Santa Fe River
Corridor Master Plan

Prepared for the
City of Santa Fe

Prepared by the
The Santa Fe River Task Force
Recreation Engineering and Planning
Acknowledgements

Santa Fe River Task Force:
  Anita Sanders
  Kent Williamson
  Neil Williams
  Melinda Romero-Pike
  Claire Reiniger
  Ted Williams
  Jane Chermayeff
  Christopher Peck
  Rob Althouse
  Julio Davila
  Charlene Owen
  Michael Buoniuto

City of Santa Fe Staff:
  Isaac Fino
  David Coss
  James Gallegos
  Chuck Lange
  Randy Thompson
  Stephanie Trujillo

Mayor and City Council Members

Planning Commission Liaison:
  Chris Wuest - Liaison
# Santa Fe River Corridor Master Plan

## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Vision</td>
<td>4</td>
</tr>
<tr>
<td>Goals and Recommendations</td>
<td>6</td>
</tr>
<tr>
<td>Goal 1: In-stream flow</td>
<td>6</td>
</tr>
<tr>
<td>Goal 2: Storm Water Discharge</td>
<td>8</td>
</tr>
<tr>
<td>Goal 3: Erosion Control</td>
<td>9</td>
</tr>
<tr>
<td>Goal 4: Flood Protection</td>
<td>10</td>
</tr>
<tr>
<td>Goal 5: The Riparian Ecosystem</td>
<td>11</td>
</tr>
<tr>
<td>Goal 6: Public Uses</td>
<td>13</td>
</tr>
<tr>
<td>Goal 7: Well-connected Trails</td>
<td>14</td>
</tr>
<tr>
<td>Goal 8: Integration</td>
<td>15</td>
</tr>
<tr>
<td>Goal 9: Quality of Life</td>
<td>16</td>
</tr>
<tr>
<td>Goal 10: Coordinated Management Program</td>
<td>18</td>
</tr>
<tr>
<td>Implementation</td>
<td>19</td>
</tr>
<tr>
<td>Acquisition of Right-of-Way and Permits</td>
<td>19</td>
</tr>
<tr>
<td>Funding</td>
<td>20</td>
</tr>
<tr>
<td>Project Management</td>
<td>25</td>
</tr>
<tr>
<td>Project Phasing</td>
<td></td>
</tr>
<tr>
<td>Appendix A - Design Guidelines</td>
<td></td>
</tr>
<tr>
<td>Appendix B - Maps</td>
<td></td>
</tr>
<tr>
<td>Appendix C - Cost Estimate</td>
<td></td>
</tr>
<tr>
<td>Appendix D - Recommendations for Stormwater Master Plan</td>
<td></td>
</tr>
</tbody>
</table>

**Reference Materials Provided on Request**

- 1985 Santa Fe River Committee Report
- Po' e Gae Report
- 1993 Santa Fe Bikeways Master Plan
Introduction

The Santa Fe River Corridor Master Plan is a comprehensive plan to develop a system connecting public parks and natural preserves along the Santa Fe River corridor. The Santa Fe River Plan is based on three fundamental beliefs:

- An adequate amount of continuously flowing water to maintain a reasonable and steady level in the river is absolutely essential.
- The entire river corridor is to be planned and developed as a connected greenway system of public parks and natural preserves.
- The design of the Santa Fe River Corridor Master (Restoration) Plan must combine riparian protection, trails, recreation, and flood protection with the aesthetics of a natural stream.

The object of the Plan is to develop a diverse and aesthetically pleasing corridor along the Santa Fe River from Two Mile Reservoir to the wastewater treatment plant. Initially, a continuous off-street pedestrian and bicycle trail is proposed from Monsignor Patrick Smith Park to Frenchy's Field. The City's intention is to respect and restore, where appropriate, the river corridor ecology. The guiding principles are riparian restoration, flood protection, erosion control, aesthetic design considerations, recreational and community uses, sound engineering, public safety, and cost effectiveness.

The contents of this report include: a vision of the Santa Fe River as collected from the people of Santa Fe, goals with corresponding recommendations, implementation recommendations, detailed design guidelines, maps, a cost estimate, and excerpts from related reports.

The River Task Force reviewed and adopted the original 1985 Santa Fe River Committee report as a starting point for its work. The current document represents an extension of the concepts presented in the 1985 plan (See 1985 SF River Committee Report.)
Vision

Nocturno

by Conrado Nalé Roxlo the Argentine b.1878

El bosque se duerme y sueña
el río no duerme, canta.
Por entre las sombras verdes
el agua sonora pasa,
dejando en la orilla oscura
manojas de espuma blanca.

