



Chollas Creek South Branch Implementation Program

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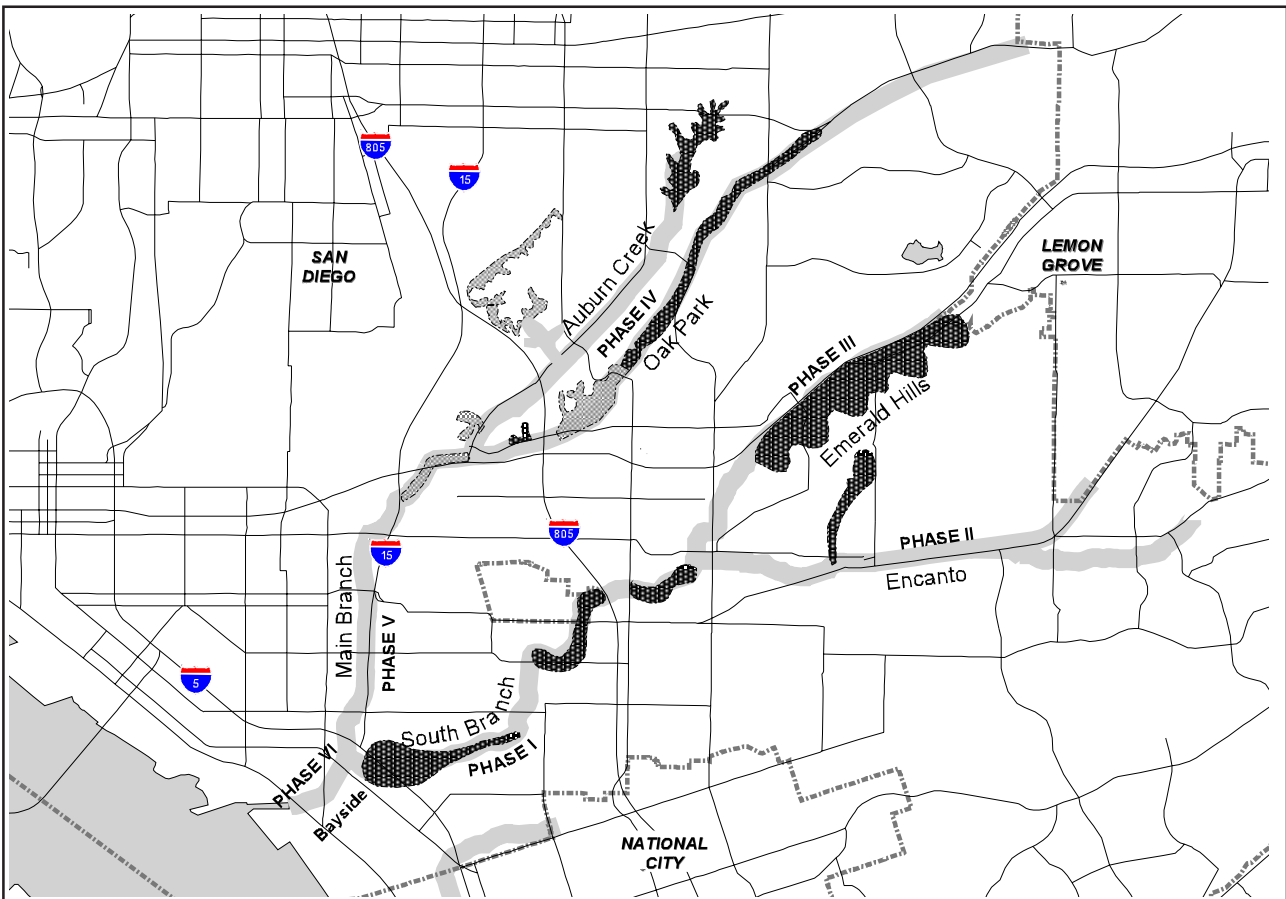
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Chollas Creek

South Branch Implementation Program





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RESTORATION AND REHABILITATION OF NATURAL HABITAT AREAS

- | | | | |
|---|------------------------------------|---|----------------------------|
|  | Already Identified |  | Chollas Creek Alignment |
|  | Potential Sites need further study |  | City of San Diego Boundary |

EXECUTIVE SUMMARY

The Chollas Creek South Branch is one of seven branches within the Chollas Creek drainage basin. The Chollas Creek Enhancement Program identifies the South Branch for Phase I implementation. It was selected because of its central location, relationship to major civic (schools, parks, colleges) and commercial development, as well as for the opportunities it offers for wetland restoration and rehabilitation, and its ultimate relationship to San Diego Bay through the Bayside section (Phase VI).

The purpose of this Implementation Program and Wetlands Management Plan is to serve as a baseline planning document for enhancing water quality and the quality of wetland resources associated with this urban creek. The primary reason is to document and preserve the few remaining wetlands within the creek's reach while allowing for development of the area. In addition, this document identifies areas where existing wetlands may be enhanced, where new wetlands may be created, and where wetlands resources may be linked to the community. Preservation and restoration of wetlands associated with Chollas Creek will not only improve the quality of wetlands and waters, but also function as a link between natural and built environments. This would create a setting for quality urban development, redevelopment, flood management, and the preservation of open space and natural resources within the heart of our City. The quality of development within the Chollas Creek South Branch will be regulated by the Design/Development Guidelines included in the Chollas Creek Enhancement Program.

The overall goal of the Phase I Chollas Creek South Branch Wetlands Management Plan is to improve environmental or economic conditions within the central San Diego communities and establish a stable, healthy and sustainable creek environment. This goal can best be achieved through a proactive planning process focusing on the development of a comprehensive approach to wetlands protection and enhancement. The following objectives are identified in the Wetlands Management Plan:

- Improve aquatic habitat including surface water quality;
- Identify remaining functional wetlands habitats and their restoration opportunities;
- Reduce flood inundation risk and associated damages;
- Reduce invasive species;

- Improve recreation opportunities; and
- Create linkages between the creek and the surrounding communities.

The above objectives will be met through the following planning measures:

- Establish a set of specific guidelines for preserving, restoring and improving wetlands and water quality along the Chollas Creek corridor;
- Establish a set of specific design guidelines for preventing flood damage, establishing a trail system along the creek, linking surrounding communities with the creek corridor, and allowing for development without further impacting the creek corridor;
- Facilitate and expedite water resources agency permit processes through identification of wetlands mitigation opportunities (preservation and restoration) along the creek and through water quality improvement provisions; and,
- Foster an understanding, communication and a common vision among developers, planners and community residents.

This Implementation Program and Wetlands Management Plan makes site specific recommendations by sub-area segments on wetland restoration and rehabilitation, upland restoration, trail development, landscaping, channel reconstruction, interpretive programs, and arts projects. The implementation program that follows is the product of the consulting work by Estrada Land Planning and KEA Environmental who prepared a detailed assessment of wetland resources and developed proposals for their enhancement. The work on this Wetlands Management Plan was financed through a grant by the California Coastal Conservancy, through the allocation of \$95,000. The Funding Proposal Tables that follow show the projected overall cost for Phase I-South Branch improvements (Table 1) and will be used for the programming of additional funding requests for implementation. Table 2 allocates the available Coastal Conservancy funding for this Phase I. These allocations have been discussed with affected community groups and agencies who support the proposed approach.

TABLE 1

**PHASE I - FUNDING PROPOSAL
CHOLLAS CREEK ENHANCEMENT PROGRAM**

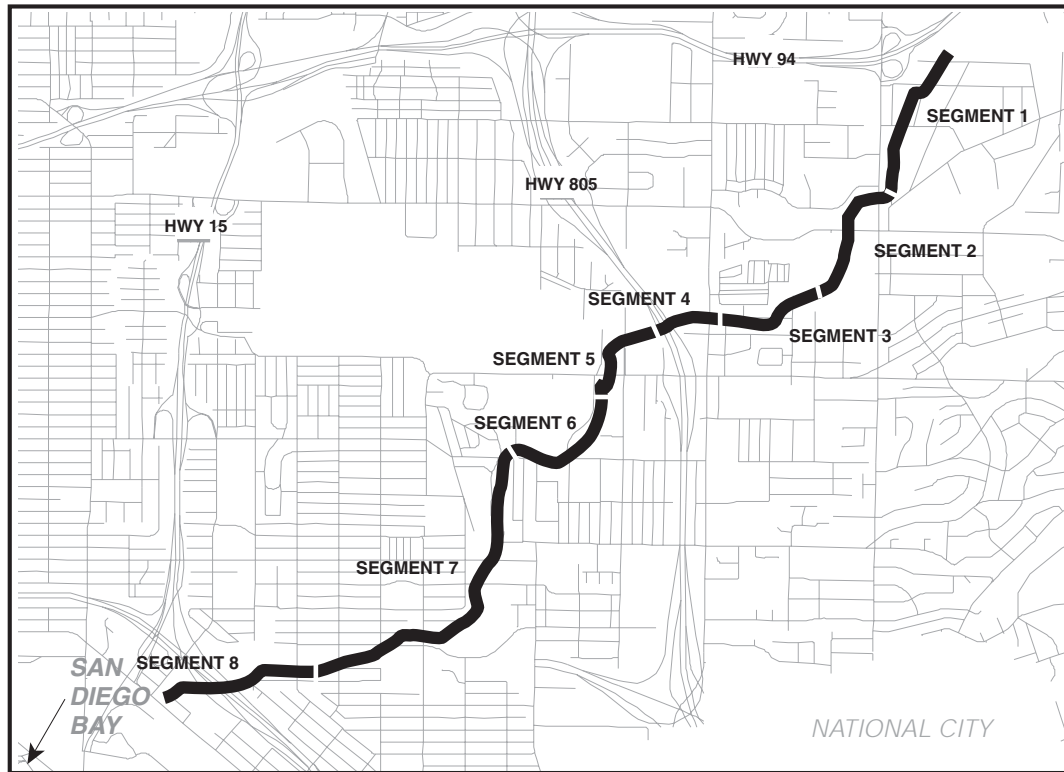
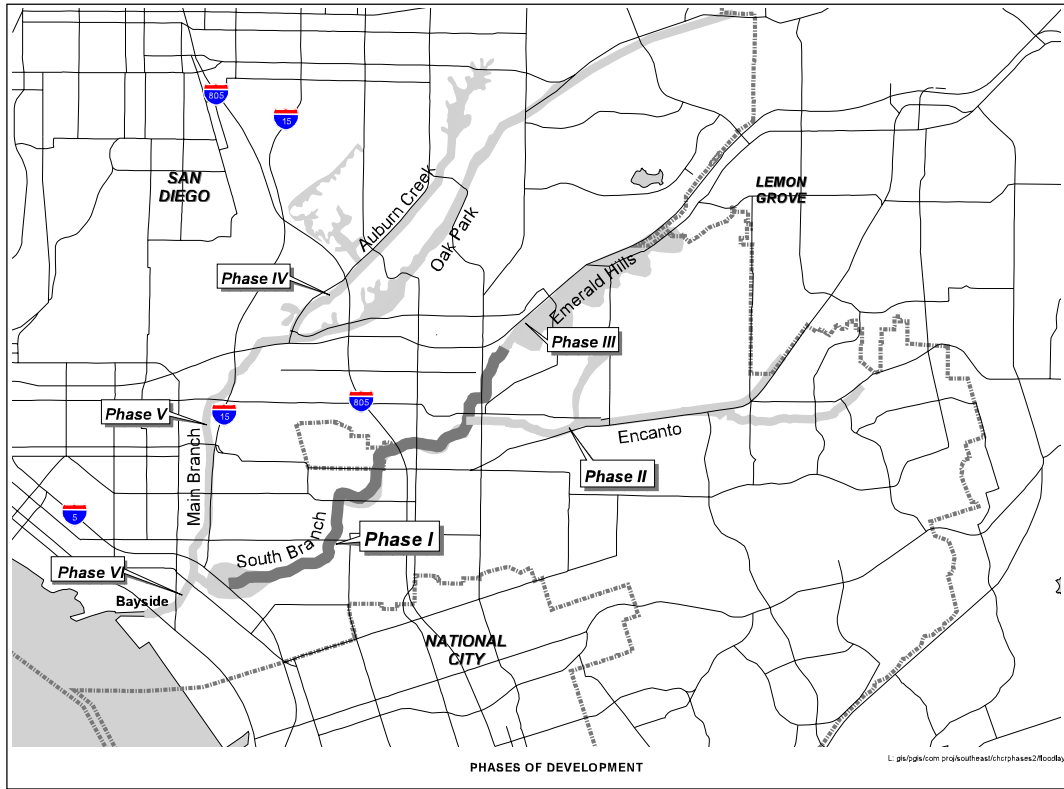
Project & Description	Funding Request	Phasing	Responsibility	Notes/Priority
<p>SEGMENT 1 Gompers Outdoor Learning Laboratory</p> <ul style="list-style-type: none"> • Complete Laboratory/ Site Improvements • Personnel • Program Development <ul style="list-style-type: none"> • Arts Project • Land Acquisition/Imp. • Trail Linkages 5154 lineal feet x \$50 	<p>\$402,000</p> <p>\$701,000</p> <p>\$150,000</p> <hr/> <p>\$1,253,000</p> <p>\$500,000</p> <p>TBD</p> <p>\$258,000</p>	Short Range 1 year	Planning Dept. lead in collaboration with the Environmental Health Coalition and Schools	High priority for educational grant and Water Quality project grant.
<p>SEGMENT 2A Science Education Center North Market St. Pathway</p> <ul style="list-style-type: none"> • Ramp/stairway link to Horton Elementary • Identification and Interpretive Signage • Staging Area • Interpretive Station <ul style="list-style-type: none"> • Wetlands Restoration (1.5 acres) 	<p>\$79,000</p> <p>\$37,000</p> <p>\$30,000</p> <p>\$150,000</p> <hr/> <p>\$296,000</p> <p>\$75,000</p>	Short Range 5 years	Planning Dept. lead in collaboration with the Elementary Institute of Science, the property owner and the Jacobs Foundation.	High priority for Coastal Conservancy Grant
<p>SEGMENT 2B Multi-Use Pathways at Market Creek Plaza</p> <ul style="list-style-type: none"> • East Side Pathway • West Side Pathway • Unity Pedestrian Bridge • Trails Linkages (funded) 	<p>\$ 75,000</p> <p>\$89,000</p> <p>\$208,200</p> <hr/> <p>\$ 372,200</p>	Short Range 5 years	Planning Dept. lead in collaboration with the Jacobs Foundation	High priority for Coastal Conservancy Grant
<p>SEGMENT 3 Water Department Parcel</p> <ul style="list-style-type: none"> • Linear park/trail linkages 1513 lineal feet x \$50 • Channel enhancement 	<p>\$76,000</p> <p>\$400,000</p>	ShortRange 5 years	Planning Dept. lead in collaboration with City Water Dept.	Priority for trail linkage in community.

