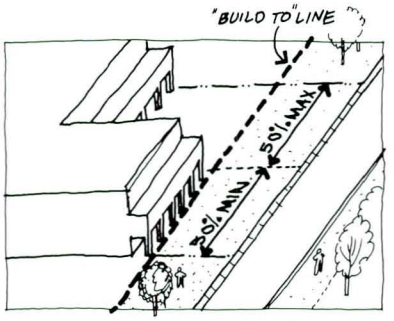


PUBLIC ACCESS ROAD OR DRIVE

In intensely developed areas the recommended building setback is thirty-five feet. In these areas it should also be a "build-to" line with a minimum 50% of the frontage requirement and minimum ten-foot-wide arcade requirement.



"BUILD TO" LINE FOR INTENSELY DEVELOPED AREAS (HIGH F.A.R)

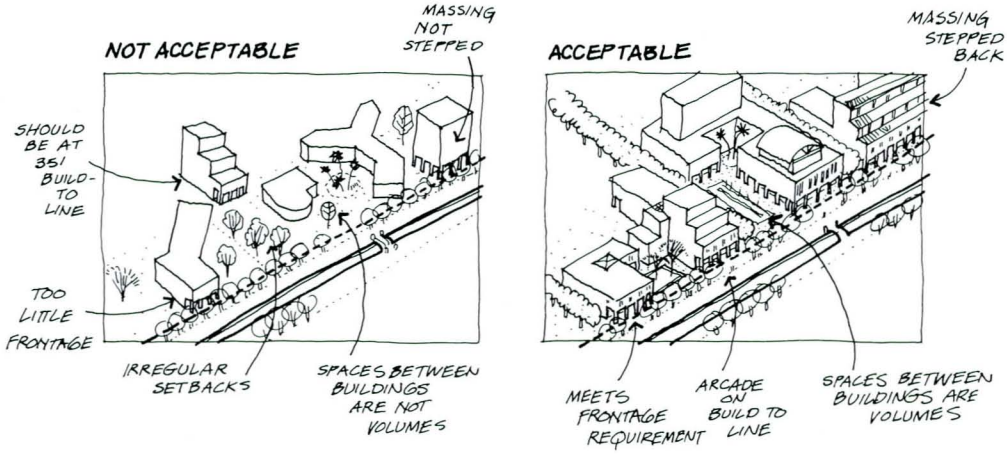


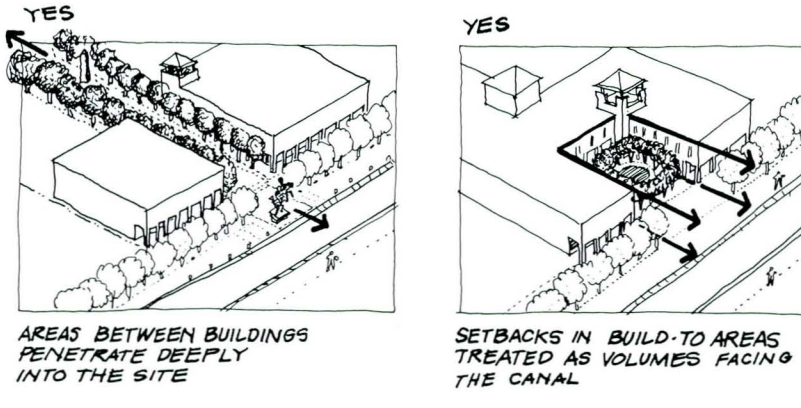
MINIMUM BUILDING FRONTAGE

7. Principle: Improvements Within the "Build-To" Zone

The goal is to create the character of an urban paseo alongside the canal within the more intensely developed areas. Within these areas:

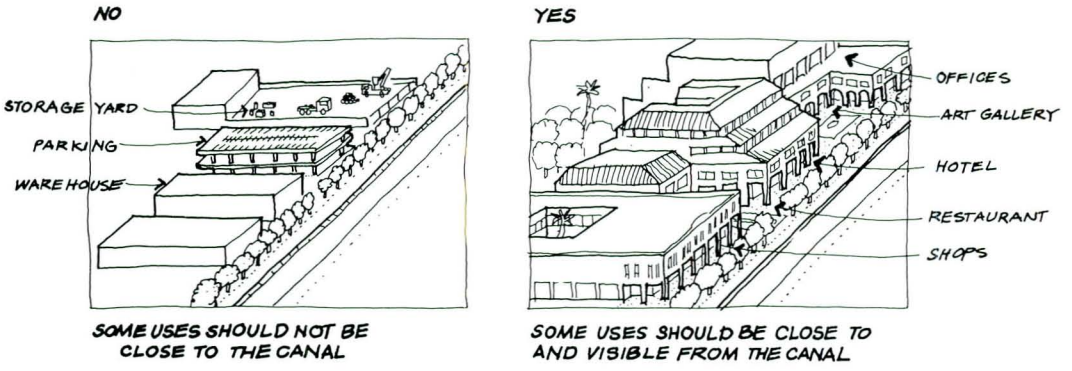
- canal edge landscape character should continue throughout the "build-to" zone
- the "build-to" zone should be a public area with a hard surface that includes street furniture, functional plantings, and other pedestrian amenities
- recommended standards which may vary by city:
  - minimum F.A.R. for "build-to" zones: 0.5 (Maximum F.A.R. may vary by city)
  - building height limits including roof equipment: thirty-six feet within 100 feet of canal
  - building profile limits: stepped-back profile for each floor above twenty-four feet at the "build-to" line.





8. Principle: Ground Level Activities in Setback Zones

The ground floor arcaded portion of "build-to" zones should contain a mix of pedestrian-oriented building uses. The goal is to line the canal with activities that are of interest to the canal bank users.



Accessibility

Accessibility to the canal system is essential in order to reinforce and preserve the system as a valuable public resource. Accessibility includes not only physical accessibility, but visual and temporal as well. Best usage of the system for circulation and the public requires:

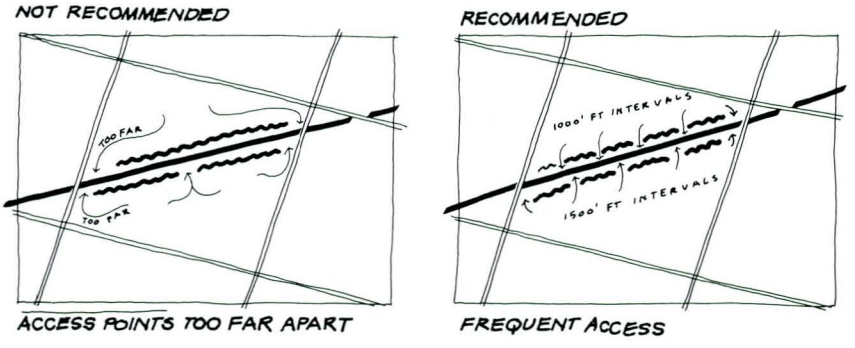
- continuous public accessibility along the length of the canal
- barrier-free access for the handicapped
- maximum public access to the canal from adjacent land
- preservation of existing and definition of new view corridors of canal water and bank
- access provided regardless of time of day.

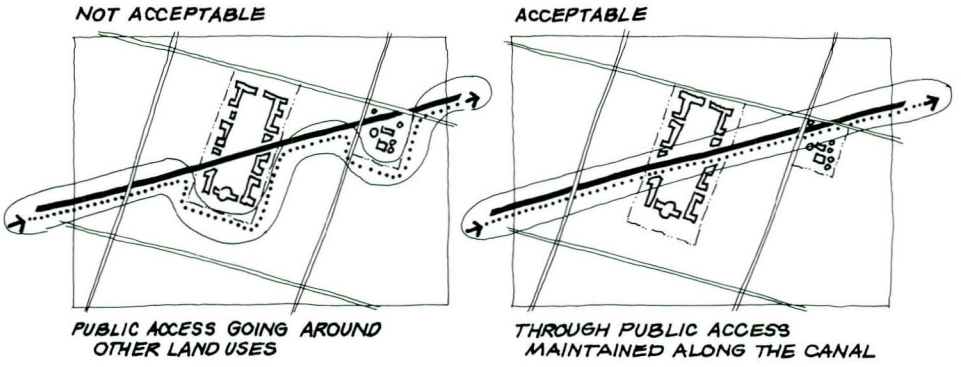
Continuous public use along the canal is important to ensure the public nature of the canal system. Users need to know that access will not be curtailed by private development or localized curfews. Access must be in perpetuity. Cities and property owners adjacent to the canals need assurance that their investments will have a long life and not end arbitrarily.