Llenos los ojos de estrellas,
en el fondo de una barca
yo voy, como una emoción
por la música del agua
y llevo el río en los labios
y llevo el bosque en el alma.
Ask people what they envision for the Santa Fe River. Words, ideas and dreams come bubbling from them like water flowing from its source. “Our river lives as crystalline water with meadows along its banks and natural springs sustaining the jarral reeds and willows” in the memories of many. Many perceive the river as the “lifeblood of the community coming down from the mountains, connecting neighborhoods, and feeding the acequias. Farmers and fishers provided for their families from the river while their children splashed along the banks in the shade of ancient cottonwoods”. These are both the memories and the dreams for the Rio de Santa Fe.

Repairing the fabric of the watershed is essential. Imagine natural meanders of water running through an enhanced riparian corridor. Animals, birds and fish will thrive as the area is re-vegetated. Large rocks and boulder dams will encourage ponds, riffles and backwater. Numerous check dams and increased vegetation in the tributaries and arroyos replenishing the aquifer through infiltration will help to heal the watershed.

The establishment of a formal riverside garden with a bandstand would provide an area for official ceremonial occasions and weddings, as well as places for storytellers, sculptures and historical documentation of the river. From there one wanders into demonstration gardens and finally on to nature trails where the sound of running water draws attention to the river again.

Promotion of an annual river festival with celebrations, tree plantings and river walks would encourage the community to continue its involvement with the river. The downtown river park becomes an alternate place for festivals, families and young people. Contemplative spaces and art installations allow for reflection on the relationship of nature and culture.

In a related effort, the Santa Fe Arts Commission has sponsored efforts to create a native American monument called Po’e Gae, which means “the watering place.” At a recent symposium, the participants agreed the most appropriate monument to Native peoples would be to restore the Santa Fe River to a living, flowing river. (See Po’e Gae Report.)
Goals and Recommendations

Goal 1: Establish a minimum in-stream flow in the river.

The Santa Fe River has meant "water is life" for four centuries. Without a reliable flow in the river, the City would not have been established. The Native American people called it Po'e Gae -- "the watering place". The 1985 River Committee report emphasized the historical importance of water in the river. There are no accounts of the river being dry prior to the construction of the water supply reservoir in 1947. There is no river if there is no water.

Assuring a minimum in-stream flow is also crucial to maintaining wildlife habitats and sustaining the riparian ecosystem, thereby stabilizing the river banks through vegetation and making the river a more delightful experience for all.

Recommendations:

A) Conduct research to determine the minimum in-stream flow necessary to sustain the river ecosystem. Define quantity and quality of flow.

Potential methods to achieve minimum in-stream flow:

- recapturing run-off below the city in a city reservoir,
- direct storage and release from a reconstructed Two Mile Reservoir,
- controlled release from existing city reservoirs,
- reclaiming treated effluent,
- acquiring water rights for in-stream flows,
- pumping Rio Grande water, or
- a combination of the above.

B) Develop a model of water diversions from the Santa Fe River. The modeling would include all claims to river water (their seniority, amount, seasonality, and any other restrictions to the right), and when completed would help clarify the amount and seasonality required of rights to be dedicated to in-stream use.
C) Measure the quantity and quality of existing flow and provide additional data on river bottom leakage to the ground water table. Flow monitoring stations should be installed.

D) Restore the riparian environment for fish, wildlife, people and erosion control.

E) Increase ground water and aquifer recharge from the river.

F) Develop a treated effluent management plan.
Goal 2: Reduce storm water discharge into the river.

Currently, all run-off from impervious surfaces within the basin not detained on site enters the river. The river serves as a storm sewer for a large portion of the city. With ongoing development, water from roofs, roads and parking lots can no longer infiltrate the ground, creating a demand for a greater carrying capacity of the river channel. While the quantity of run-off during storm events increases, water quality decreases due to pollution.

Recommendations:

A) Expand the requirements for on-site detention ponding of new and existing major impervious areas.

B) Require use of porous paving materials, reducing impervious surfaces city wide.

C) Use right-of-way of city streets for water harvesting and detention.

D) Construct numerous wetland/detention areas within the tributary arroyos using bio-filtration methods to improve water quality.
Goal 3: Decrease erosion in the river and in the contributing arroyos.