SEGMENT 4 Creek Path/Trail Linkages <ul style="list-style-type: none"> • Native species replanting • Sidewalk improvements 4,000 lineal feet x \$50 • I-805 underpass study • Arts Project 	\$50,000 \$200,000 \$1,000,000 \$500,000	Short Range 5 years	Art Commission lead in collaboration with Planning Dept	Priority for Arts and Culture Dept. project and Water Quality project grant.
SEGMENT 5 YMCA Site <ul style="list-style-type: none"> • Hydraulic Analysis • Wetlands Restoration 9.4 acres • Trail Linkages 2487 lineal feet (2 sides) x \$50 	\$325,000 \$37,800 \$124,000 <hr/> \$486,800	Short Range 5 years	Planning Dept. lead in collaboration with Water Dept., Wetlands Restoration experts	Future grant funding source or potential private development mitigation project
SEGMENT 6 Imperial Marketplace Project <ul style="list-style-type: none"> • Funded by SEDC 		Short Range under construction	Southeastern Economic Development Corp. (SEDC)	Complete
SEGMENT 7 Sidewalk trail systems San Pasqual St. <ul style="list-style-type: none"> • Public right-of-way trail 3950 lineal feet Southcrest/Alpha Street <ul style="list-style-type: none"> • 2674 total lineal feet (838 lineal feet along park site) • Art Project/Construction 	\$197,500 \$133,700 \$620,000	Short Range 5 years	Art Commission Lead in collaboration with Planning Department	Part of trails grant request.
SEGMENT 8 “252 Corridor” Public Park North side of creek (funded) South side of creek: <ul style="list-style-type: none"> • Wetlands Restoration/ Botanical Gardens With Art Component • Trail Linkages (676 lineal feet x \$50) • Active and passive Park 	\$453,000 \$33,800 <i>funded Separately</i> \$486,800	Short Range 5 years	Park and Recreation in collaboration with Planning Dept. and Arts and Culture Commission.	Priority for Coastal Conservancy Grant Mitigation Credits

TABLE 2

**PHASE I - FUNDING PROPOSAL
CHOLLAS CREEK ENHANCEMENT PROGRAM - SELECTED SEGMENTS
Priority for Coastal Conservancy Grant Funding / DRAFT Oct. 4, 2001**

Project & Description	Funding Request	Phasing	Responsibility	Notes/Priority
SEGMENT 2A Science Education Center North Market St. Pathway <ul style="list-style-type: none"> • Ramp/stairway link to Horton Elementary • Identification and Interpretive Signage • Staging Area • Interpretive Station <ul style="list-style-type: none"> • Wetlands Restoration (1.5 acres) <p align="right">Total</p>	\$79,000 \$37,000 \$30,000 \$150,000 <hr/> \$296,000 \$75,000 <hr/> \$371,000	Short Range 5 years	Planning Dept. lead in collaboration with Elementary Institute of Science, property owner and the Jacobs Foundation.	Priority for Coastal Conservancy Grant
SEGMENT 2B Multi-Use Pathways at Market Creek Plaza <ul style="list-style-type: none"> • East Side Pathway • West Side Pathway • Unity Pedestrian Bridge • Trail Linkages (funded) <p align="right">Total</p>	\$75,000 \$89,000 \$208,200 <hr/> \$372,200	Short Range 5 years	Planning Dept. lead in collaboration with the Jacobs Foundation.	Priority for Coastal Conservancy Grant
SEGMENT 5 YMCA Site (Alternate 2) <ul style="list-style-type: none"> • Hydraulic Analysis • Wetlands Restoration (9.4 acres) • Trail Linkages <p align="right">Total</p>	\$325,000 \$37,800 \$124,000 \$486,800	Short Range 5 years	Planning Dept Lead in collaboration with Water Dept. Wetlands Restoration Experts.	Priority for Coastal Conservancy Grant
SEGMENT 8 "252 Corridor" Public Park South side of creek (Alternate 1) <ul style="list-style-type: none"> • Wetlands Restoration/ Botanical Gardens with Art Component • Trail Linkages • Active and Passive Park <p align="right">Total</p>	\$453,000 \$33,800 <i>funded Separately</i> <hr/> \$486,800	Short Range 5 years	Park and Recreation lead in collaboration with Planning Dept. and Arts and Culture Commission.	Priority for Coastal Conservancy Grant Mitigation Credits
TOTAL GRANT	\$ 1,230,000			



PHASE I – SOUTH BRANCH

Existing Creek Conditions

San Diego has unique geographic and topographic features that give our region a truly special character. Our system of mesas, coastal plains, canyons and creeks are the elements that comprise this landscape. Of these elements, only canyons and creeks have the capability to link one area with another. Although considerably threatened by development, the many forks of Chollas Creek still present opportunities to create biologically functional wetlands while allowing for human use. Chollas Creek is the drainage channel that traverses Southeastern San Diego from Mid-City and Lemon Grove to San Diego Bay. The creek was once well known to Native Americans, who used it as their major trail through this portion of the region. The natural drainage channel has been substantially modified in the past 50 years following urban development and now consists of both earthen and concrete lined inverts. Residential development, business complexes, roads and freeways have segmented the creek's geography to the extent that almost all of its surrounding open space has been lost. Therefore, the City of San Diego and the communities surrounding the creek have made the management and restoration of Chollas Creek and its associated wetlands a high priority. With the projected growth of the Southeastern San Diego communities to reach over 300,000 people in the next ten years, Chollas Creek may hold the key for the revitalization of these communities. Design/Development Guidelines and management measures to reach this goal are described in the wider range Chollas Creek Enhancement Program, and are further detailed in this Phase I Wetlands Management Plan for Chollas Creek.



Existing Conditions

The South Branch Boundaries

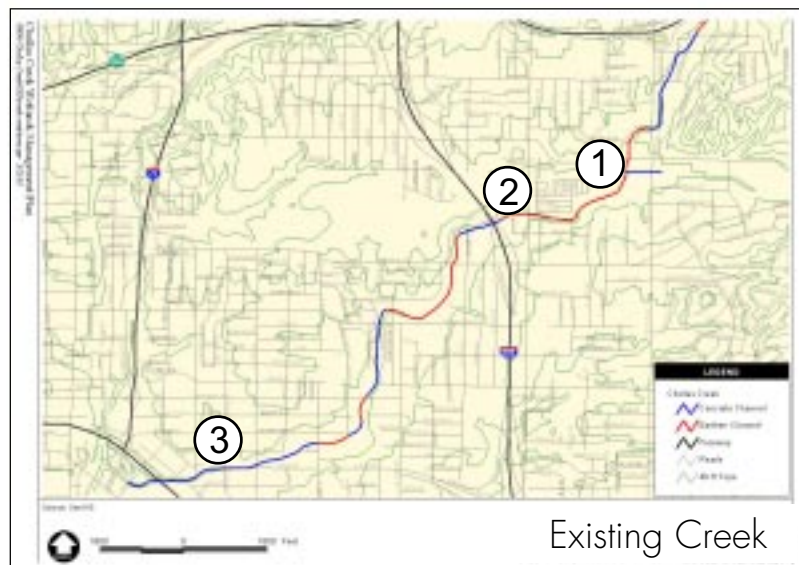
The Chollas Creek South Branch (Phase I) spans from Martin Luther King Jr. Freeway (State Highway 94) at the Kelton Road intersection, to Interstate 5 (I-5) south of downtown San Diego at the junction with State Highway 15. The creek then empties into San Diego Bay. The creek flows through a portion of Emerald Hills and the neighborhoods of Lincoln Park and Southcrest. The study area is mostly developed; therefore, for analysis purposes, a 500-foot buffer on either side of the creek was used as the study area boundary. The majority of the study



area consists of roads (including three freeways: I-5, I-805 and SR-94), high-density residential development, commercial development, public services, utilities, a transportation terminal and a cemetery. Open space is limited, however, a large expanse of open space still exists at the west end of the study area close to I-5 and in the middle section of the study area east of I-805. Both areas are planned for development.







The study area is also located just south of the Multiple Habitat Planning Area (MHPA) of the City's Multiple Species Conservation Program (MSCP), which extends north of the northernmost study area boundary along Highway 94 on both sides of the creek. At the beginning of this study in early 2000, two areas containing the last remnants of riparian habitat have since been developed: the Imperial Marketplace south of Imperial Avenue and the Market Creek Plaza of the Jacobs Family Foundation south of Market Street and the trolley station.

For the most part, the creek runs through a human-made channel that in two sections has been recently encased in concrete. In some places flood walls and flood dividers have been constructed, while in other places the creek bed is concrete-lined on at least one of the banks. Phase I Chollas Creek South Branch flows through an earthen channel in three places within the study area, (1) from Euclid Avenue to I-805, (2) from 45th Street to Imperial Avenue; and (3) for a very small stretch between Z Street and Boston Avenue.





Chollas Creek South Branch - Phase I Areas

- | | | | |
|---|---|---|---|
|  Habitat Restoration or Rehabilitation |  Reconstruction / Arts Project |  Parks |  Schools |
|  Tunnel / Bridge Arts Project |  City of San Diego Boundary | | |

Study Methods

KEA Environmental Consultants biologists first reviewed aerial photographs of the creek area and based on this information, conducted several field investigations to identify biological and wetland resources within the study area. Field investigations took place on May 15 and 22, and July 6, 2000, and included a biological site assessment including the delineation of vegetation communities, identification of potential sensitive plants and animals and delineation of wetlands resources using the 1987 Corps Wetlands Manual. The consultants mapped all biological resources in the field using 1:24,000 scale United States Geological Survey (USGS) topographic maps of the project area. All plant and animal species were identified to the level possible and recorded. The biological resources were also evaluated based on existing biological data sources for the project vicinity (i.e., the California Natural Diversity Data Base (NDDDB); Multiple Species Conservation Program (MSCP) sensitive species lists and maps; Bauder 1995; Sakrison and Bauder 1997; and, Skinner and Pavlik 1994). In addition, Nasland Engineering undertook a hydrological field assessment on May 22, 2000.

Plant and animal species were identified by direct observation and indirect signs such as the evidence of scat, tracks, calls, nests, or burrows. Scientific nomenclature used throughout this report conforms to Hickman (1993) and Skinner and Pavlik (1994) for plants; and Laudenslayer et al. (1991) for amphibians, reptiles, birds, and mammals.

Following field investigations, baseline conditions were determined by mapping field data in a Geographic Information System (GIS) database. These data were overlaid with existing GIS data acquired from SanGIS (i.e. 2-foot topography, existing and proposed land use, vegetation, biological resources, creek conditions, FEMA flood conditions, parcels, roads, etc.). Based on this composite graphic, the consultants identified wetlands management opportunities (e.g., suitable areas for wetlands expansion, creation and restoration, preferably on City property or on available land) and constraints (e.g., already protected or developed areas or areas planned for development or constrained by flood risk) that were verified in the field. This field confirmation allowed the consultants to update the data and include them in the modeling effort. The consultants then



determined trail configurations and enhancement and management treatments for each of the areas identified in the model that are compatible with the Chollas Creek Enhancement Program. Hydraulic effects from proposed modifications were assessed using a HEC II computer model.

Existing and in process development within the study area was verified in the field and updated on GIS land use overlays acquired from SanGIS (1999). Land use types were categorized in residential, commercial, utilities, public open space, parks, and vacant-not graded, among others. Vegetation overlays were also updated with information gathered in the field, including pockets of jurisdictional wetlands and riparian habitats. Areas of slopes greater than 25 percent were excluded from the model, as these areas would be precluded from restoration and enhancement treatments. Weed management will be necessary along the entire reach of the creek within the study area.

Biological Conditions

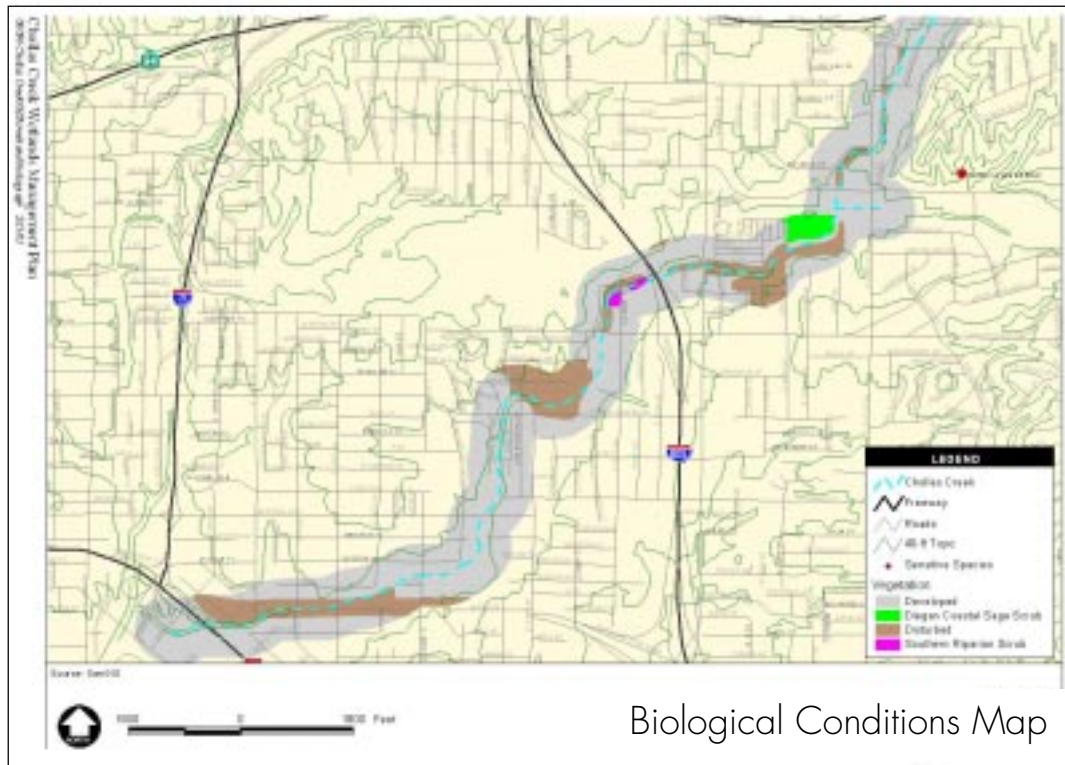
Due to the urbanization of the area, biological resources are scarce. Biological conditions of Phase I are depicted on a map on page 13. This map was derived from a digital database (SanGIS 1999) and has been updated with information collected in the field.