In addition, the canal operators must have access at all times for the operation of the canals and other utility service facilities (i.e., overhead and underground power lines, communication, gas, sewer, and water lines, etc.). Therefore, canal use must not disrupt the efficient operation of the canals by the canal operators.

1. Principle: Public Access

Retain both sides of all major canals as a continuous public space. Preserve the public realm of the canals by not allowing private or civic uses to block access to the canal or continuity of use along the canal.





2. Principle: Twenty-Four-Hour-a-Day Public Access

Establish twenty-four-hour-a-day public access to the canal. While access should not be abridged by local curfews or local development restrictions, adjacent parks may have restricted access times.

3. Principle: Access Rights of Canal Operator

Maintain current policy of continuous access to canal bank for service vehicles. Prolonged maintenance and service activities should be discouraged so public use will not be significantly affected.

4. Principle: Utility and Emergency Access

Canal improvements and development cannot limit utility, emergency, and public safety access.

5. Principle: Use of Canal Banks by Adjacent Landowners

Canal banks cannot be used by adjacent landowners for service, maintenance, service access, or storage.

6. Principle: Handicapped Access

All canal banks, access points to the canals, pedestrian bridges, and access to adjacent canal bank redevelopment should be barrier-free. All barrier-free design shall meet city, state, and federal standards.

7. Principle: Equestrian Access

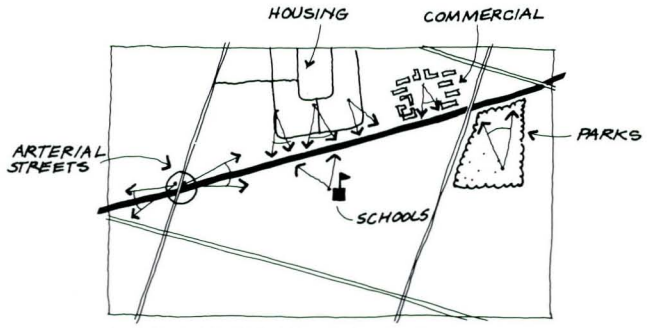
All existing equestrian rights-of-use on the canal banks should be honored (i.e., Sun Circle Trail, etc.). Consideration should be given for additional equestrian use as appropriate to local conditions.

8. Principle: Prohibited Private Vehicular Access

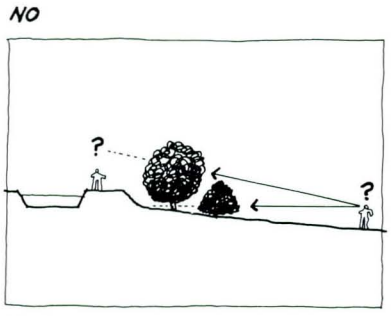
Private motorized vehicles should not be allowed within the canal right-of-way. Exceptions include motorized wheelchairs and approved small-scale public people movers.

9. Principle: Enhance Visibility of the Canal.

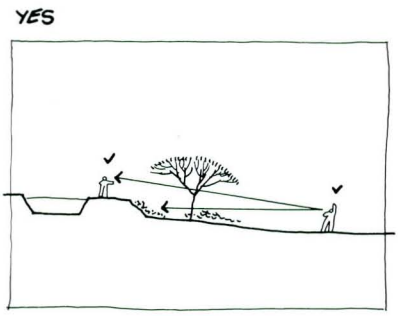
Maintain and enhance views of the canal (including views of canal banks and canal water) from arterial streets, local streets, and adjacent land uses.



CANAL VISIBLE FROM ADJACENT LAND USES



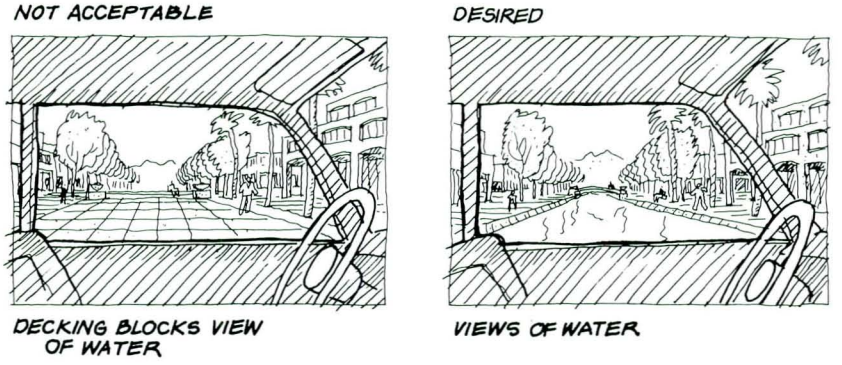
LANDSCAPING THAT BLOCKS VIEWS OF THE CANAL



LANDSCAPING THAT ALLOWS VIEWS OF THE CANAL

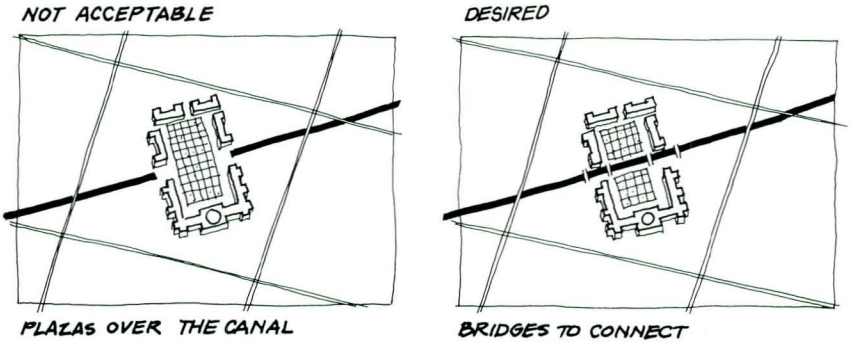
10. Principle: Limited Decking at Arterial Intersections

Maximize water visibility from arterial crossings by limiting adjacent decking and other visual obstructions.



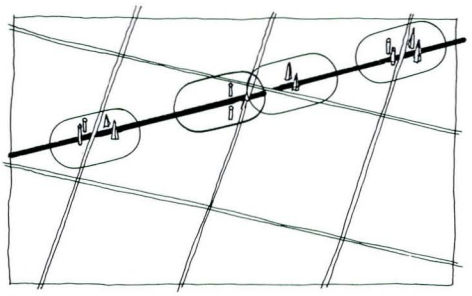
11. Principle: Limited Decking

As a general rule, decking of the canal should be prohibited. When decking is considered, it should be limited to those areas that maximize public benefit and minimize impact on public view. No decking should be larger than the width of the canal water body nor should the deck support any enclosed structures.



12. Principle: Gateway Access from Canal Arterial Street Intersections

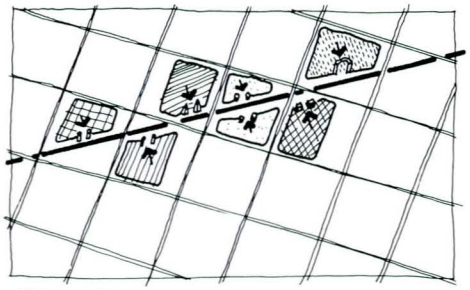
Develop canal gateways to mark public access at all arterial intersections.



GATEWAYS TO THE CANAL AT EACH ARTERIAL CROSSING

13. Principle: Gateway Access for Adjacent Land Uses

Develop canal gateways to mark appropriate public access for all adjacent public / semi-public land uses including housing areas. All large new developments having canal frontage should provide public access through the site to the canal bank. Appropriate access from housing areas should be through a gate which may be locked or unlocked depending on the type of housing area.



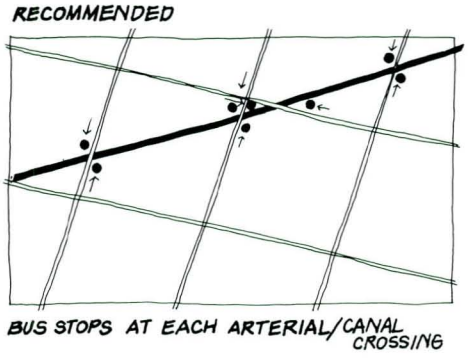
GATEWAYS FROM ADJACENT LAND USES TO THE CANAL

14. Principle: Canal Access from Adjacent Individual Single-Family Houses

Allow private yards of adjacent single-family houses to have gates (lockable) for pedestrian access to the canal banks. Service access from canal banks to private yards of new single-family houses or remodeled properties is not allowed.