Increased run-off combined with the channelization of the river due to the loss of much of the natural flood plain has dramatically increased erosion and the potential for flooding. The movement of storm waters in the tributary arroyos needs to be slowed down to prevent flood damage to the community and further erosion. Slowing the rate of run-off from the arroyos will also increase infiltration and aquifer recharge.

Recommendations:

A) Build regional detention ponds in arroyos, such as the Arroyo de las Mascaras, Arroyo Saiz and the Cañada Ancha, to reduce peak discharges.

B) Consider the management of McClure and Nichols reservoir operations for attenuation of peak flows in the river.

C) Require temporary run-off controls for construction projects such as silt fences and sedimentation ponds.

D) Prevent down cutting and stream bank erosion through numerous grade-control structures.

E) Keep channels free of impervious materials, like concrete lining, using biotechnical methods.

F) Repair existing degradation of the river and arroyo channel beds by raising the channel bottoms to historical levels wherever consistent with adequate flood protection (i.e., the St. Francis Drive to Camino Alire section).
Goal 4: Integrate and coordinate flood protection improvements with projects proposed within this plan.

Floods are unpredictable but naturally occurring events. The city has neither total responsibility nor complete ability to prevent catastrophic flooding. However, it is important to establish the level of protection possible and desirable. The flood carrying capacity of the river should not be reduced and where possible, should be increased when this can be accomplished without altering the character of the river. Improvements made to the river should be consistent with good flood engineering practice as well as the goals of this plan. In the 1930’s, the Civilian Conservation Corps constructed many gabions and check dams in the arroyos around Santa Fe. Many of these still exist after 60 years and have been effective in minimizing erosion.

Recommendations:

A) Investigate rebuilding Two Mile Reservoir in an environmentally and structurally sound way for flood control, minimum stream flow and recreation.

B) Thoroughly pursue upstream measures, as outlined in Goal 3, to reduce peak run-off. (See 1985 SF River Committee Report, pp. 35-37.)

C) Increase channel capacity and reduce velocities through meandering where possible.

D) Evaluate current levels of protection in each segment of the river.

E) Balance possible protection levels with associated costs and impacts on the riparian ecosystem.

F) Coordinate Flood Drainage Master Plan improvements and goals with this plan.

G) Create ways for people to get out of the danger zone (especially in areas with steep banks).

H) Prohibit residential or urban development within the 100 year flood zone and consider selective acquisitions of private parcels within this zone.
Goal 5: Restore and preserve the riparian ecosystem.

The ecological requirements of a natural river system must be balanced with the impact of human uses. A wide range of river-related experiences within the urban setting should be encouraged. Ultimately, the Santa Fe River can be reestablished as a focal point of the community. Relatively intact areas of the river which support disturbed ecosystems should be identified with the goal of preserving them. Undeveloped but disturbed areas of the river should be considered for preservation and improvement of fish and wildlife habitat, as well as for development of passive park areas. The restoration of the natural elements of the river corridor would be the priority at these sites, although some transition from natural areas to developed irrigated areas will be planned. Developed areas of the river will continue to be a mix of formal park land and activity centers, providing recreation opportunities for the community.

Recommendations:

A) Retain and strengthen the character and feeling of a natural river.

B) Protect, restore and create riparian plant and animal habitat. Identify ecologically sensitive areas and design the trails to direct use away from these areas.

C) Implement a vegetation and planting program for the Santa Fe River Corridor. Recognize the need for a sustainable vegetation management and planting program in order to maintain and enhance the river ecology. Conduct research to ensure the selection of appropriate and diverse species, as well as siting and protection of replacement vegetation.

D) Identify river bank restoration areas. These are areas that have been disturbed by construction or previous attempts to channel the river, and will require individual attention and restoration plans.

E) Consider the site specific character when planning improvements.

F) Provide public education to increase environmental awareness about the river restoration and park projects.
G) Survey and quantify the amount of habitat (river length, acreage of bosque, occurring species)

H) Create fish passages.

I) Lengthen river with meanders where possible.

J) Develop an integrated pest management plan for the riparian corridor.