Vegetation Communities

The majority of the creek within the study area has been altered by development. As a result, only small pockets of native vegetation are present as exotic vegetation and disturbed vegetation communities characterize the majority of the creek alignment.

Riparian and Wetland Communities

Much of the channel invert of Chollas Creek is unvegetated. In these areas the channel invert is characterized by large cobbles, gravel and sand. Portions of the stream had standing water, but to a depth of only a few inches. It is assumed that much of the hydrologic flow is associated with urban runoff. Flood control maintenance activities and scouring from rain events are the two primary factors hindering the development of vegetation along the invert of the creek. Though seedlings of various species may become established within the channel invert, they do not seem to persist, as evidenced by the lack of juveniles and mature individuals.



Biological Conditions Map

Riparian scrub is a shrub-dominated community that occurs along stream and river corridors. Along Chollas Creek this community is situated at the outer edges of the channel invert and the lower slopes of the creek's bank. Mulefat (*Baccharis salicifolia*) is the sole dominant, native shrub within this community and its distribution is relatively patchy along the creek. Individuals of Goodding's black willow (*Salix gooddingii*) are also scattered within this community. A high number of non-native species are also associated with mulefat, which is indicative of the disturbed condition of this community. In most instances, the cover of non-native species is much higher than the native cover. Giant cane (*Arundo donax*), spiny cocklebur (*Xanthium spinosum*), white sweetclover (*Melilotus alba*), Bermuda grass (*Cynodon dactylon*), castor bean (*Ricinus communis*), and sweet fennel (*Foeniculum vulgare*) are all non-native species that may be present within this community.

Freshwater Marsh in areas where there is a more constant water source, emergent wetland species may persist. They primarily exist in the channel invert, preempting the establishment of juveniles and mature individuals due to frequent scour events. Freshwater marsh habitat along the creek is characterized by herbaceous species such as: cattails (*Typha latifolia*), umbrella



sedge (*Cyperus sp.*), bulrush (*Scirpus sp.*) and spike sedge (*Eleocharis sp.*) Similar to the riparian scrub described above, cover of non-native species is usually much higher than native cover, indicative of the disturbed condition of the creek.

Disturbed Wetlands are areas dominated almost exclusively by non-native wetland indicator species. Large patches of giant reed, white sweetclover, and spiny cocklebur occur all along the creek.

Ornamental Riparian Woodlands exist in at least one place along Phase I (Segment 4 - a section east of I-805 separating two condominium complexes), at this point the creek is surrounded by planted cottonwood trees (*Populus fremontii*) intermixed with eucalyptus and other ornamentals. In addition, it appears that two developments that are currently being built, the Imperial Marketplace and the Market Creek Plaza, will also be fitted with ornamental plantings adjacent to riparian areas in park settings. Development of the Market Creek Plaza will include restoration of the riparian creek corridor west of the development. The Imperial Marketplace project will be planting native riparian trees on creek slopes equipped with Armorflex.

Upland Communities on the majority of slopes surrounding the creek are dominated by non-native species, either ruderal weedy species or ornamentals that have been planted for aesthetic value(s).

A high number of ornamentals occur along the upper slopes of the creek. Eucalyptus (*Eucalyptus sp.*), acacia (*Acacia sp.*), Peruvian pepper tree (*Schinus molle*) and fan palms (*Washingtonia sp.*) are all present along these slopes. Most of these individuals were intentionally planted but some are likely to be opportunistic colonizers.

Ruderal Communities are ones that are dominated by early seral, non-natives that depend upon a regime of frequent disturbance for their continued persistence. Sweet fennel, castor bean, fountain grass (*Pennisetum setaceum*), ripgut grass (*Bromus diandrus*), wild oat (*Avena sp.*), tree tobacco (*Nicotiana glauca*) and giant cane are the most common non-natives in these areas. Some native shrub elements are present within these areas but are so scattered that they do not represent native shrub habitats, such as chaparral or sage scrub. Some of the more conspicuous natives include: lemonade-berry (*Rhus integrifolia*), toyon (*Heteromeles arbutifolia*), cholla (*Opuntia sp.*), broom baccharis (*Baccharis sarothroides*), and flat-top buckwheat (*Eriogonum fasciculatum*).

Sensitive Species not presently found in the study area (SanGIS 1999). However, there are several sensitive species that are known in proximity of the study area. One site of the federal threatened coastal California gnatcatcher (*Polioptila Californica californica*) is known from a large patch of coastal sage scrub between Roswell and Market streets along the Encanto Branch, approximately 1,500 feet to the east of Chollas Creek. This species is not expected to occur within the study area due to the lack of suitable habitat and the disturbed condition of the study area. Several populations of coast barrel cactus (*Ferocactus viridescens*), a California Native Plant Society (CNPS) List 2 species, are known from approximately 6,000 feet north of the study area along the slopes of the northern fork of Chollas Creek at the Emerald Hills Branch. This species would have a low to moderate potential to occur in small population numbers in the disturbed upland areas that still have some coastal sage scrub or chaparral elements associated with them. Though not reported from the project vicinity, there are several other sensitive plant species that potentially could occur, albeit in small numbers, within the study area. Western dichondra (*Dichondra occidentalis*), a CNPS List 4 species, could occur in those disturbed areas that still have coastal sage scrub or chaparral elements. Southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*) another CNPS List 4 species, could occur in small numbers along portions of the creek with a more permanent water supply. However, this species was not observed within the study area during the reconnaissance surveys.



Hydrology

The hydrology for Phase I Chollas Creek South Branch has been studied, and the floodplain mapped by FEMA. According to data furnished by the City of San Diego, the watershed for Phase I above the confluence with the Main Branch of Chollas Creek west of Interstate 15, is 10.9 square miles. South of Market Street near the transit center, Chollas Creek splits. The southerly fork is known as the Encanto Branch. Above the confluence, the Phase I watershed is 3.3 square miles. The watershed for the Encanto Branch above the confluence is approximately 6 square miles.



Flood Insurance Rate Maps (FIRMs) were prepared for Chollas Creek by FEMA in June 1997. These maps show various Flood Hazard Zones based on 100-year and 500-year floods. Flood control measures for this type of creek are normally aimed at providing protection from the 100-year flood. The peak 100-year



discharge for Chollas Creek used for FEMA's floodplain mapping is as follows:

- Above confluence with the Main Branch of Chollas Creek: 5,300 cubic feet per second (CFS)
- Above confluence with Encanto Branch: 1,900 CFS
- At Kelton Road Emerald Hills Branch: 1,500 CFS
- Encanto Branch above the confluence: 3,500 CFS.

Chollas Creek exhibits varying degrees of streamflow. Certain reaches of the creek have an intermittent flow, with water flowing only during the rainy season, while other reaches of the creek are more perennial, where flow occurs more continuously throughout the year. Since rainfall patterns are consistent throughout the creek's watershed, variation in streamflow would be attributable to differences in urban runoff, differences in perched groundwater levels, and differences in the channel's substrate texture that would effect percolation rates.

Creek conditions along Chollas Creek within the study area vary between concrete-lined channel, concrete on one bank only, and earthen channel. The creek flows through an earthen channel in three places within the study area: 1) from Euclid Avenue to I-805; 2) from 45th Street to Imperial Avenue; and, 3) for a very small stretch between Z Street and Boston Avenue. Residences border the creek within the entire northern portion of the study area (Segment 1). In this area, the creek is controlled by concrete channels, often equipped with flood walls and flood dividers to protect surrounding land uses from flood risk.

Water Quality



The following section is based on the Characterization of Stormwater Toxicity in Chollas Creek, San Diego, a Southern California Coastal Water Research Project Prepared in collaboration with the City of San Diego, the Port of San Diego and the Regional Water Quality Control Board (RWQCB), San Diego Region (1999). Although the data collected for this study was from the National Pollutant Discharge Elimination System (NPDES) monitoring station on the North Fork of Chollas Creek, it is assumed that the data, conclusions and management recommendations are pertinent to Phase I (i.e., the study area). However, the study did state that the toxicants observed in this study may not be the primary toxicants in other regions of the watershed.

Urban runoff from the Chollas Creek watershed has been monitored since the 1993-94 wet season. Over this period, samples of wet weather runoff have consistently exhibited chronic toxicity to the native freshwater invertebrate (*Ceriodaphnia dubia*). Sediment collected at the mouth of the creek following the wet season, were toxic to the native marine amphipod (*Eohaustorius estuarius*). These toxicity levels have led the RWQCB to add Chollas Creek to the State's list of impaired waterbodies, the 303(d) list that requires the RWQCB to proceed with a Total Maximum Daily Load (TMDL) to control toxicity within the watershed. The aforementioned study:



- Observed that toxic responses differed between freshwater and marine species after exposure to stormwater;
- Preliminarily identified the organophosphate pesticide diazinon in the stormwater runoff as the agent most likely responsible for the toxicity observed in the freshwater species *Ceriodaphnia dubia*;
- Identified trace metals, most likely zinc, in the stormwater runoff from Chollas Creek as responsible for toxicity observed in the marine species *Strongylocentrotus purpuratus*.

This study recommended that:

- Additional Toxicity Identification Evaluations (TIEs) testing be conducted to confirm toxicants and improve confidence in management actions. The study hypothesized that other toxicants may be responsible for the toxicity found in early season storm events;
- A connection needs to be made between the in-channel sampling and the effects on the receiving water environment. In order to assume impairments of beneficial uses in the receiving waters, one needs to extrapolate these samples either upstream of the current NPDES monitoring station on the North Fork of Chollas Creek or downstream to the marine habitat in San Diego Bay;
- Toxicological and chemical testing should be used jointly for tracking the source of these toxicants. One of the initial steps in the TMDL is identifying sources



within the watershed for assigning load allocations. Although this study identified a small handful of constituents that play a role in the observed toxicity, these toxicants may not be the primary toxicants in other regions of the watershed. Also the toxicants may vary in their toxicity due to changes in bioavailability.

Small streams remove more nutrients, such as nitrogen, from water than do their larger counterparts, according to researchers who have applied sampling methods developed in a National Science Foundation (NSF) Arctic area ecological study to waterways across the nation. The finding could have important implications for land-use policies in watersheds from the Chesapeake Bay on the East Coast to Puget Sound in the west. While excess nitrogen has many sources, including runoff from residential lawns and byproducts of automobile combustion, taking greater care to insure that small streams can work effectively to clean the water will reduce the overall nitrogen load that makes its way into larger bodies of water.

Evolving runoff control regulations should be applied to this area. These coupled with wetland and upland enhancements will help to correct water pollution conditions over a long period of time.

MANAGEMENT RECOMMENDATIONS

Constraints and Opportunities

Chollas Creek South Branch (Phase I) is channelized and degraded in most of its reach due to urbanization. Nevertheless it offers an opportunity to combine community planning with the protection of valuable wetlands resources. The following constraints are taken into account:



- The extent of past disturbances and confinement of the creek precludes the possibility of recreating a truly natural floodway. These factors have either eliminated or significantly altered landscape-level hydrogeomorphic processes necessary to maintain a functioning riverine system;
- Only a few pockets of wetlands exist within the study area, most of which are confined in space between development and significantly disturbed areas, consisting mainly of exotic species;
- Development of true wetlands habitat for mitigation purposes may not be feasible due to the lack of available space and connectivity to other functional wetlands areas;
- Creation of recreational open space accessible to humans and development of wetlands inhabitable by sensitive plant and animal species will be mutually exclusive, again, mostly due to confined space;
- Creation of dense wetlands vegetation may result in unsafe conditions for human use as it may attract transient populations seeking shelter, unless specific safety features are installed (to be detailed in any implementation-level documents);
- The value for wildlife in the study area is significantly diminished due to dense development patterns and lack of contiguous open space (i.e., habitat fragmentation and edge effects);



- Development of true natural wetland habitat may attract wetlands associated sensitive species that, without habitat connectivity, have no chance for sustained survival;
- Wetlands vegetation may create hydrological problems such as flood risk unless it is planned as part of the flood control system (this plan has taken this into consideration and avoided wetlands creation that would pose a flood risk);
- Wetlands enhancement and open space development including wetlands could preclude the development of certain types of flood control and management designs.

Despite above-described constraints, the following opportunities have been taken into consideration during the development of management recommendations:

- Comprehensive planning can provide for a continuity of habitat and flood protection measures;
- Degraded habitat can be restored with native species to enhance the urban creek corridor and improve the image of the community;
- Green open spaces with native landscaping and restored wetlands habitats provide a welcome change from the concrete and asphalt nature of this urbanized area;
- A theme of native species plantings and associated trail systems will create a community identity linking the communities within the southeastern part of San Diego;
- Mitigation credits for the purpose of water quality improvement (not sensitive species mitigation) may be given on a case-by-case basis for certain wetlands enhancement projects;
- Riparian wetlands plantings are resilient and often establish themselves rather quickly;



- Native riparian open space with associated recreational open space, trails and lighting (and other safety precautions) offer an opportunity for creative activities for children and adults alike;
- Enhanced open space can be used by the community for recreational and educational purposes;
- Enhanced open space will increase property values.



Areas potentially suitable for wetlands restoration and enhancement include vacant lots, parks or other open spaces that include areas with disturbed vegetation or riparian habitats that could benefit from enhancement. Development was restricted from the model, and such sensitive vegetation communities as coastal sage scrub were rated as having very low suitability to be converted to wetlands. Disturbed vegetation and riparian areas received high rankings. While parks and cemeteries were ranked with medium restoration suitability, vacant lots and open space received high rankings.