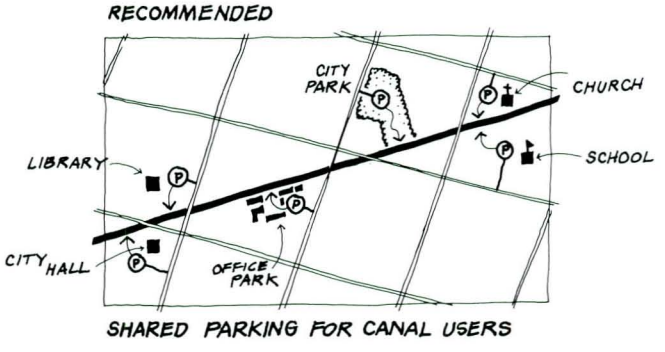
15. Principle: Bus Access

Increase public access to the canals by developing a bus stop at every appropriate canal / bus route intersection.



16. Principle: Parking and Canal Access

First priority is for shared-use parking for canal users in existing parking areas through arrangements with adjacent landowners such as parks, schools, churches, shopping areas, libraries, etc. Second priority is for handicapped canal user parking areas located at canal gateways.



17. Principle: Utility Service Access

Canal utility and emergency access shall be provided at all times. For example:

- no canal use should disrupt the efficient operation of the canals
- police, emergency, utility, and canal operators' service vehicles shall have unrestricted access
- service access areas should be integrated with public circulation
- during canal dry-up, all canal operators will have priority access while maintaining continuous pedestrian access wherever possible
- private contractors should not use the canals as access to adjacent sites, nor should they use the banks as storage space (this does not limit canal operation and maintenance).

Identity

The canals have the potential to become a major popular regional image for the Metropolitan Phoenix Area, similar to the civic parks and landmarks of other great cities. The identity of the canal is tied to its primary characteristics:

- its physical form as a linear element
- its character as juxtaposition of arid land and flowing canal water
- and its character as a realm of activities and experiences that touch both modern sensibilities like jogging and bicycling, and the historic roots of the Valley's agricultural and equestrian / western tradition.

In a region where tourism is one of the most important industries, a memorable image and a strong regional identity are essential. The canal system with a strong recognizable image can begin to develop a framework around which a higher quality of urban form can develop. This urban identity can provide a unique image for the relatively young Metropolitan Phoenix Area.

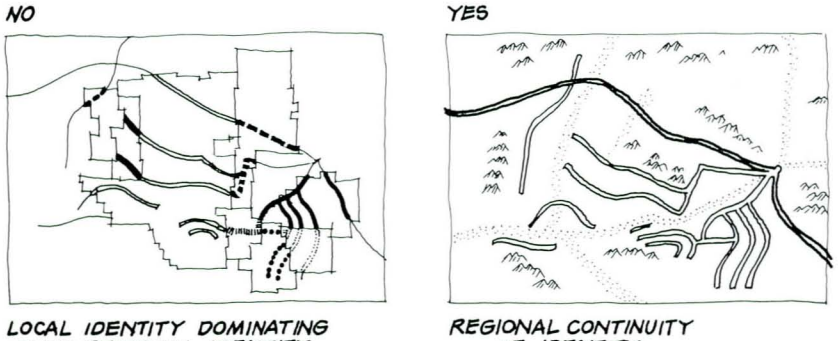
The identity of the canal system comes from common elements that occur at the entire system level, at the level of each individual city, and at the neighborhood level.

1. Principle: Regional Canal Identity

The canal system should be developed as a regional framework where the whole is greater than the sum of the parts. Regional identity must not be compromised by local identity.

The establishment of a memorable design image for the entire canal system can be achieved through the use of a characteristic canal cross-section and design features that include:

- continuous view of open water
- continuous pedestrian circulation path on both sides of the canal
- continuous planting of arid-region shade trees
- continuous canal edge treatment
- common signage system
- coordinated site furnishings (e.g., benches, light standards, paving materials, and other pedestrian amenities).



2. Principle: Local Canal Identity

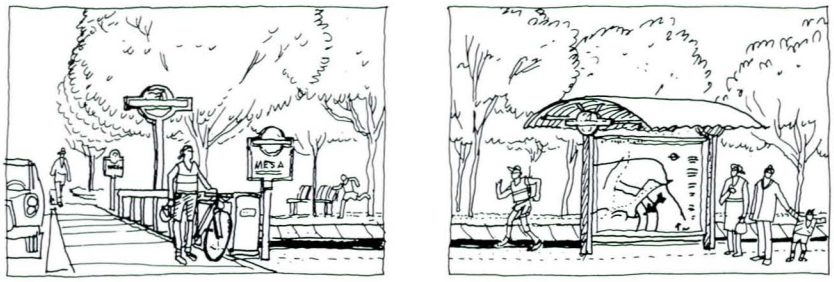
Local identity can be achieved within the regional design framework through locally determined intensities of adjacent use.

3. Principle: Signage / Markers

Identify an appropriate character and theme for the overall image of the canal system and develop standard designs and uniform usage standards for a basic canal signage system. This should include:

- identity markers
- historic and cultural markers
- canal map / message board signs
- basic route and safety signage
- public drinking fountains
- emergency call boxes.

YES

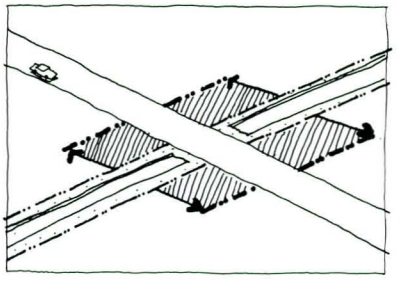


IDENTITY SIGNAGE AND HISTORIC MARKERS THROUGHOUT THE SYSTEM

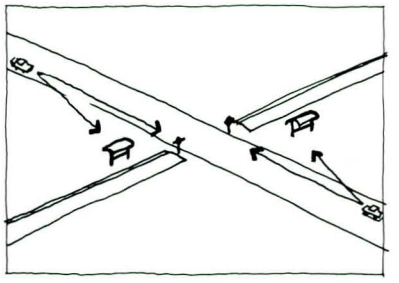
4. Principle: Canal / Arterial Crossing

Coordinate the design of canal arterial crossings to create a distinct identity that repeats throughout the system. The key ingredients are:

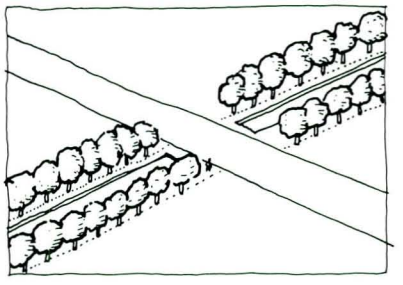
- an expanded canal right-of-way
- marking the canal / arterial crossing with the use of landscape elements such as trees and special paving materials, pedestrian amenities, (e.g., drinking fountains, benches, and shade elements), signage, and public art.



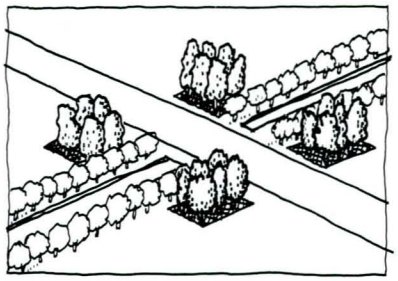
WIDEN CANAL BANK RIGHT OF WAY AT INTERSECTION



LOCATE THEME-IDENTITY MARKERS SO THEY ARE VISIBLE

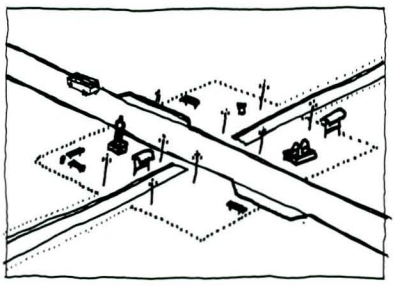


MAINTAIN CONTINUITY OF CANAL BANK LANDSCAPING



LANDMARK PLANTING PROVIDES ADDITIONAL SHADE

UNIFYING GROUND TREATMENT



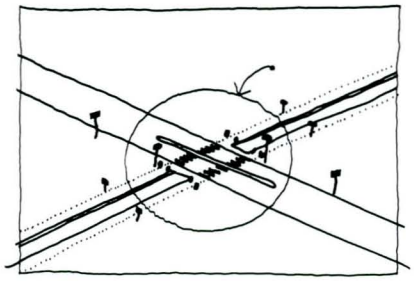
LIGHTING

DRINKING FOUNTAIN

HISTORIC MARKER - CANAL MAP

SEATING & BUS STOP

PUBLIC ART



APPROPRIATE DEVELOPMENT OF A CROSSING....