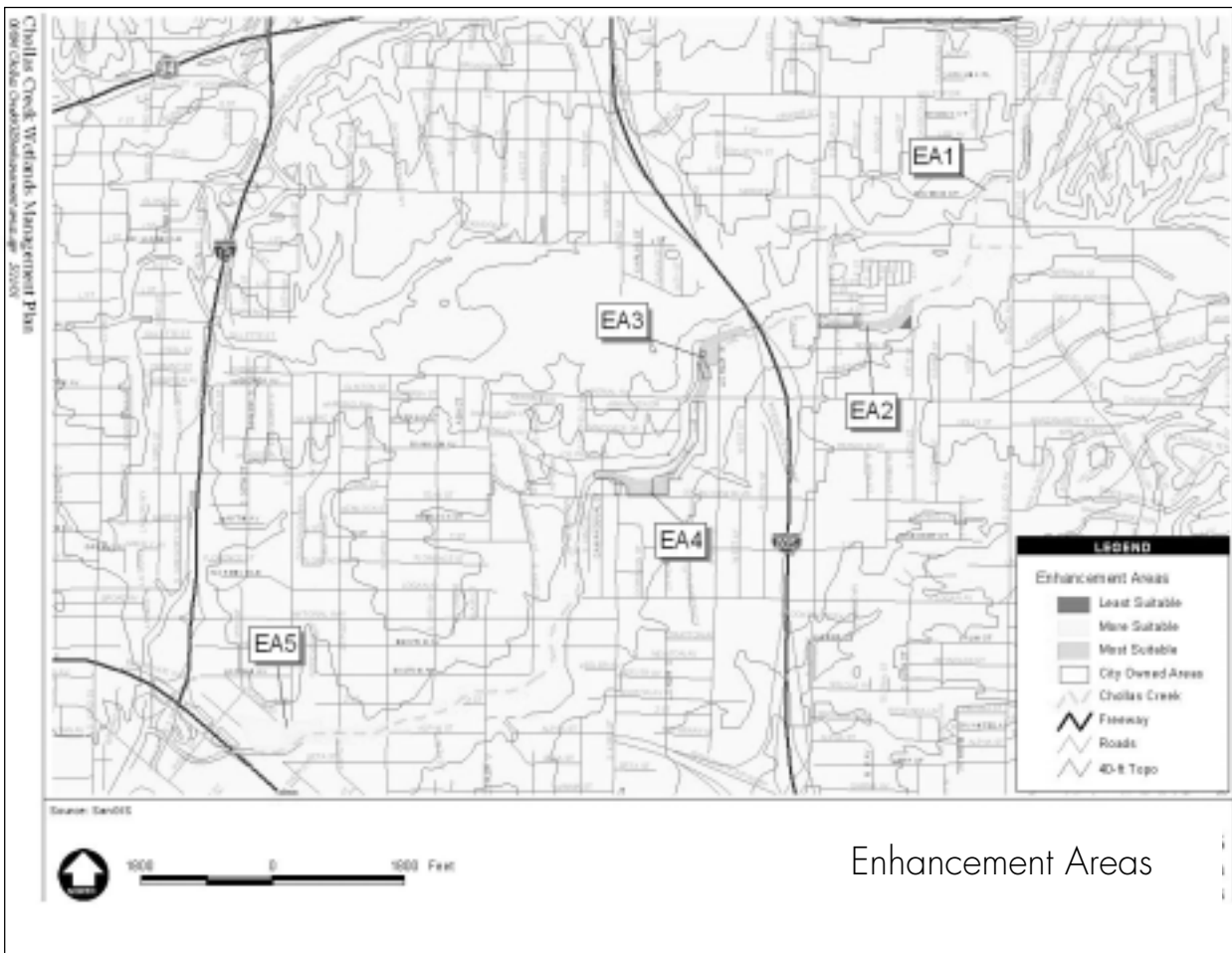
Soils also determined restoration and enhancement suitability, as some soils preclude the successful establishment of riparian vegetation, and others benefit riparian restoration and enhancement. Heavy soils and soils on steep slopes received low rankings, convertible soils (such as graded land and urban soil complexes) received medium rankings, and suitable soils such as sandy loams and other permeable native soils were ranked highly.

Creek conditions were also entered into the model, although not ranked. Information regarding concrete lining of the channel versus earthen channel was added to the model result to determine the extent of treatments. Hydraulic modeling results were added to determine the feasibility of creek alterations.

Once sites suitable for restoration and enhancement were identified and the suitability was tested, a parcel map was overlain to determine ownership of the selected sites. Private and public ownership were categorized, and City ownership was given the highest value, followed by public ownership. Private ownership was given the lowest ranking due to the difficulty of property acquisition. Only areas with the highest restoration suitability that are also owned by the City of San Diego



are ranked with the highest suitability. Sites suitable for wetlands enhancement treatments are illustrated. Once sites and appropriate enhancement methods were identified, creek modifications were adjusted according to HEC II model calculations to avoid any flood risk to surrounding structures. The hydraulic analysis has not included any investigation into the feasibility of maintaining the proposed vegetation within the selected regimes. Also, geotechnical and sediment transport issues have not been addressed. Such matters should be considered before additional design is undertaken.



Identification of Enhancement Areas

The constraints and opportunities were considered in the identification of enhancement areas. For example, creek corridor width in most areas is determined by the proximity of adjacent development and would, in most cases, not allow for the establishment of optimally functioning wildlife habitat. Pockets of open space that may be suitable for native riparian vegetation establishment are disconnected and fragmented. If sensitive wildlife species were to move into these areas, they would most likely not be able to sustain themselves due to the lack of migration corridors and associated shelter and food sources (ecological sink), and the vulnerability to predators due to the surrounding urban development (edge effect). For these reasons, areas identified below may not easily earn mitigation credit from the wildlife agencies as a compensation for sensitive species lost elsewhere due to construction projects. However, current mitigation projects have been permitted with the ACOE, CDFG, and RWQCB for their water quality functions, and the potential for future mitigation for “in-kind” habitat creation remains a feasible option. From this perspective, an effort should still be made to apply mitigation credits to the wetland restoration areas within Chollas Creek. Ultimately, the purpose of wetlands enhancement and management as described below is to serve the human environment in this urbanized region of the Chollas Creek watershed.

Constraints and opportunities were also evaluated to measure and reduce flood risk based on both hydrological and hydraulic analyses. If flood risk would increase from the removal of concrete channel lining or widening of the floodplain, these recommendations were either rejected or modified such that any flood risk to residences and businesses would be reduced. In addition, safety measures were considered in open space and trail design to reduce risk from floods or crime. It should be noted that some of the trails may not be accessible during high flood events; other trails would have to be routed away from the creek corridor through the neighborhood streets due to space constraints within the creekbed.

A hydrological analysis was made based on floodplain mapping for Phase I has been accomplished utilizing the HEC-II computer program. The program creates a model of the floodplain based on the dimensions and physical characteristics of the floodplain, channel and bridge structures. The program

then calculates the water surface elevation and the velocity of flow for various flood events. Any alteration of the floodplain, channel or bridge structures can result in raising or lowering the water surface elevation of floodwaters and may cause a significant change in the water's velocity. In developed areas such as those flanking the creek in Phase I, any rise in the elevation of floodwaters may cause increased flooding. Changes in velocity can result in increased channel erosion or changes in sediment carrying capacity. Therefore it is important to evaluate the hydraulic effects of any proposed changes in the channel.

Modifications to the channel configuration are proposed for Phase I in the following reaches of Chollas Creek:

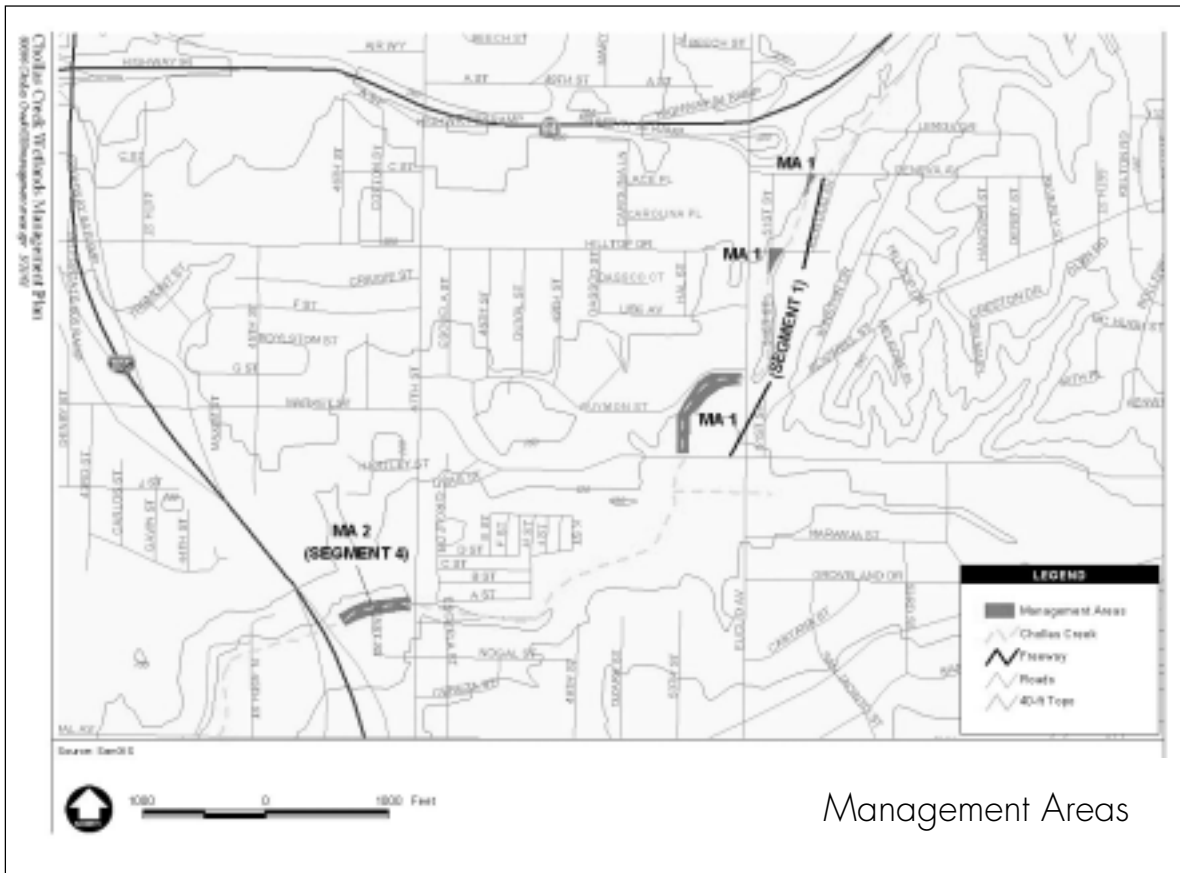
1. South of the existing Sunshine Gardens mobile home park and east of 47th Street (Segment 3).
2. Between Imperial Avenue and Interstate 805 adjacent to the YMCA property (Segment 5).
3. Between Interstate 5 and 38th Street (Segment 8).

Hydraulic effects were also analyzed to assess proposed modifications to the creekbed to accommodate proposed habitat restoration or rehabilitation of the creek and their likely hydraulic effects on the creek's water flow. The hydraulic parameters used in evaluating each proposed modification include:

1. The proposed modifications must result in a calculated 100-year water surface elevation at or below that predicted in the existing model for a 100-year flood assumed to be confined to the floodway.
2. The calculated water surface elevation for a 100-year flood upstream and downstream of each reach studied must not be significantly changed.
3. Properties intended for habitable structures on either side of the proposed modified flood channel must be protected from a 100-year flood in accordance with the requirements of FEMA and the City of San Diego.
4. The calculated mean velocity of the 100-year flood flow in vegetated sections of the modified channel must not exceed 7 feet per second (FPS).

Identification of Management Areas

Because the study area is located in a very urbanized section of the City of San Diego, open space and large tracts of vacant properties are very scarce in this area. Revitalizing this part of San Diego is a high priority within the City and thus, development pressures in the study area are strong. As development proceeds, it is important that adequate mitigation measures be established and that viable riparian areas be protected. Project approval conditions for mitigation should create additional habitat areas within the creek. An aggressive exotics removal and channel broadening effort should also be a component of the mitigation effort. It is the goal of this management plan to recognize development pressures combined with the need for flood protection and management, as well as include a functional recreational and environmental component through wetlands preservation and restoration.



Management Areas

Management Areas (MA) are reaches within the creek that would benefit from continued habitat management practices such as exotic species control, sediment and debris removal and trash removal. Enhancement Areas (EA) were identified through a modeling effort as sites (Figure 6) that would benefit from creek alteration and wetlands restoration and enhancement to restore some of the original wetlands and riparian communities that were historically (prior to urbanization) present in Southern California creeks and to enhance the landscape and recreational effect of the creek. Management Actions such as wetlands preservation and exotic species control, and Enhancement/ Restoration Actions for riparian areas are outlined in the next section.

PROPOSED MANAGEMENT AND ENHANCEMENT PROJECTS




South Branch

For purposes of developing manageable projects in terms of both size and funding, the South Branch was divided into project segments. A total of eight (8) segments have been established running east to west. The segments are designed to closely relate to definable geographic areas, land use and development conditions. The projects are listed by segments and include project funding as well as the management and enhancement areas.


The following projects are proposed for implementation of the South Chollas Creek Branch Enhancement Plan.




SEGMENT 1

 Habitat Enhancement / Restoration or Management Actions

 Arts Project / Underpass

 Reconstruction area / Arts Project

 Trail

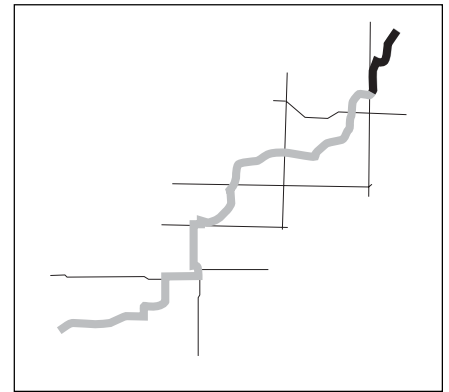
 Education Center, Learning Centers Interpretive Centers

Gompers Outdoor Learning Laboratory - Segment 1

Educational Project

The Gompers 3.6 area site offers a good opportunity for an interactive laboratory facility. The site is owned and maintained by San Diego City Schools. Some infrastructure is already in place as a result of an earlier CALTRANS Environmental Enhancement and Mitigation Program Grant. The existing infrastructure includes walkways, portable structures, a canopy-shaded seating/study area and an amphitheater facing the creek. With this existing infrastructure, the estimated cost of additional physical site improvements is \$402,000. These improvements include: wetlands management and enhancement areas, improvement of an existing wind generator, construction of a solar energy system, sound attenuation improvements, propagation center improvements, habitat enhancement, storage building improvements, installation of interpretive signs, and construction of a security gate and fencing. Additional costs cover personnel and program development.