GRADE SEPARATION PREFERRED

5. Principle: Urban Identity

Urban and suburban areas should have distinct identities. Within urban areas the canal right-of-way should take on the characteristics of a highly-developed urban paseo. These design characteristics include:

- high-quality paved urban surfaces such as:
  - stone
  - unit paver concrete
  - fired brick
  - poured-in-place textured and / or integrally colored concrete
- high-quality urban seating
- shade structures to enhance pedestrian comfort
- low-water use fountains to cool adjacent outdoor areas passively
- cooling towers in appropriate areas
- arid-region shade trees on a planting grid, where appropriate, of not less than twenty-five feet on center
- appropriately screened lighting.

6. Principle: City Identity

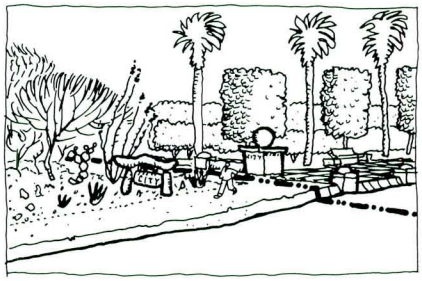
Unique aspects of each city should be reflected in the landscape and building character along the canal banks while maintaining regional identity.

CIVIC IDENTITY OCCURS WITHIN OVERALL GUIDELINES

7. Principle: City Boundaries

City boundaries should be identified through use of a different canal landscape treatment from one city to another.

NO



TOO MUCH CONTRAST · COORDINATION NEEDED

Continuity

Continuity of the canal system is important in order to reinforce the canals as a Valley-wide system. The use of the canal system as a continuous circulation system is important to uniting and linking all major recreation areas and other significant development nodes along the canal.

One of the major design concepts to provide continuity is unobstructed public circulation along the canal. Ideally, this public circulation path should be integrated for joint use with other pathway requirements (e.g., maintenance roads) and it should provide as little interruption at arterial street crossings as possible. The specific design of continuous elements need not be identical throughout the entire system. However, a common framework or idea is essential if the canal system is to be perceived as one continuous system.

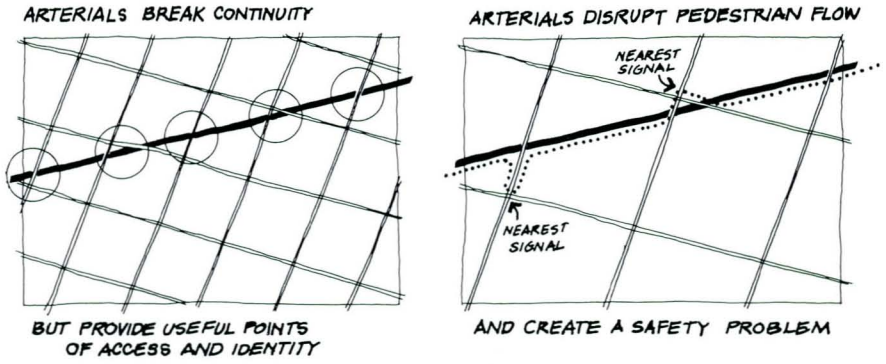
In addition to continuity in overall idea, a continuity of design standards from one city to the next should be implemented. One city's uniqueness might allow for responses different from another's, but the general standards and review process should be similar from one city to the next.

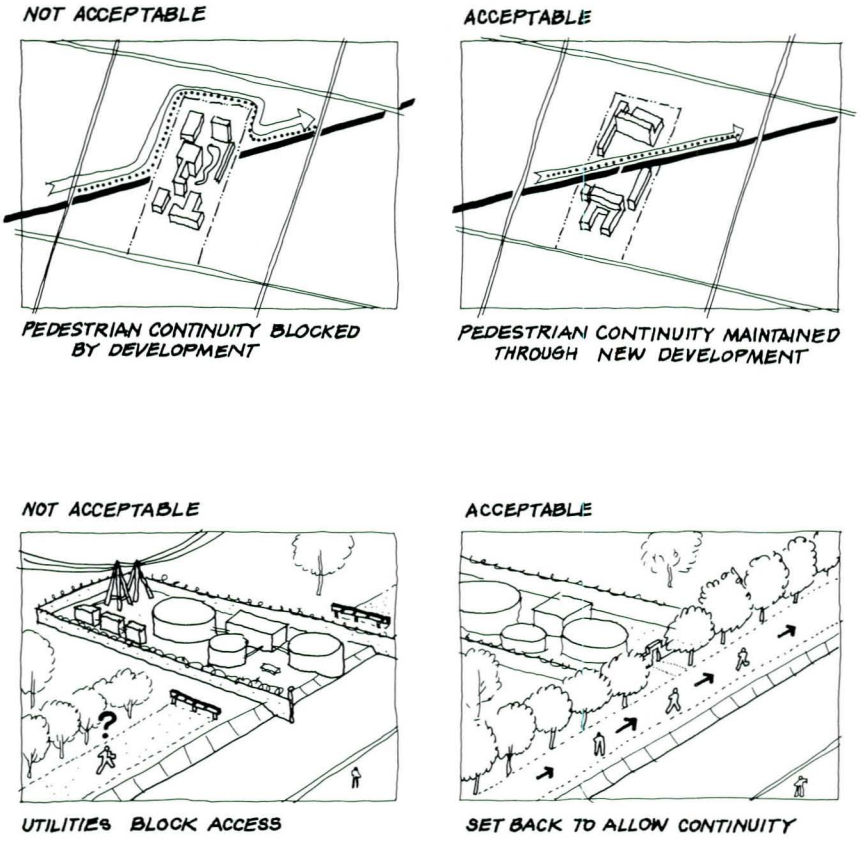
Landscape improvements are primary elements for reinforcing the linear character of canals and for encouraging community use. Continuity would also be reinforced by a single thematic identity and signage program marking access points and providing direction throughout the canal.

Continuity among design elements along the canal increases the possibility of diverse adjacent land uses.

1. Principle: Continuous Public Circulation

Continuous public circulation should be provided along the entire length of the canal bank system. Continuous public non-vehicular circulation should be provided and integrated with the twenty-foot-wide service access immediately adjacent to the canal water on both sides of the canal.



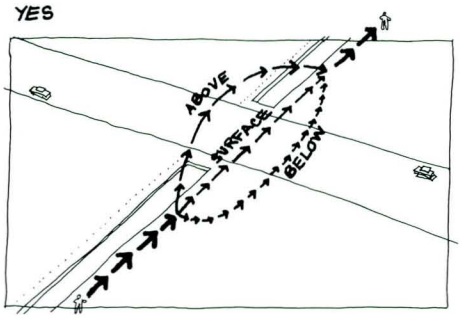


2. Principle: Existing Continuity Disruption

Where continuity of canal bank circulation is currently disrupted, efforts should be made to re-establish that continuity.

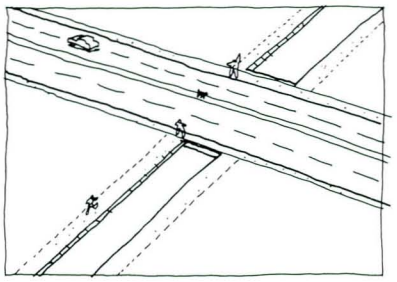
3. Principle: Continuity at Arterial Street Crossings

There should be physical continuity of the circulation system at major arterial crossings. The choice of method depends upon funding, amount and type of canal use at the crossing point, land use, existing development, visibility, traffic counts, speed, and width of street. Grade separation (i.e., above grade or below grade) is the recommended method to ensure continuity while providing maximum safety from vehicular traffic.