Project Budget:	
Site Improvements	\$402,000 <i>Interactive Laboratory</i>
Personnel	\$701,000
Program Development	\$150,000



Arts Project

The two-block creek section along 51st Street that has been channelized should be the subject of a public arts project to address how the concrete channel area can be enhanced. By integrating hydrological and flood control design in contrast with artistic enhancements and pedestrian trails, this right-of-way area can have multiple functions and a design that can be the pride of the neighborhood.

Project Budget:	\$500,000 <i>Channel Reconstruction</i>
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Management Actions

The northern reach of Chollas Creek is concrete encased to Euclid Avenue; residential development immediately surrounds the channel on both sides. However, there are pockets of vacant lots occupied by ruderal vegetation communities and dominated by weedy, invasive plant species, often on steep slopes. These areas exist south of Geneva Street and west of the creek (opposite Elwood Avenue); in a corner between Hilltop and 51st Street west of the creek; and east of Euclid Avenue to Market Street.

Due to the small size, isolation and steep grade of these areas, restoration is not feasible, however, weed control and trash removal will benefit higher quality riparian systems and wetlands downstream. Vacant lots should be acquired, landscaped and utilized as pocket parks.

Project Budget: land acquisition and improvements (Total cost still to be determined)



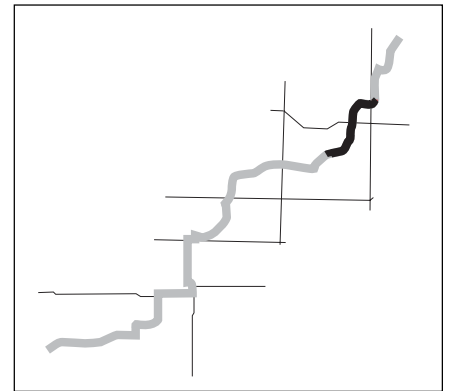
Trail Linkages

The trail linkages will lead from the Gompers Learning Laboratory along the public sidewalks to the Chollas Creek and Euclid Avenue (at Guymon Street) convergence. A second connecting trail system will lead from the Multiple Species Conservation Program (MSCP) Preserve to the Elementary Institute of Science, the Malcolm X Library and the paleontological outcropping adjacent to the library. These trail systems should be developed in accordance with the design guidelines. There are 5154 lineal feet of trails proposed. Trail cost per lineal foot is estimated at \$50.00.

Project Budget: \$258,000 *Trails*

Science Education Center Segment 2A

The intersection of Market Street and Euclid Avenue is important to surrounding neighborhoods as it hosts a number of civic institutions, namely: the Tubman-Chavez Cultural Center, the Malcolm X Library, The Elementary Institute of Science, Horton Elementary School, and the Euclid Avenue Transit Station. Due to its many civic offerings, this intersection will serve as a strategic point of community revitalization in Southeastern San Diego.



Trail Linkage

A ramp/stairway from Guymon Street would provide access to Chollas Creek from the Horton Elementary School. Members of the community would follow a pathway along the eastern side of the creek that would link into the Science Education Center north of Market Street. Identification and interpretive signage, a staging area and an interpretive station plus lighting will encourage students and residents to use the creek as an “educational laboratory” as well as a recreational and entertainment hub for daytime and evening activities.

Project Budget: \$296,000 *Trails*

Habitat Enhancement/Restoration


This area immediately west of Euclid Avenue is characterized by a cobbly invert bottom and steep creek banks. Although the creek is channelized in this segment, it is not visibly concrete-lined. The invert bottom and banks are occupied by exotic wetlands vegetation (mainly giant reed), interspersed with pockets of emergent wetlands, freshwater marsh and isolated willows. A vacant lot with ruderal vegetation extends south of the property.




Hydrological information for this segment of the Creek is not available at this time, although the creek seems to be running on the surface year-round in this area. The invert banks are very steep. A hydrological and hydraulic analysis (including




SEGMENT 2A

 Habitat Enhancement / Restoration or Management Actions

 Arts Project / Underpass

 Reconstruction area / Arts Project

 Trail

 Education Center, Learning Centers
Interpretive Centers

groundwater study) for this area will be conducted for the implementation of the enhancement measures. The groundwater study will measure depth of groundwater at the invert bottom and the invert banks to determine the location, grade and slope of the modified north/eastern invert bank.

The proposal includes wetlands restoration adjacent to a proposed new Science Education Center. The Center will provide a valuable resource to study water quality and plant life. This area is suitable for combining wetlands enhancement and restoration with an educational facility. The northern/western bank will not be lowered to maintain flood protection, current grades, and integrity of the surrounding land uses (street, school). However, the northern/eastern bank could be terraced to allow for the transition of a restored wetlands system to an educational facility, the Science Education Center. Wetlands restoration would follow the methods described below, and consist of the following:

- Creek grading to lower the northern/eastern bank, widen the floodplain, and terrace the bank to connect to the Science Education Center;
- Exotic species removal;
- Planting of freshwater marsh and emergent wetlands in the creek invert;
- Planting of riparian scrub vegetation on the creek banks;
- Planting of a transitional buffer consisting of wetlands and upland vegetation between the riparian scrub vegetation and the Science Education Center;
- Establishment of a trail system with interpretive signs to link the restoration area to the Science Education Center

Education Center

The Science Education Center is proposed for construction on a small portion of the side of the site pad, south of the restoration area. The Center is designed to be large enough to accommodate an average class size of 20 students in an open air structure to protect participants from the sun and rain. It is not intended to be a large structure and will consist of interpretive signs, structures and hands-on exhibits. Exhibits would feature such subjects as the:

- history of Chollas Creek and its use by Native Americans;

- biology and hydrology of wetlands;
- importance of wetlands for water quality and wildlife;
- loss of wetlands due to urbanization and associated disturbances;
- restoration and enhancement of wetlands; and
- ways to protect and enhance wetlands and water quality.

The Science Education Center and restoration areas will be equipped with appropriate lighting and other safety features as determined by the City of San Diego. Lighting will be shaded downward so as not to disturb nesting birds. Access to the Center will be planned sensibly to allow for traffic flow from Euclid Avenue and the trolley station without impacting the restored riparian plantings. The educational facility will feature appropriate outdoor furniture, possibly constructed of natural materials to mimic the natural theme of the exhibit. Trails will be designed such that they impact the wetlands minimally but still provide maximum educational benefit. Trail surfaces will be built from decomposed granite, bark mulch, or equivalent natural surfaces. The area will be revegetated using native vegetation appropriate for riparian wetlands restoration as detailed in this plan. No ornamental or invasive exotic plants will be used for the educational facility nor the wetlands restoration portion of this area. If feasible, the educational facility may include a hands-on exhibit where children can create their own miniature wetlands system. The Center and its wetlands will need to be maintained on a regular basis to avoid degradation of the wetlands system (vandalism, loitering, destruction of vegetation, etc.).

Project Budget: \$75,000 *Interpretive Center
Improvements*

Market Creek Plaza Segment 2B

The Jacobs Family Foundation, a non-profit organization, has taken the lead in implementing Market Creek Plaza, a major redevelopment project in the southwest quadrant of the intersection between Market Street and Euclid Avenue.

Trail Linkages

Market Creek Plaza will include food and retail stores, office buildings, a movie theater, and a youth center with Chollas Creek running through the middle of the site, the Jacobs Family Foundation is restoring this natural resource to enhance the project's public spaces and design quality. Proposed enhancements include trail linkages throughout as follows:

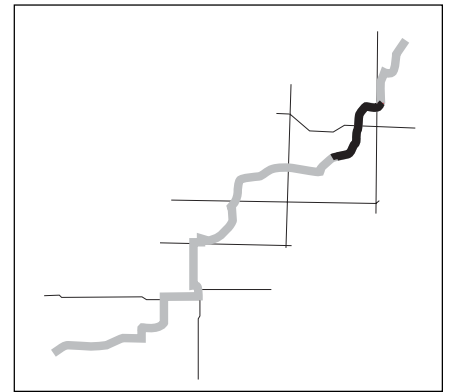
East Side Pathway

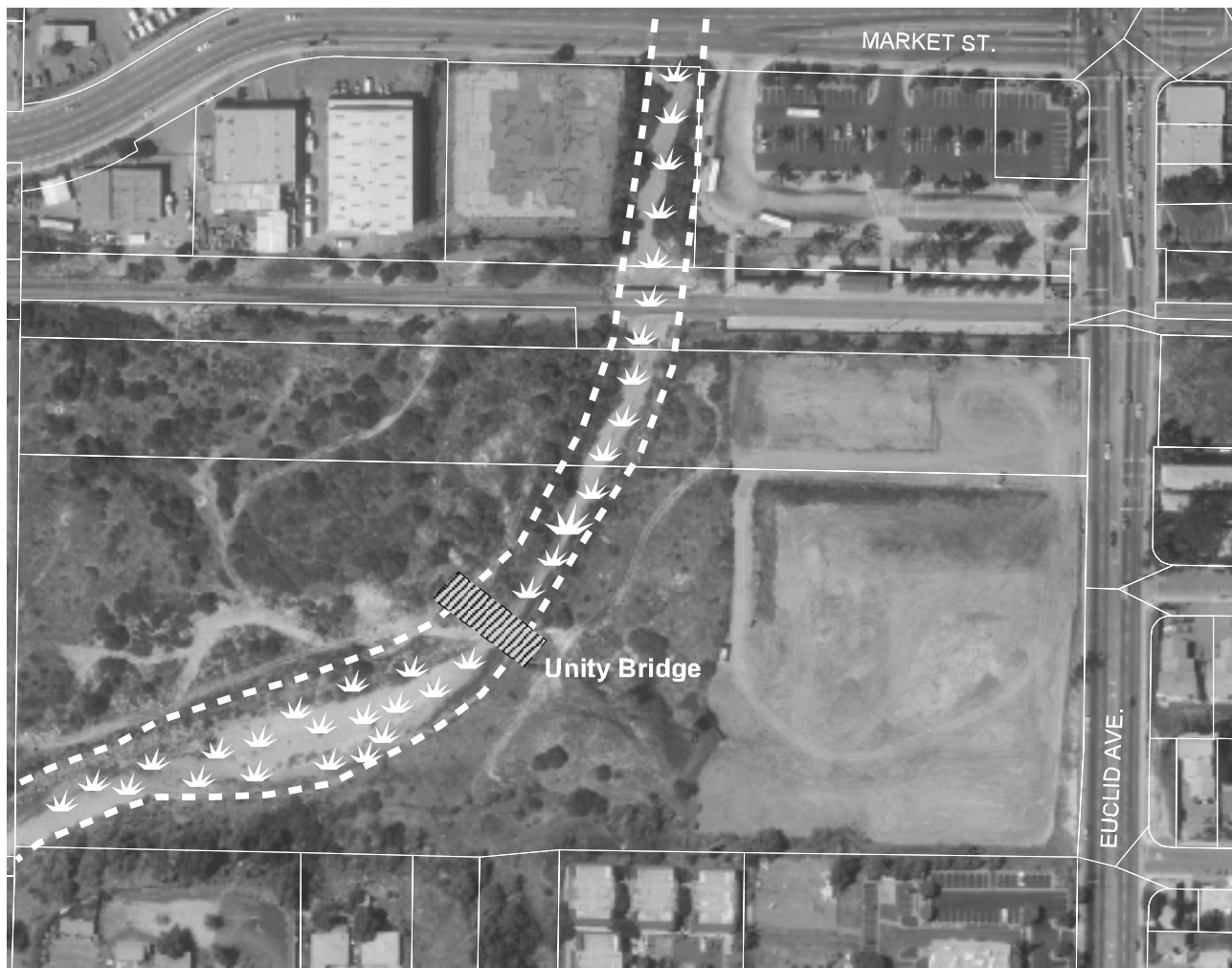
This pathway would begin on the southern side of the Market Street west of the Euclid Trolley Station. From the station, this eight-foot wide trail follows a ramp along the offices and retail shops of the Plaza. Walking along the trail, a pedestrian would experience the excitement of Market Creek Plaza - a "celebration" fountain, colorful kiosks selling clothing, gifts and food, and the Renaissance Conference Center. The pathway would take the visitor past the spectacular amphitheater, an outdoor performing arts center designed to rise when water flows through the creek. The pathway would then follow an embankment that includes a 500-person, 11-tiered terraced seating area surrounded by shade trees and built-in lighting. The visitor will marvel at the multi-cultural tile tapestries that are built into the pathway and follow a lighted promenade that continues south to the end of the project's property. The length of the East Side Pathway is 850 feet. This development cost is being funded and constructed by the Jacobs Family Foundation as part of their Market Creek Commercial Center Development.

Project Budget: \$75,000 *Trail*





West Side Pathway

Located on the western side of the creek, this pathway would cross a vehicle bridge and follow the creek passing in front of the Magic Johnson Cinema complex and continue south for 750





SEGMENT 2B

-  Habitat Enhancement / Restoration or Management Actions
-  Trail
-  Arts Project / Underpass
-  Reconstruction area / Arts Project

feet concluding at the end of the project's property. This portion of the walkway will include dense landscaping and inset and pole lighting along the entire length of the trail.

Project Budget: \$89,000 *Trail*

"Unity" Bridge

A pedestrian-only bridge will span 135 feet across the creek to link the two trails together. This bridge is a single span Bow Truss steel structure measuring 35 feet in height and 16 feet from the floor of the Creek. Standing on the bridge, pedestrians will have a spectacular view of the amphitheater and experience the natural beauty of the creek and the surrounding landscaping.

Project Budget: \$208,200 *Bridge*

Other Trail Linkages





The trail system in Segment 2B will consist of paved eight foot trails on both sides of the creek, connected by a pedestrian "unity" bridge. The trails will run from the creek's convergence with Euclid Avenue to the southwestern corner of the Market Creek Plaza site.

Project Funded: By Jacobs Foundation



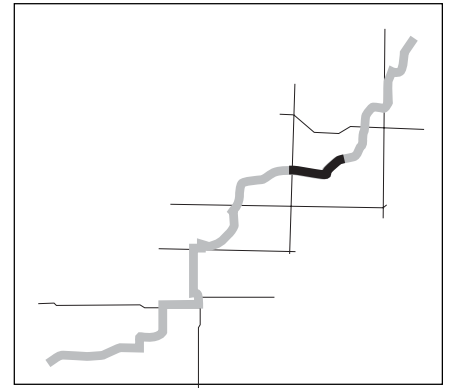


SEGMENT 3

-  Habitat Enhancement / Restoration or Management Actions
-  Arts Project / Underpass
-  Reconstruction area / Arts Project
-  Trail

City Water Department Parcel Segment 3

A new linear park link is proposed along the Chollas Creek flood plain, east of 47th Street, in the zone between Imperial Avenue and Market Street. This area is presently undeveloped. The parcel south of the El Rey Trailer Plaza Mobile Home Park, is owned by the City Water Department. The Water Department intends to maintain the parcel for potential future use. For this reason, no wetlands restoration is proposed. However, the Water Department would consider allowing a trail to go through the parcel. This could be accomplished by negotiating a “Right of Entry Permit” with the Water Department. It would be a temporary (3 years) permit that would allow the trail construction to begin. Later, a long-term lease could be negotiated allowing for permanent public access to the trail.



Project Budget: \$76,000 *Trail*

Enhancement/Restoration Actions

Within this segment, most of the channel invert is cobbly and unvegetated. Very large areas are infested with giant cane (disturbed wetlands) that cover the edges of the invert as well as a good portion of the creek’s banks. Small patches of riparian scrub vegetation are also scattered along the banks. Ornamentals and ruderal vegetation characterize the upland areas, though there are some scattered chaparral species on the south side of the creek. A small tributary drains the residential area on the southeastern side of the creek and supports additional riparian habitat.



This segment extends approximately 1,900 feet east of the 47th Street bridge. The bed of the creek is lined with cobble and rocks. The sloping sides are heavily vegetated. Except for the portion near the 47th Street bridge, the creek appears unimproved. The width of the bed varies between approximately 30 and 80 feet. The creek bed is normally dry except during and after rainfall. Site drainage from the mobile home park and other surrounding properties enters the channel on the surface and in underground pipes.



The calculated water surface elevation in a 100-year flood varies from approximately 81 Mean Sea Level (MSL) at 47th Street to approximately 92 MSL at the easterly end of the mobile home park. The 100-year flood is not totally contained within the defined channel. Most of the mobile home park, as well as some undeveloped land south of the creek, is currently subject to inundation in a 100-year flood. Portions of the mobile home park are as much as 5 feet below the 100-year flood level.

The 100-year flood flow is classified as “subcritical” meaning the elevation of the water surface may be influenced by conditions downstream. In this instance, the calculated water surface in a 100-year flood is elevated because of a constriction at the 47th Street bridge. The average velocity of flow within the channel during a 100-year flood is estimated to be between 5 and 7 feet per second.

Proposed enhancements include widening of the channel and adding multiple plateaus within the cross section for trails and vegetation (Figure 7). Freshwater Marsh is proposed on the channel invert in selected areas where it is supported by groundwater and urban surface water runoff. The banks are to be planted with riparian, transition, and upland vegetation including trees and shrubs.



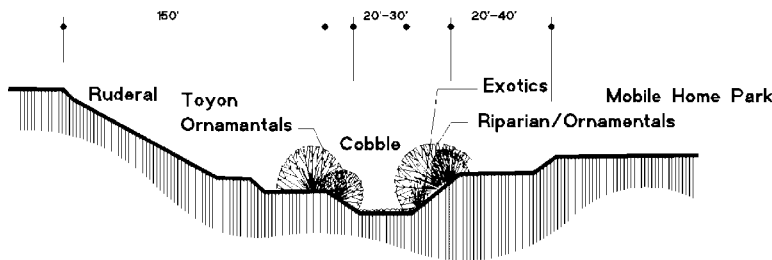
Widening of the floodplain and using a combination of wetlands protection, exotic species removal and habitat restoration, as described in the detailed Management Actions, appears particularly feasible in this area. The site is adjacent to the proposed Market Creek Plaza which is intended as a community focal point, and the site is also a short distance away from the trolley stations, another perceived community focal point. Therefore, a natural riparian corridor that is accessible by trail presents an extension of the upstream focal point into the community.

- The site is suitable for enhancement due to appropriate aspect, location, vegetation, size, soils, water and the fact that the western portion of the site is already owned by the City of San Diego.
- Preservation and enhancement of riparian habitat on this site allows for the conservation of the last remaining larger wetlands area within the study area.

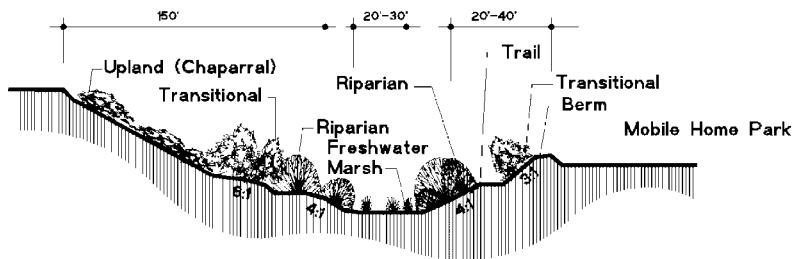
The proposed Enhancement Actions require that a hydraulic analysis be made for the area. The water surface elevation of the 100-year flood is influenced heavily by a backwater caused by a constriction at the 47th Street bridge. Assuming no modifications to the bridge, it is not practical to lower the water surface elevation of the flood in this segment. Therefore, a 5 to 6 foot high protective berm is needed along the northerly bank of the improved channel.

From a hydraulic standpoint, the typical cross-section modified as described above should provide adequate flood control protection with acceptable flow velocities. However, a 300-foot long portion between 600 and 900 feet from 47th Street will have to be narrowed by at least 50 feet because of steep topography on the south side.

Project Budget : \$400,000 *Enhancement/Restoration*



EA 2 Segment 3
Section at El Rey Trailer Plaza Mobile Home Park (looking west)

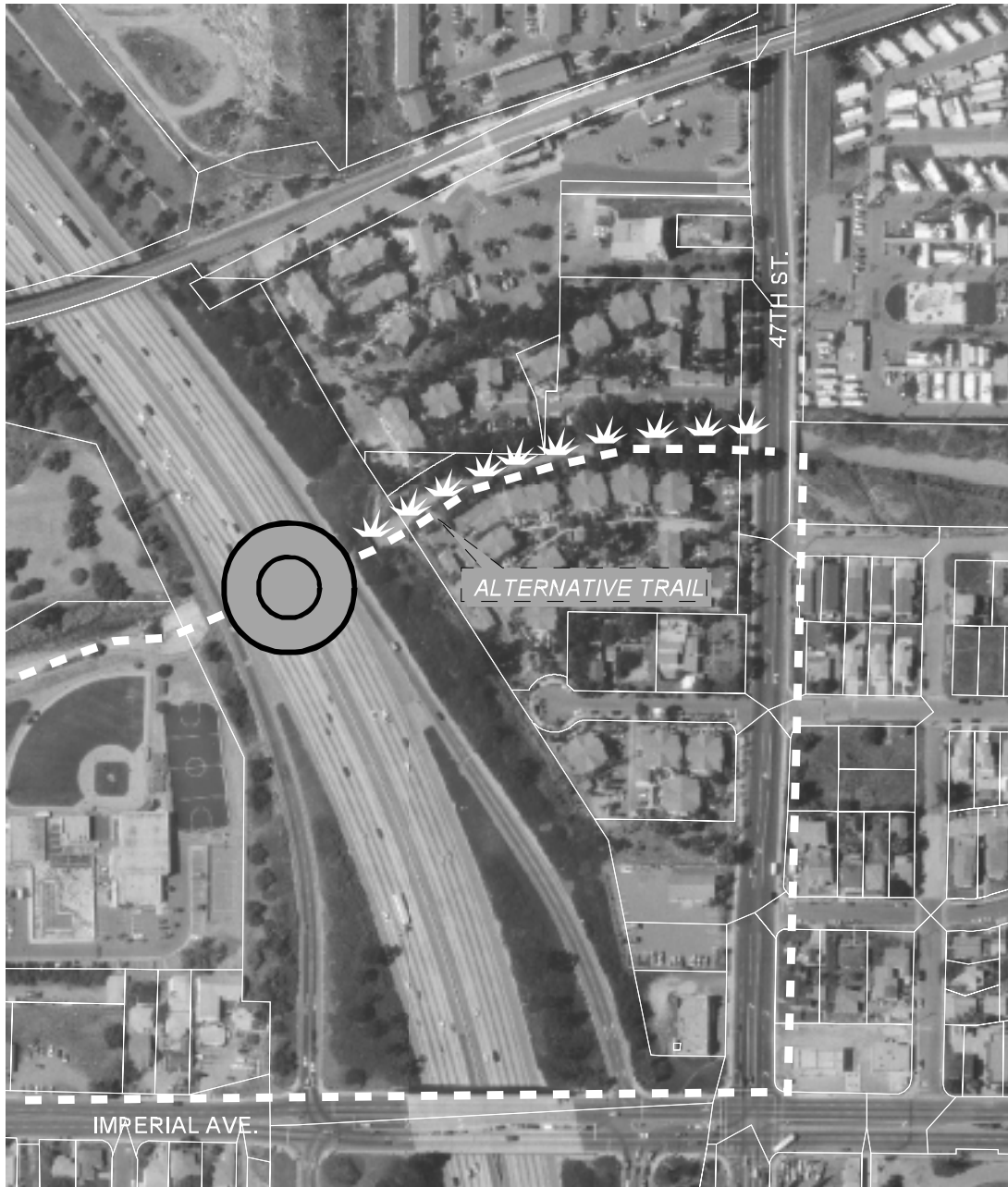


EA 2 Segment 3
Proposed section at El Rey Trailer Plaza Mobile Home Park (looking west)




No Scale

Profile of Enhancement Area 2




SEGMENT 4

 Habitat Enhancement / Restoration or Management Actions

 Trail

 Arts Project / Underpass

 Reconstruction area / Arts Project

East of Interstate 805 Segment 4

This segment spans westward between 47th Street and the culvert under I-805 and is surrounded by condominium complexes. A trail within the creek is one of the options proposed for this segment.

Management Actions

The creek flows through a narrow invert surrounded by banks with 2:1 or 3:1 slope ratios. The invert is cobble-lined and exhibits infrequent wetlands vegetation. The banks are occupied with such ornamentals as eucalyptus, palm trees, acacias and pepper trees and with an understory of mostly exotic plant species. However, the creek corridor in this area is lined with mature cottonwoods that were planted on top of the south bank.

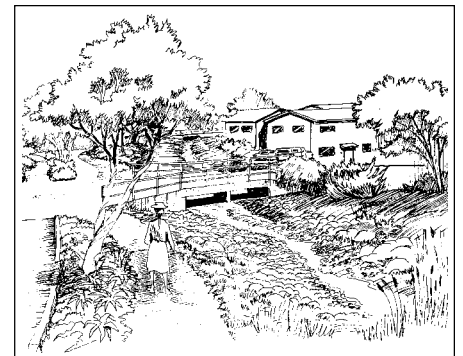
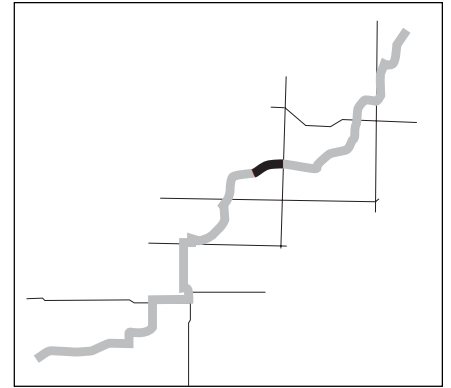
Although condominium complexes line the creek on both sides with fences established on top of the creek banks, there is opportunity for exotic species removal and replanting with native riparian species. A trail within the creek compatible with the Chollas Creek Enhancement Program could be established to link the community. Replanting would follow the enhancement guidelines outlined below.

Project Budget : \$50,000 *Trail*

Trail Linkages

The trail system connection was reviewed and three alternatives were considered:

1. the trail may continue in the actual creek bed if safe passage provisions are made, or
2. an easement for construction of a trail system adjacent to the creek can be acquired, or
3. the trail system can be continued along the public right-of-way to the YMCA.



For the immediate future, the preferred routing for this path, due to safety considerations, is option 3, which includes an interpretive program to be installed along the public right-of-way. There are approximately 4,000 lineal feet of sidewalk/trail proposed.

Project Budget: \$200,000 *Trail*

Arts Project

The underpass of Interstate I-805 should be the subject of a Public Arts project to find inventive ways of using the underpass tunnels for safe pedestrian passage under the freeway. Also, a future study to address creek trail locations and the re-engineering the I-805 underpass linkage to create a safe trail environment is proposed.

Project Budget: \$1,000,000 *I-805 study/
re-engineering*
 \$500,000 *Arts Project*

North and West of YMCA Site - Segment 5

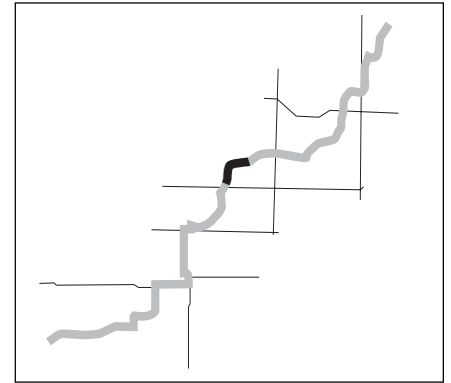
Segment 5 begins at the culvert on the west side of I-805, runs west to YMCA Way and then bends south to Imperial Avenue.