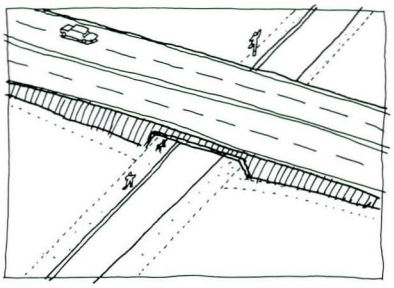
MAINTAIN PEDESTRIAN CONTINUITY AT CANAL/ARTERIAL CROSSINGS

NOT ACCEPTABLE



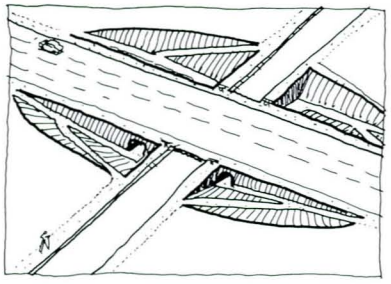
TYPICAL SITUATION: UNDEVELOPED SURFACE CROSSING

ACCEPTABLE



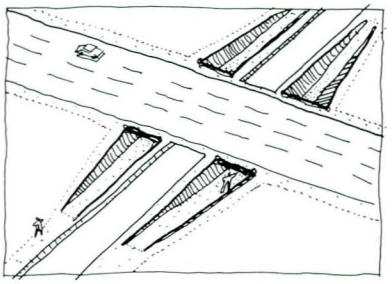
ARTERIAL ABOVE CANAL

ACCEPTABLE - NOT PREFERRED



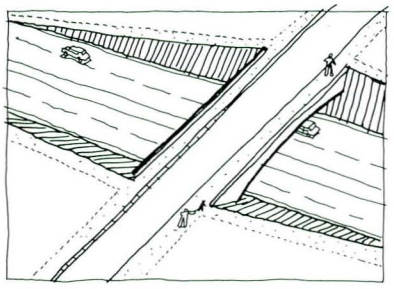
ELBOW TURNS AND CULVERTS DISRUPT CONTINUITY

ACCEPTABLE - PREFERRED



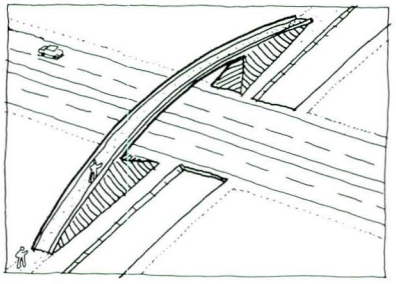
PEDESTRIAN UNDERPASS MAXIMIZES CONTINUITY

ACCEPTABLE



ARTERIAL BELOW CANAL

ACCEPTABLE



PEDESTRIAN BRIDGES

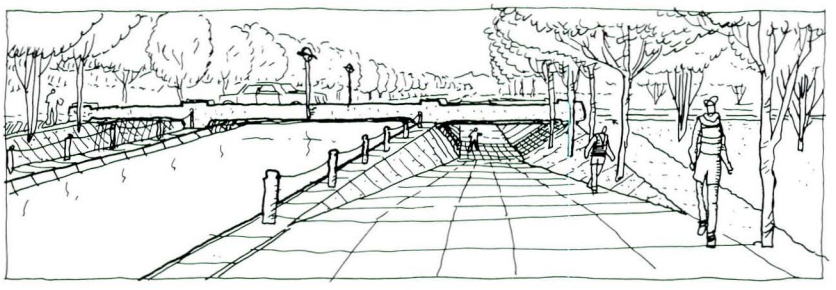
When grade separation is not possible, other safety measures should be provided, including (see Safety):

- clearly marked crosswalks with motorist warning signs
- a pedestrian-activated traffic signal
- a pedestrian / cyclist safety island within the middle of the road right-of-way
- vehicular rumble strips to warn oncoming traffic
- reduced speed zone, properly signed.

4. Principle: Design Continuity

While allowing for uniqueness of special conditions, adjacent land uses, and individual city image, there should be a consistent and continuous design identity for the entire system. Certain design elements that reinforce continuity should be incorporated within canal improvements, such as:

- canal-edge treatment
- pathway system
- grid of trees
- lighting
- signage.

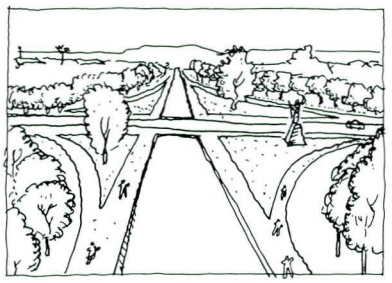


MAINTAIN PEDESTRIAN CONTINUITY

5. Principle: Canal-Edge Treatment

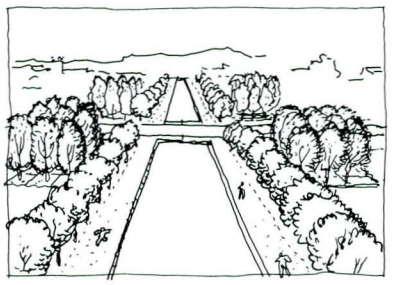
A common, improved canal-edge treatment will provide an identifiable design image that will increase the public's perception of canal multiple use.

AVOID



EMPHASIS ON THE INTERSECTION

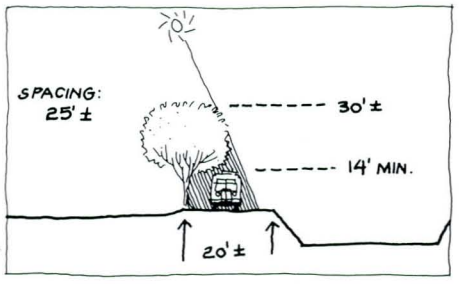
ACHIEVE



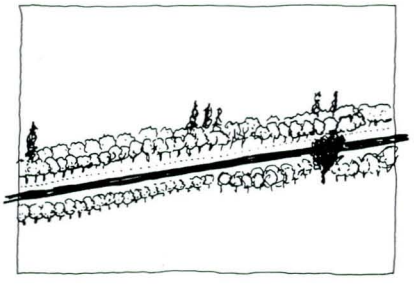
EMPHASIS ON CANAL CONTINUITY

6. Principle: Linear Landscape Concept

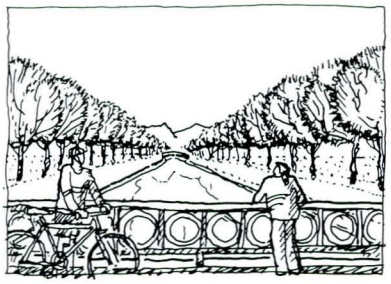
The continuity of the canals should be reinforced with a linear landscape that is consistent in overall theme but allows variety in detail and final design. The continuity of low and moderate water-use trees placed on a regular twenty-five foot planting interval will provide visual and design continuity with shade. Adjacent to the service access roadway, appropriate setbacks should be provided for tree limbs. Shade trees that can be pruned to allow fourteen feet of vertical access (for service and emergency vehicles) should be selected. In the vicinity of overhead power lines, shade trees which will not grow to a height that will interfere with the overhead lines should be selected. The goal is to provide continuous shade (80% on a site basis) on at least one side of the canal.



BASIC TREE PLANTING PLAN



DOMINANT LINEAR CHARACTER FOR THE CANAL LANDSCAPE PLAN



BRIDGES PROVIDE LONG VIEWS

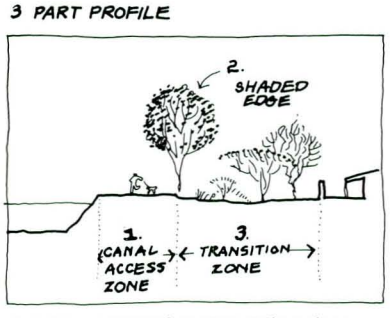
TREES ENHANCE THE LINEAR AND ARID LANDSCAPE CHARACTER OF THE CANALS.

7. Principle: Three-Part Linear Canal Profile

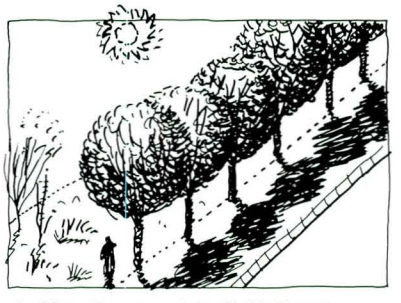
Continuity of the canal system can be reinforced by subdividing the canal right-of-way into three distinct use zones:

- the twenty-foot canal access zone
- the shaded tree edge adjacent to the non-water edge of the canal access zone
- a transition zone.

The canal access zone should have consistent design treatment within districts. The shaded tree edge should allow the unrestricted movement of service vehicles, while providing shade for canal users. In intensely used areas, both the canal access zone and the canal transition zone should be paved and developed as an urban paseo. In other areas, the transition zone may be used to screen views to or from the canal.



A 3 PART PROFILE FOR THE CANAL



SHADE IS WELCOME ALONG THE CANAL

8. Principle: Landscape Materials Selection Criteria

Selection of landscape elements should be based on life-cycle costs, (initial cost plus maintenance) and not solely on low initial cost.