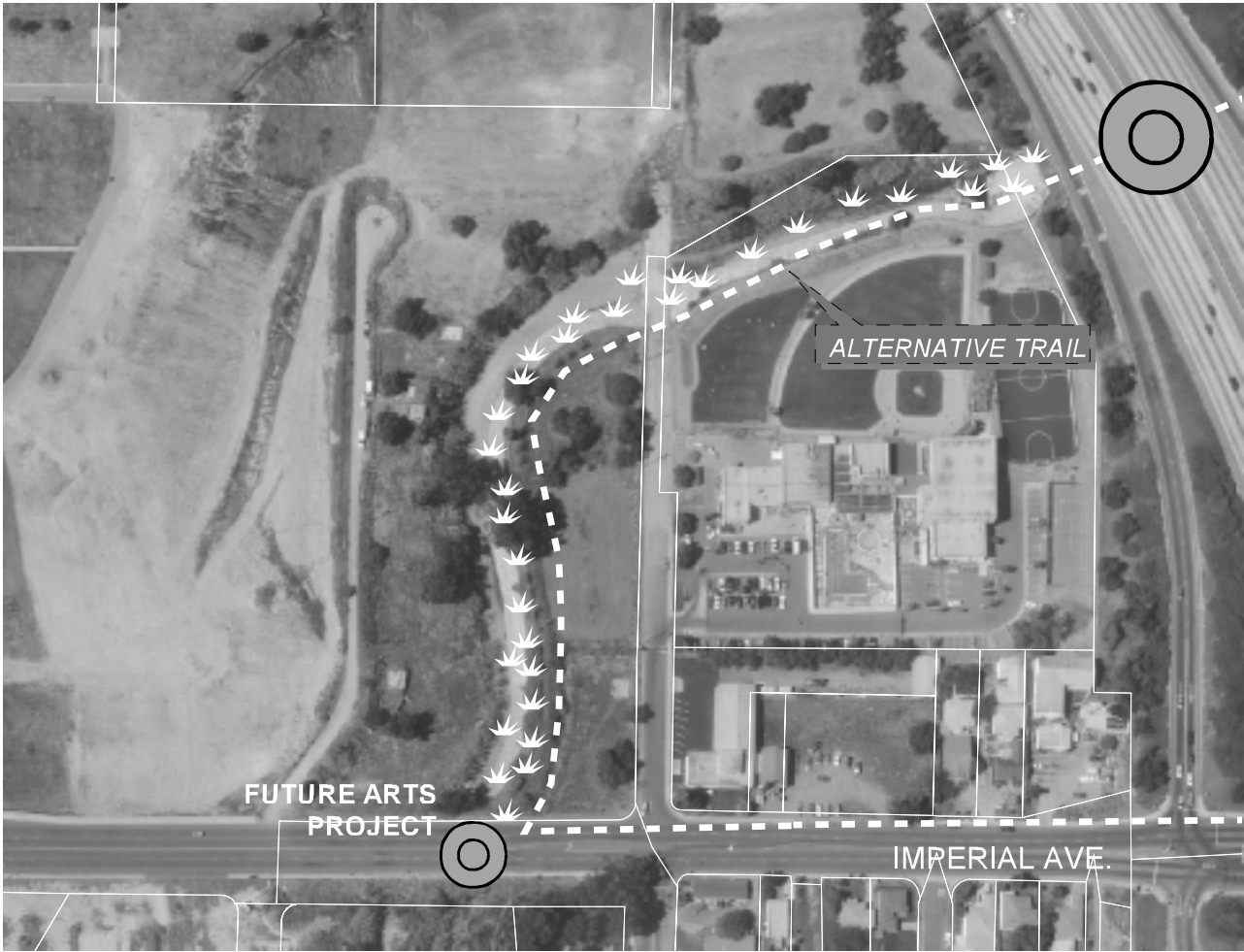
Enhancement/Restoration Actions

Within this segment, the eastern bank of Chollas Creek is concrete-lined, while the western bank is earthen. Most of the channel invert (approximately 90 to 95 percent) is cobbly and unvegetated, though large patches of disturbed wetlands, composed mostly of giant cane and white sweetclover, occur along the edges of the invert. A concrete dip crossing traverses the creek in this area and appears to back-up water on the upstream side, thus supporting areas of disturbed freshwater marsh habitat. Small patches of riparian scrub are also present on the north and south sides of the creek.





The channel runs from the west side of the Interstate 805 bridge and proceeds westerly crossing the extension of YMCA Way (formerly 45th Street). It then bends to the south and runs for approximately 400 feet to Imperial Avenue. The total length is approximately 1,200 feet. This portion of Chollas Creek was improved in 1978. The bottom width ranges between 40 and 50 feet. The depth and the top width vary. The channel bottom is primarily cobble. One bank (the east and south side) is lined with concrete. The other bank is vegetated. North and west of the creek, the land slopes up to Greenwood Cemetery located on a plateau at least 50 feet above the floodplain. The extension of YMCA Way is constructed as a dip section. Under flood conditions the road is submerged and acts as a drop structure. A water main and a gas line have been constructed beneath the road crossing.

Most of the creek bed in the vicinity appears dry except during and after rainfall. Several isolated pockets of ponding water have been observed at other times. The 100-year flood flow within the channel is classified as subcritical. Flow is constricted at the Imperial Avenue bridge resulting in an elevated water surface upstream to the drop structure. Except for a small, undeveloped piece of property west of the creek near Imperial

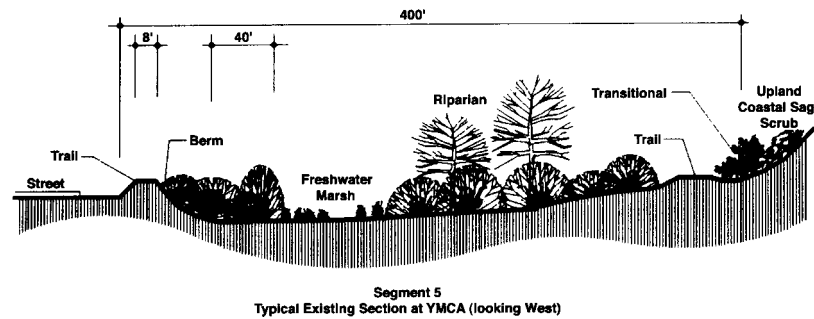
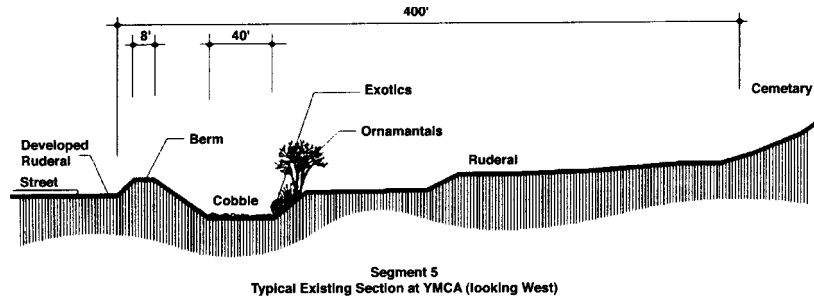




SEGMENT 5

-  Habitat Enhancement / Restoration or Management Actions
-  Arts Project / Underpass
-  Reconstruction area / Arts Project
-  Trail

Avenue, the 100-year flood is confined to the channel. A portion of the land lying east and south of the creek (the YMCA property) is below the 100-year flood elevation but is protected from flooding by a 10-foot high earthen berm. The calculated mean velocity in the channel during a 100-year flood ranges from 6.4 to 8.7 feet per second.



Proposed enhancements compatible with wetlands management recommendations would include removing the concrete lining from the channel bank downstream of YMCA Way and removing the paved dip section in the creek. Between Imperial Avenue and YMCA Way, the channel will be widened and re-vegetated in a manner similar to the enhancement area in Segment 3. Trails are proposed along the channel banks. Upstream (east) of YMCA Way, no channel modifications are proposed.

Restoration and enhancement for this segment would involve regrading of the channel banks to lower and widen the flood-plain (see illustration above). The berm at the southern portion of the site would be retained as flood control. Restoration and

enhancement measures would follow the methods described in the earlier description. Grading and revegetation operations would require acquisition or lease options of the lower (southern) portion of the cemetery to accommodate the wider floodplain. Flood control in this area is not required as the floodwater elevation is expected to remain similar to current conditions. The southern portion of this site is owned by the City of San Diego. This enhances the restoration and enhancement value significantly beyond the hydrological and biological feasibility, as property acquisition may not be necessary.

Because significant changes are proposed between Imperial Avenue and YMCA Way, a Hydrological Study will be required. Within this reach, the water surface elevation in a 100-year flood is determined primarily by a constriction at Imperial Avenue. Unless the Imperial Avenue bridge is modified, the water surface elevation anywhere in this reach will not be much below 70 MSL. The cross-section as proposed anticipates moving the existing earthen berm at the east channel bank all the way to the edge of YMCA Way. The low-lying area west of the channel near Imperial should be filled to an elevation above 70 MSL.

The typical cross-section as proposed will provide adequate flood protection with acceptable flow velocities. The hydraulic effect of roughening the channel bank and bed will be offset by the increased width. The elevation of the floodwater surface should not change significantly.

Project Budget: \$37,800 *Hydrological Study*
\$325,000 *Enhancement/Restoration*
\$564,000 (*entire project budget estimate*)

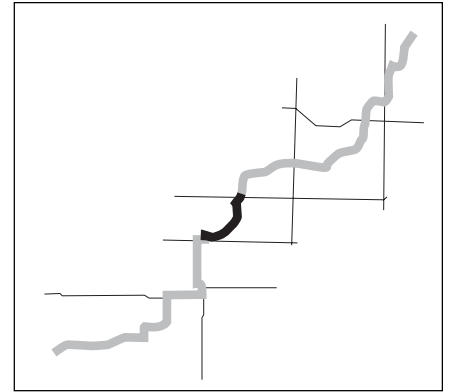
Trail Linkages

Trails are proposed to run directly adjacent to and on both sides of the creek as it traverses the Jackie Robinson Family YMCA and continues to its intersection with Imperial Avenue.

Project Budget: \$124,000 *Trails*

Imperial Marketplace - Segment 6

The Imperial Marketplace project involves the development of a 42.01 acre site in which Chollas Creek runs along its eastern and southern perimeter. Plans involve the construction of a community shopping center with approximately 243,427 square feet of retail space. This project is intended to balance the goals of the Southeastern San Diego Community Plan, both economic and social, by providing needed commercial services to the community and removing blight from the neighborhood. The project will incorporate flood control along Chollas Creek with landscaping improvements to create a park-like area along the creek and the edge of the retail center.



The section of Chollas Creek, which traverses the Imperial Marketplace, provides an important connection from the Jackie Robinson YMCA and Imperial Avenue to the Educational Cultural Complex on Ocean View Boulevard. Specific improvements include: the creation of 2.71 acres of flood channel within the reconstructed creek, the planting of native vegetation along the channel, the construction of multi-use trails on both the north and south sides of the creek, and the installation of trail-related amenities.







Enhancement/Restoration Actions

Much of this segment has been recently cleared and regraded for construction of the Imperial Marketplace. Creek slopes have been altered to 2:1 engineered slopes on both sides of the creek that are designed to potentially contain 100-year floods. Although this area featured one last remnant of relatively functional riparian vegetation within the study area, the current channel invert and newly manufactured slopes do not presently support vegetation. Revegetation and mitigation activities are in conceptual form and will be implemented as part of the project. Armorflex, a structural method of stabilizing steep slopes, will be utilized to stabilize banks in certain areas, but it is uncertain how well these areas will revegetate. Ornamentals, mostly large eucalyptus, occur in the upland areas. From the landscape plans for Imperial Marketplace, it is apparent that the slopes will be landscaped with trees and shrub plants, some of which are





SEGMENT 6

- | | |
|---|---|
|  Habitat Enhancement / Restoration or Management Actions |  Trail |
|  Arts Project / Underpass |  Education Center, Learning Centers Interpretive Centers |
|  Reconstruction area / Arts Project |  Parks |

native, but most of which are ornamental. The parcel that contains the creek and a corridor on both sides of the creek is owned by the City of San Diego.

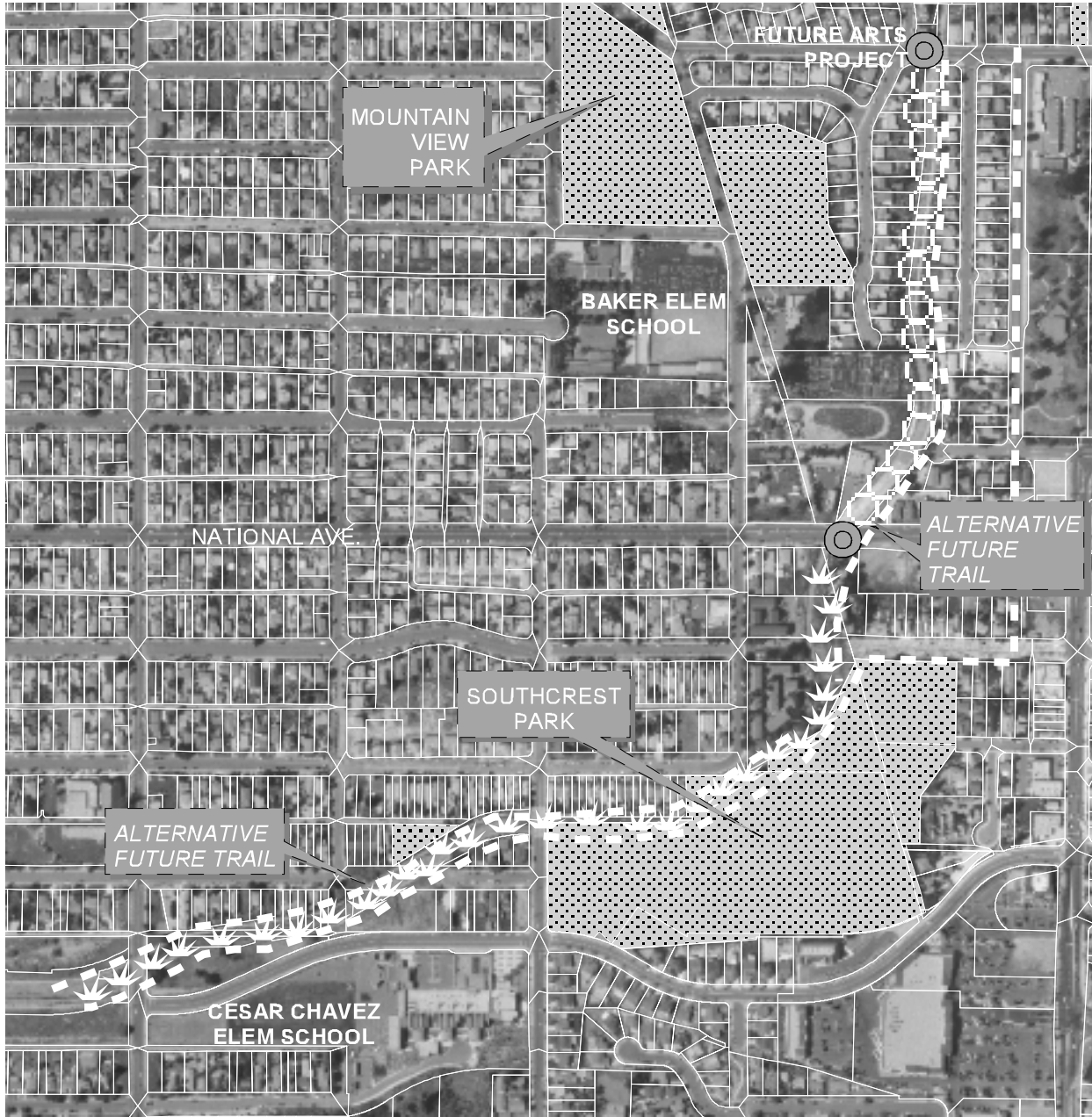
The construction and landscape plans for the Imperial Marketplace indicate that landscape maintenance is the responsibility of the Southeastern Economic Development Corporation, the owners of the Imperial Marketplace. Therefore, Management Actions are not included in this Wetlands Management Plan. The creek corridor has reverted back to City of San Diego ownership as a land swap, and the City will be responsible for its maintenance.