Diversity

Diversity of site and landscape development adds a visual richness to the physical environment. A specific site design should respond to the uniqueness of city and neighborhoods, adjacent land uses, and other special conditions while maintaining the overall canal system identity. There should be a diversity of individual site designs. Also, diverse land uses that provide active public spaces along the canal are encouraged. Active public uses such as parks, public buildings, retail and commercial uses, residential (single-family and multi-family) as well as mixed-use developments in appropriate locations will add a richness to the canal system environment.

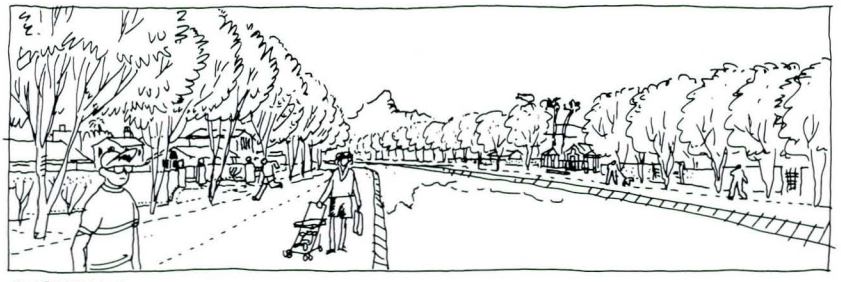
Every design should adhere to the general principles and respond to the uniqueness of the situation (i.e., site, adjacent land uses, and surrounding landscape).

1. Principle: Canal Right-of-Way Design Diversity

There should be a diversity of design responses for varied site conditions.

DIFFERENT SEGMENTS OF THE CANAL WILL HAVE DIFFERENT CHARACTERS

URBAN PASEO



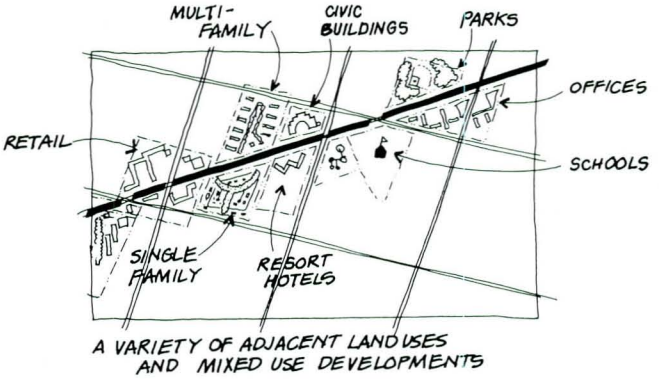
SUBURBAN

RURAL - AGRICULTURAL

2. Principle: Adjacent Land-Use Diversity

In order to reinforce the public nature of the canal system, diverse land uses that provide an active public realm are encouraged. Mixed uses are preferred over single-use zones. New developments that would provide active public use and be compatible with the canal system include:

- open space (parks and schools)
- other public land uses (libraries, cultural facilities, municipal services)
- quasi-public land uses (golf courses, resorts, health clubs, research parks)
- retail / commercial (shopping, entertainment, restaurants, cafes)
- multi-family housing
- mixed-use office development
- single-family housing.



3. Principle: Diversity of Adjacent Site Design

If canal continuity is strong, greater adjacent site diversity is possible.

Safety

Every use of the canal right-of-way should strive to maximize public safety. The overriding concept is to develop a safe canal environment that is accessible, popular and usable. This will require coordination with individual city standards and practices. To achieve support and advocacy for the canals, the public must be confident that concern for safety has shaped the environment. General areas of consideration, based on increased and high-intensity of use, to be considered and resolved include:

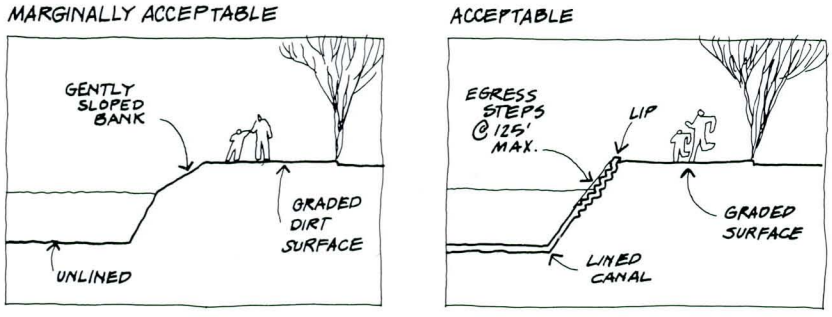
- edge treatment of canal that discourages slipping and falling and that enables people (and animals) to get out of the canal
- surfaces that are appropriate for the type and amount of traffic (e.g., emergency vehicles, pedestrians, bicyclists, joggers, equestrians) as well as for control of erosion
- lighting that is reliable and appropriate for location
- emergency communication, including "call boxes" and public telephones
- drinking fountains, shade and seating
- safety of canal users at canal and road crossings
- signage that is reliable and comprehensible
- public safety program coordination (electrical, telephone / telecommunications, gas, water, sewer, etc.).

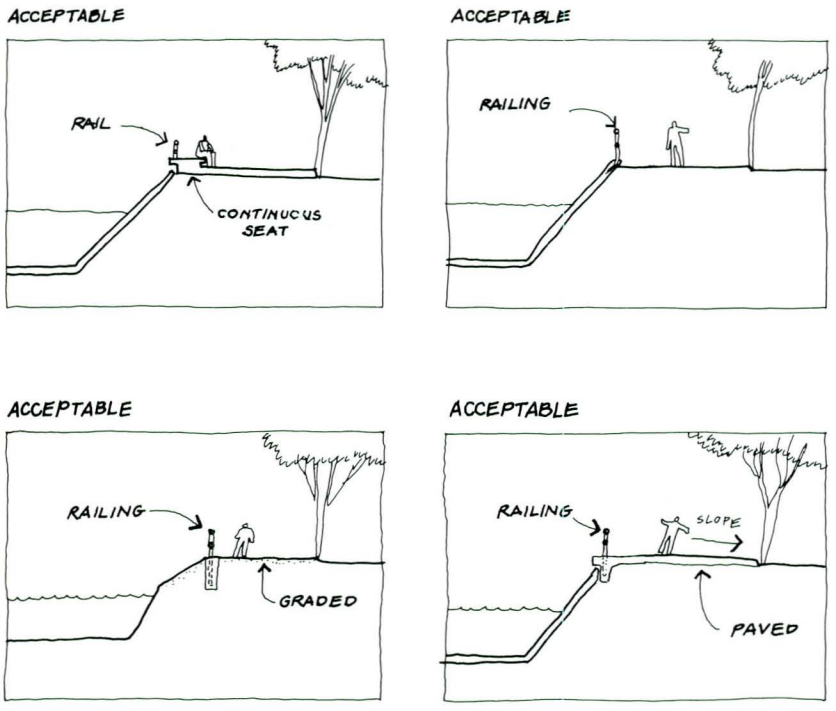
1. Principle: Minimize the Potential Hazards Near Water For Users

Canal edges should be clearly marked with material changes, curbs, guard rails in high-use areas, or plant materials, etc. Edge treatment of the canal should allow for easy exit if someone accidentally falls into the water. Canal bank edge treatment should be appropriate for the type and intensity of adjacent use.

In newly-lined canals, the canal profile should allow for continuous ease of emergency exit. Where this can not be achieved with profile design, emergency steps should be provided in the canal to facilitate safe emergency exiting from the canal.

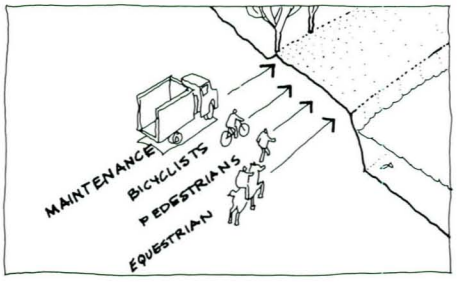
- recommended minimum spacing between sets of emergency steps is 125 feet or less, depending on the intensity of use
- railings are recommended in intensely-used segments
- a continuous seating ledge may be used if supplemented by a railing.





2. Principle: Canal Bank Use

Potential hazards of increased canal bank use should be minimized. Along the canal, pedestrians should have priority. The next priority is shared by low-speed bicyclists and equestrian use. (High-speed bicycling is not recommended along canal banks.) A mix of all types of users along the canal bank is generally desired.

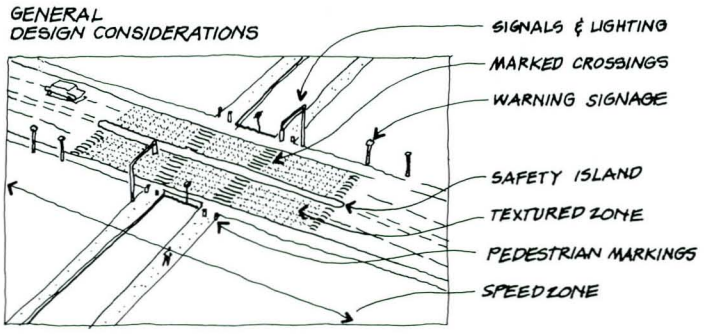


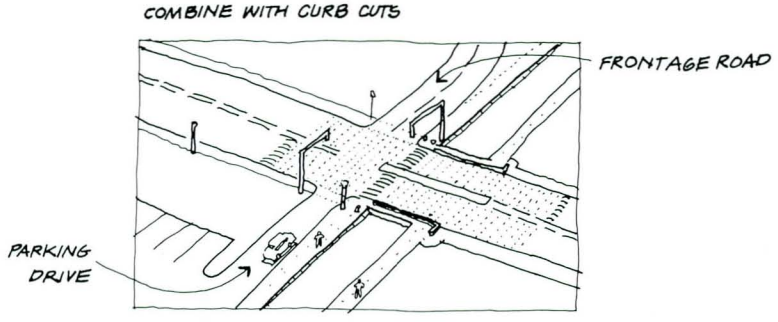
SHARED USE IS THE EXPECTED PATTERN FOR THE LENGTH OF THE CANAL

3. Principle: Safety at Surface Arterial Crossings.

The design treatment of pathways and major streets should warn users of crossing hazards. Grade separations or traffic lights should be considered for all major arterial crossings.

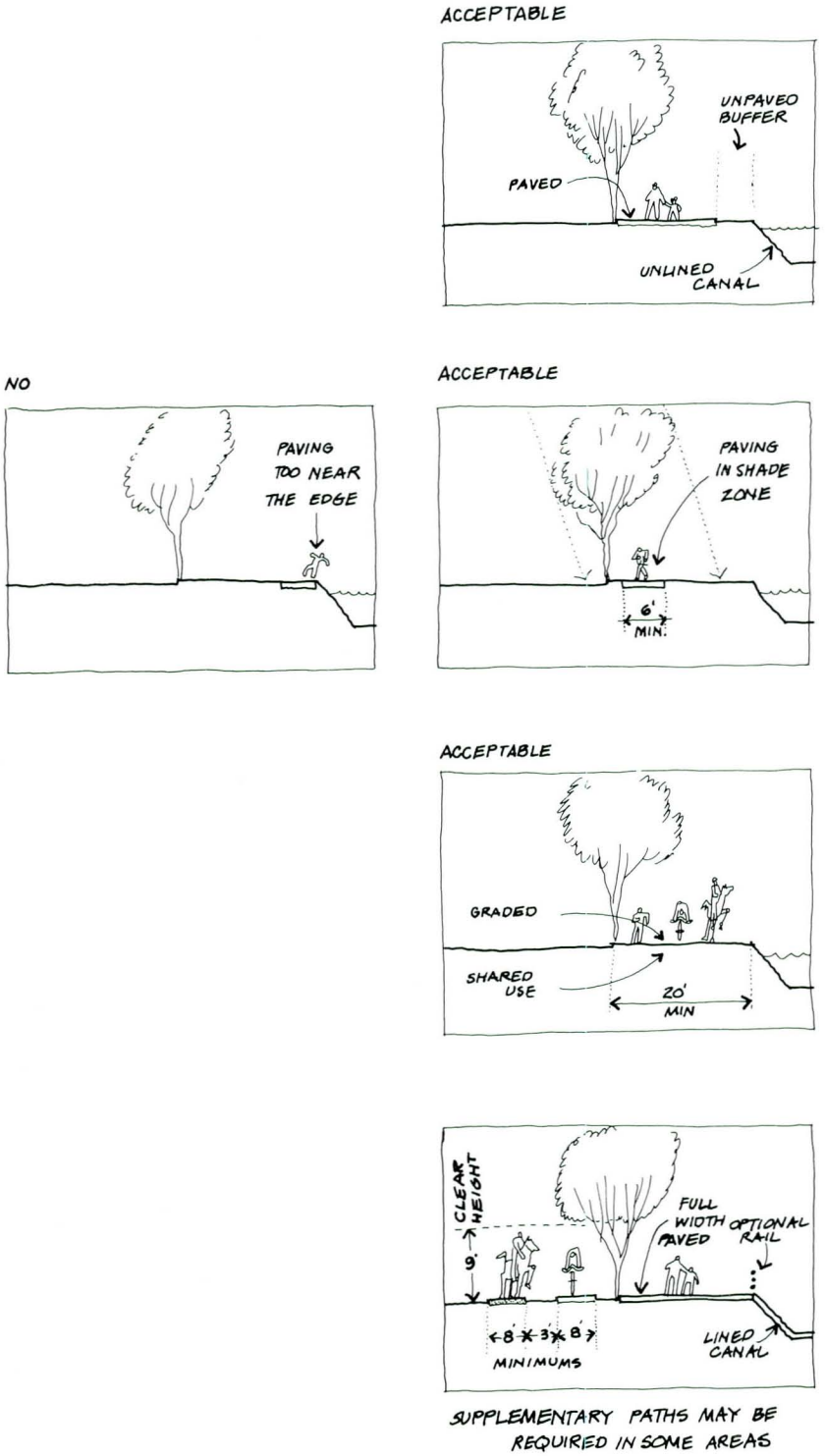
- provisions for pedestrian crossings vary with intensity of use and amount of traffic
- grade separation is generally recommended for safety and canal continuity
- detailed design of arterial crossings should provide signals, signage, and cues that announce and regulate both street and canal bank user traffic.





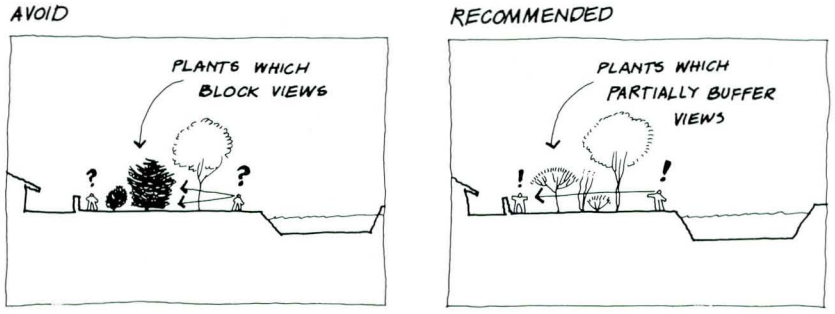
4. Principle: Adequate Pathway Dimensions

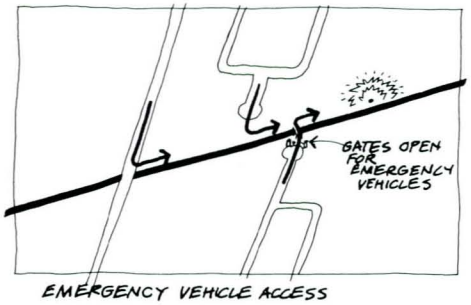
Pathways should be wide enough to accommodate multiple uses. Incompatible canal uses (active versus passive) should be separated. As intensity of use increases, wider use-access zones should be provided (e.g., the minimum of twenty feet should be increased as appropriate).



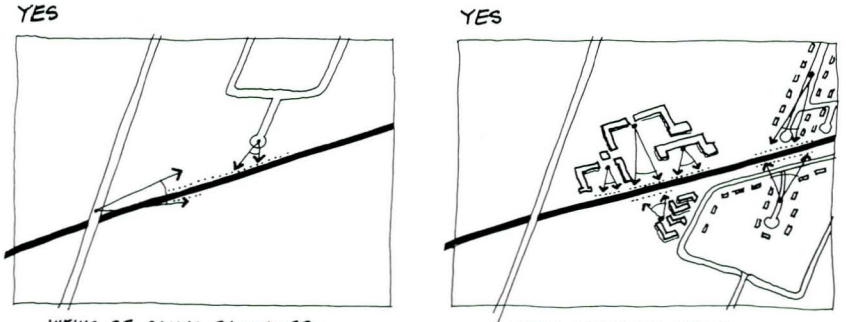
5. Principle: Security and Visibility

Site planning of new developments should make users of the canal bank visible from the development. Landscape elements along the canal should not be so dense as to provide hiding places. Landscape elements at canal / arterial intersections and other adjacent streets and cul-de-sacs should not block views of the canal and should allow long views of the canal banks for police, security, etc.