Project Funded: By Southeastern Economic
Development Corporation (SEDC)






Trail Linkages

The trails system will consist of 10-foot wide decomposed granite trails on both sides of the creek, running from Imperial Avenue to Ocean View Boulevard. Trail amenities along this segment will include lighting, benches, drinking fountains and bike racks.

Project Funded: Estimated Completion Date 2002



SEGMENT 7

-  Habitat Enhancement / Restoration
or Management Actions
-  Arts Project / Underpass
-  Reconstruction area / Arts Project
-  Trail
-  Parks

Chollas Walk - Segment 7

This segment of Chollas Creek runs from north of Ocean View Blvd., near San Pasqual Street, south to Southcrest Community Park and then travels westerly along the north border of the park and continues on to 38th Street.

Trail Linkages

Due to the lack of space adjacent to the creek, the trail segment from Ocean View Boulevard to Southcrest Park would continue, for the time being, entirely along existing sidewalks along San Pasqual Street. The sidewalks would be enhanced with street trees, interpretive and directional signage, as well as a number of public art projects, thus creating an urban art trail. There are approximately 3950 lineal feet (\$50/lineal foot) of trails proposed.

Project Budget: \$197,500 *Trail*

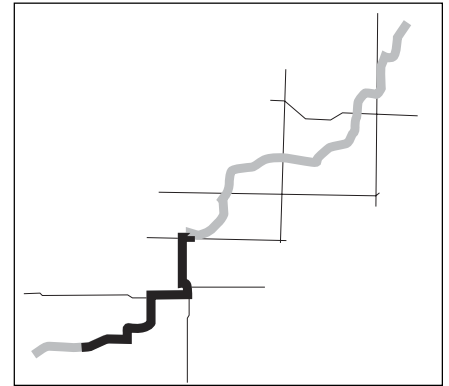
The trail system would run adjacent to the creek as it traverses Southcrest Park, then revert to the sidewalk along Alpha Street until it reaches the proposed 252 Corridor Park. There are approximately 2674 lineal feet (\$50/lineal foot) of trails proposed.

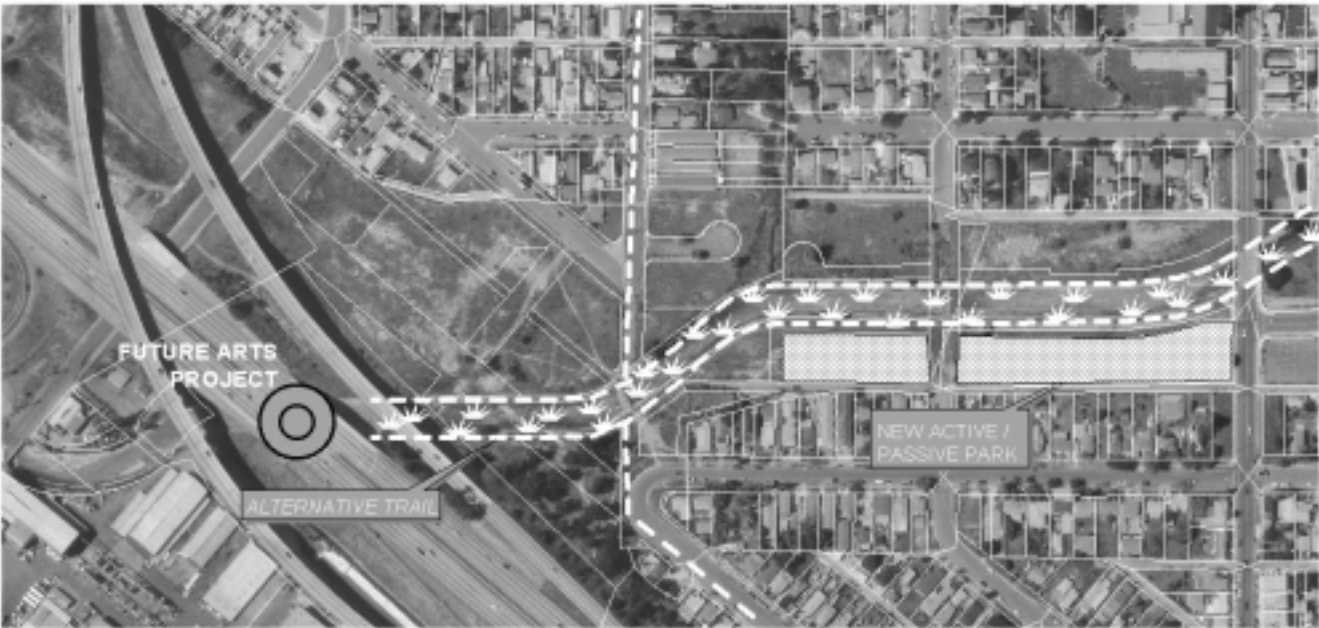
Project Budget: \$133,700 *Trail*

Arts Project

A one-block segment of the creek to the west of San Pasqual Street is a concrete channel that runs between two rows of single-family homes. Prior to concretization, the area was a deep earthen gorge where children could often be found exploring. A public arts project that will address hydrology, flood safety, and environmental enhancement should be pursued for this area. The following budget is an estimate depending on the final art concept.

Projected Budget: \$20,000 *Schematic design*
\$600,000 *Channel Reconstruction*
(estimate)



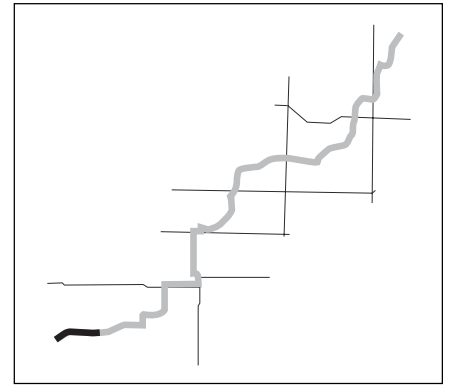


SEGMENT 8

- | | |
|---|--|
|  Habitat Enhancement / Restoration or Management Actions |  Trail |
|  Arts Project / Underpass |  Education Center, Learning Centers
Interpretive Centers |
|  Reconstruction area / Arts Project |  Parks |

Southcrest - 252 Corridor Segment 8

Once the site of single family homes, the corridor was acquired by the State of California prior to 1960 and cleared for a proposed freeway project (SR-252). Following heavy opposition from the community, the freeway project was canceled in the late 1970's and this strip of vacant land was turned over to the Southeastern Economic Development Corporation (SEDC) for redevelopment. SEDC is currently in the process of developing housing along the creek and turning over several parcels to the City of San Diego for the creation of a park in the western most area. The Cesar Chavez Elementary School has since been constructed along this corridor near the creek.



Enhancement/Restoration Actions

Within this segment, Chollas Creek flows through an unvegetated channel with engineered invert and banks. A majority of the upland areas are either ruderal vegetation or ornamentals. The site is in the 252 Corridor project footprint, which is proposed for the northern bank of Chollas Creek. Incorporating wetland enhancement in this area may be constrained by lack of expansion areas.

The channel in this reach was constructed in 1959. The cross section is trapezoidal with concrete-lined banks and a sandy bottom with some cobble. The bottom is approximately 50 feet wide. The top width is variable, averaging between 90 and 100 feet. Some low vegetation grows in the sediment. Pockets of ponding water appear in this portion of the channel year round. Between Interstate 5 and 38th Street the only crossing structure is a footbridge located approximately 1,200 feet west of 38th Street. The right of way for 37th Street crosses the channel. There are no surface improvements in the channel at 37th Street, but there are underground sewer and water mains crossing. A sewer main also crosses the channel in the vicinity of the footbridge. Side drainage enters the channel from both sides on the surface, and through underground pipes. The length of this reach of channel is approximately 1,800 feet. Land on the south side of the channel is generally lower than that on the north. The channel does not have sufficient capacity to contain a 100-



year flood. The 100-year flood flow in this reach is 5300 Cubic Feet per Second (CFS). Under steady, uniform flow conditions the channel as designed has a capacity of approximately 4,000 CFS. In addition, there is a significant backwater effect from a constriction at Interstate 5. As a consequence, some of the land and some occupied dwellings on the south are in a “Special Flood Hazard Zone” as defined by FEMA, subject to inundation in a 100-year flood. Some land north of the channel is also in this zone, but none of it is developed. The elevation of the water surface in a 100-year flood is approximately 17 MSL through the entire reach. Near the footbridge, the existing elevation south of the channel is 11 MSL, approximately six feet below the 100-year flood elevation. The velocity of the 100-year flow in the channel is calculated to range between 8 and 10 feet per second. Flow is subcritical.

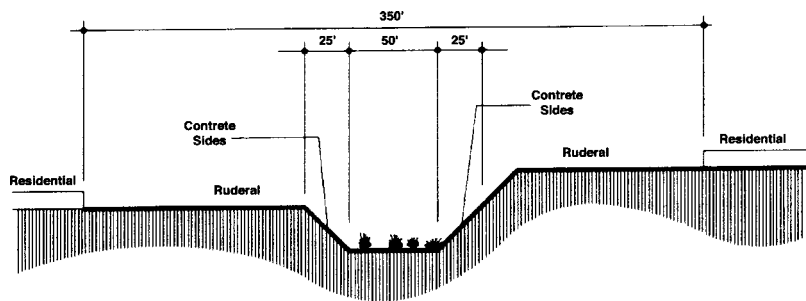
Park projects are being developed on both the north side of the creek (funded) and the south side of the Creek may include the following improvements: Active recreation, play equipment, open turf areas, restrooms, walkways, security lighting, landscaping, botanical gardens, public art, outdoor learning laboratory and site furniture.

In addition to the creation of a linear park, this corridor also offers an opportunity to comprehensively restore the creekbed itself. The condition of the creek along this segment is primarily that of a trapezoidal channel with concrete sides and a natural bottom. Creek restoration could involve the long-term removal of existing concrete sections of the creek and reversion to more natural conditions. Included in these restoration activities could be; the removal of non-native plant species and revegetation of the creek bed. This restoration project would directly contribute to the state’s resource priorities of Habitat/Ecosystem Restoration and Protection by comprehensively improving the environmental quality of the region. Due to its geographical location near the mouth of the Chollas Creek, this project is especially important because this naturalization and revegetation would serve to help clean polluted urban runoff through natural wetland processes and ultimately contribute to a cleaner San Diego Bay.

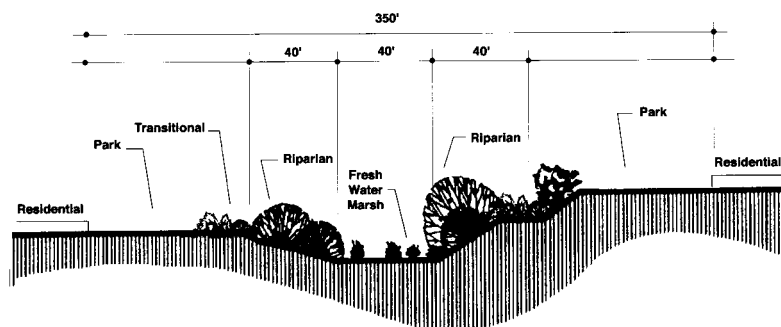
Proposed enhancements in this reach include removing the concrete from the southern channel banks and widening the top of the channel creating steps or ledges in the banks upon which the trails could be placed. The banks would be lowered and

planted with vegetation similar to the other reaches. A 7-foot high earthen berm will be necessary along the southerly bank of the channel to protect existing properties. It may also be necessary to raise a portion of 38th Street a few feet to contain flooding within the channel. Vacant property north of the channel should be filled with earth as necessary to raise it above the flood level.

Restoration of some of the park site is possible, particularly through widening of the creek and revegetating the creek banks with riparian vegetation. Park facilities could include active and passive recreation and be established in the higher creek bank areas, the vegetation for which would be wetlands transitional and buffer types (see illustration below). The lower banks could be treated with restoration measures applying the riparian plant palettes, while the park-like features would utilize the transitional/buffer palettes, as described in the detailed management actions below. The park area will be traversed by



Typical Existing Section at Southcrest Park (looking west)



Proposed Section at Southcrest Park (looking west)

trails that would complete the community linkage system. Because of the backwater effect from the constriction downstream, there is little that can be done to lower the 100-year water surface elevation through this reach. The typical cross-section as proposed, together with an earthen berm along the south side, will provide adequate flood protection with acceptable flow velocities. The hydraulic effect of roughening the channel bank and bed will be more than offset by the increased width.

Project Budget: \$453,000 *Enhancement/
Restoration*

Trail Linkages

At the proposed 252 Corridor Park, the trail system would run directly adjacent to the south side of the creek along the northern border of the park. There are 1363 lineal feet of trails proposed.

Project Budget: \$33,800 (Coastal Conservancy
funding) *Trails*
\$68,150 (entire project budget
estimate) *Trails*