EMERGENCY VEHICLE ACCESS
FROM ARTERIALS AND LOCAL ROADS



VIEWS OF CANAL BANK USERS
FROM ARTERIALS & LOCAL ROADS

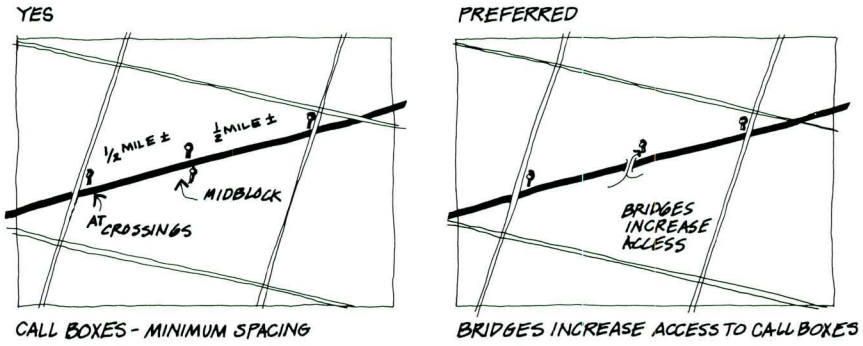
NEW DEVELOPMENTS
EMPHASIZE VIEWS OF CANAL USERS

6. Principle: Lighting

Security lighting is highly recommended at canal arterial crossings, other access points, and grade separations. Continuous canal lighting is recommended for all canal segments, especially heavily-used portions. Lighting should be as low as possible and be directed only onto canal right-of-way. Lights should not shine onto private residences.

7. Principle: Call Box / Public Telephone Spacing

Public telephones or emergency call boxes should be located at a minimum interval of about one-half mile with units at each arterial intersection.



CALL BOXES - MINIMUM SPACING

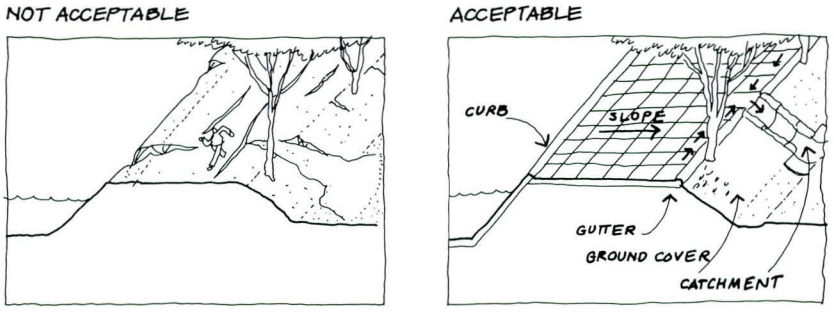
BRIDGES INCREASE ACCESS TO CALL BOXES

8. Principle: Coordination with Utility Companies

Any development or proposed uses should be coordinated with utility companies to ensure that safety standards and practices are implemented. The potential safety conflict of new development near electrical lines, gas lines, and other utility uses should be minimized. No permanent uses, such as rest areas or playgrounds, should be allowed near any transmission towers.

9. Principle: Appropriate Surface Maintenance

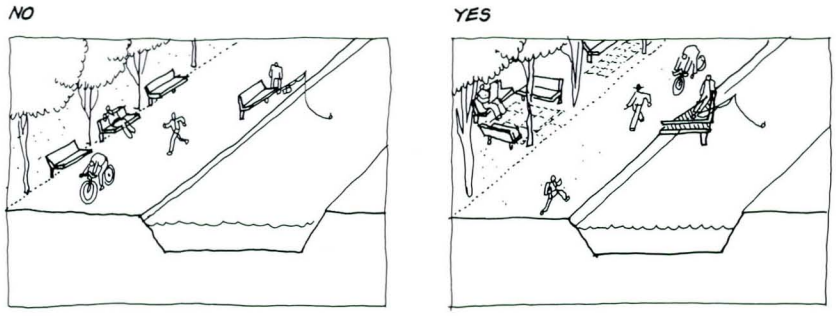
All pedestrian-use surfaces (both paved and unpaved) should be inspected and maintained on a regular basis to prevent potential hazards to the canal user. Storm water run-off should be controlled so canal banks and edges are not eroded.



SURFACE MAINTENANCE IS NECESSARY FOR USER SAFETY

10. Principle: Separation of Incompatible Uses

More active recreational uses should not interfere with quiet recreational uses.



LOCATE QUIET ACTIVITIES AWAY FROM MORE ACTIVE USES

Conclusion

The Metropolitan Canal Project has begun to generate the regional cooperation that is mandatory if full potential of the Valley canal system is to be realized. The planning process, facilitated by the Junior League of Phoenix, was invaluable to producing the Regional Design Framework. This regional design and planning project reflects only part of the total effort and time expended by the project team, consultants, SRP professionals, Junior League of Phoenix volunteers, city representatives and professionals, and citizen representatives in countless meetings, workshops, and presentations. It is hoped that this important planning process will continue, guided by the design framework proposed by this report.

Afterword

The multiple use of the 181-mile canal system has tremendous financial and cultural implications for the entire urbanized region. To achieve full potential of the system requires a long-term regional conservation and development plan. Any implementation measure should acknowledge the public resource aspects of the canal system and the need to manage this valuable public resource in a regional context.

This section reflects the input of approximately 62 participants from Valley city staffs, including the mayors of six cities, who attended the Metropolitan Canal Forum, April 26, 1990.

Implementation Suggestions

- All Valley cities should "adopt in principle" the Design Guidelines of the Metropolitan Canal Project.
- All Valley cities should prepare a Canal Master Plan for the canals within their city boundaries.
- All Valley cities should negotiate Multiple-Use Master Agreements with the Salt River Project.
- Consideration should be given to creating a Canal Conservation and Development Commission. This group could initially be funded by each of the Valley cities, which would recoup their investment as development reached a certain level. It could be structured in the manner of the Arizona Municipal Water Users Association, the (San Francisco) Bay Area Conservation and Development Commission, or the California Coastal Commission. This Commission should include representatives of all Valley cities, SRP, and major user groups. A professional advisory staff is also suggested. The role of this group would be to promote not only the conservation and development of the canals, but also the long term regional character of the system.
- The Salt River Project should consider augmenting their existing engineering expertise with planning and architectural professionals to assist in the management of the multiple-use projects.
- All Valley cities should consider updating their Recreational Master Plans to consider the potential impact of the canal system.
- All Valley cities should consider updating their General Plan to acknowledge the impact of development and improvements on the canal system.
- All Valley cities should consider demonstration projects providing positive examples of development oriented toward the canal, and meeting established design criteria.

Community Involvement

Community involvement at a grass-roots level will be an important factor in making new development successful and vital. Suggestions for achieving community involvement include:

- disseminating information through community groups and regional citizens' committees
- establishing more events on the canal banks
- using the media to promote canal use and awareness
- developing an informational network for those living near canals
- utilizing better those city canal / recreation programs already in existence
- using demonstration projects to generate public interest.

Funding

One significant source of funding will be private developers responsible for canal right-of-way improvements adjacent to their development (similar to street improvements). For the improvement of sections of the canal system which are planned as primarily linear recreational areas, cities should allocate a portion of proposed park and recreation budgets. Where proposed public-use development is greater than existing budgets will allow, multiple use of the canals will require creative funding from both public and private sectors. Possible sources of needed funding include:

- bond elections
- Arts Commission grants / projects
- community facilities districts
- private donations
- civic groups' contributions
- development impact fees
- federal grants through Arizona State Parks land and water conservation fund
- redirection of lottery funds
- state transportation funding for alternative transportation
- fund raising events
- developers' projects.

Other specific funding-related suggestions generated at the Forum were to:

- create a lobby for funding
- create incentives for builders and buildings
- complete demonstration projects to increase citizen awareness
- use open-space projects as attractions for developer interest in adjacent parcels
- develop a consortium between cities and county to fund regional projects
- investigate funding tactics in other cities' waterfront development areas.

At the Metropolitan Canal Forum, funding was not perceived as a major obstacle. Improvements will be dictated to a certain extent by available funds, but it is projected that new improvements will also generate interest in funding similar projects. Implementation of canal improvements will be a long-term project. Development nodes will be implemented first at the most economically appropriate locations. Infill projects, both public (including linear parks) and private, will follow. However, providing a supportive regional framework will encourage investments in individual projects as they are perceived as part of a larger diverse system offering many amenities along a linear system through many Valley cities.

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