K) Coordinate with future tree ordinance (regarding treatment of non-native species in the riparian corridor).
**Goal 6: Provide for a wide variety of public uses.**

The Santa Fe River is currently one of the most under used public spaces in the city (with possible exception of some stretches downtown). Increases in population and continuing development of vacant land result in fewer natural areas and diminished access to open space for many people inside the city. Tourism related economic factors have altered the character of downtown to a point where many locals feel alienated as the civic spaces lose some of their socializing functions. A well-connected river corridor with continuous trails would be a desirable feature the community. The river corridor should be a beautiful, inviting and safe environment for residents and visitors of all ages. In order to be successful, it must allow for a wide range of activities and experiences to occur along the banks of the river. Improvements should increase opportunities for social interaction and community building. Human uses must be appropriate to the character of the respective river section and the needs of the adjacent neighborhoods. Special and non-compatible uses should be limited to designated locations along the river.

Recommendations:

A) Include a process in designing specific projects to determine the appropriate public use for the area.

B) Connect existing parks with trails allowing parks to serve as destinations along the river. This plan does not preclude further development and improvement of existing parks.

C) Increase visual and physical access to identified locations along the river.
Goal 7: Establish continuous, safe, and well-connected trails along the river.

The river corridor has great potential for alternate modes of transportation as recognized in the Bikeways Master plan of 1993 (adopted by City Council March 10, 1993, see 1993 SF Bikeways Master Plan). It must be recognized that pedestrians and cyclists are more sensitive to their environment than automobile drivers. Existing and proposed trails and bikeways are an important planning consideration and should be accommodated in or near to the river corridor.

Recommendations:

A) Develop a continuous system of walking and biking trails.

B) Route trails underneath cross bridges.

C) Create separate soft surface walking trails where appropriate.

D) Buffer trails from vehicular traffic.

E) Integrate design guidelines with existing standards for trails.

F) Develop trail lighting system (design to prevent light pollution).

G) Design connections from residential and commercial areas to trails.

H) Coordinate with public transit.

I) Provide logical entrance and exit points for access and safety.

J) Design river corridor improvements to be accessible to the handicapped where such access is reasonable. All major facilities will be accessible to those in wheelchairs.
Goal 8: Integrate the river with its surroundings.

In order for the river to have a unifying function throughout the entire corridor, it is important to recognize a number of significant relationships during the planning and implementation stages. Proposed uses and improvements should take into account the historical, cultural and social aspects of the adjacent areas. They should adequately address the environmental and legal concerns of adjoining neighborhoods and property owners. Except for protected or otherwise designated areas, the river front should be publicly accessible. Selective acquisitions or interests in property along the river should be pursued.

Recommendations:

A) Map property ownership and describe areas bordering the river. Identify areas for acquisition based on the following considerations about the property:

- includes a unique or sensitive ecological area,
- provides a necessary trail linkage or an entry to the river trail system,
- contributes to flood hazard management, or
- provides a scenic amenity or buffer area.

B) Negotiate and cooperate with affected parties during planning and implementation phases.

C) Establish an easement of adequate size to protect the river edge when property with river frontage is developed or redeveloped. Regardless of acquisitions required for ecological reasons, for a trail linkage or entry, or for flood hazard management, it is recognized that any development along the river could impact the stability of the riverside ecology.

D) Build storm water detention basins as multiple use facilities (parks/open space).

E) Create agricultural restoration areas adjacent to the river.

F) Restore acequias in or along the river corridor.
Goal 9: Improve the quality of life of the people of Santa Fe through river projects.

The restoration and development of the Santa Fe River offers significant opportunities to involve the community in the planning and implementation stages with numerous benefits to the local people. Educational, economic and intercultural aspects can be addressed if projects are designed and implemented in such a way as to allow for citizen participation at every step of the process.

Recommendations:

A) Involve the public in the planning process.

B) Celebrate the entire planning and implementation process by seizing all opportunities for public involvement at every ground breaking and every tree planting.

C) Allow for and encourage the participation of smaller local businesses and community groups during the project implementation.

D) Involve schools in meaningful ways.

E) Develop community involvement programs involving:

- volunteers,
- nonprofit organizations,
- environmental groups,
- garden clubs,
- schools,
- Santa Fe Community College,
- Youth Ecology Corps and
- Local subcontractors/work force.
F) Possible programs could achieve:

- apprenticeship and job training in landscaping and stone masonry,
- community workshops in trail building, erosion control, tree planting etc.,
- design competitions for facilities/special features,
- art in public places,
- Adopt-a-…… programs,
- memorial parks, walkways, etc.,
- awards, festivals, events, and special activities along the river and
- curricular activities in schools.
Goal 10: Develop a coordinated management program for the maintenance of land and improvements along the river.

It should be recognized at the outset that successful Santa Fe River Corridor projects will require an on-going maintenance budget, in addition to capital expenditures. The range of maintenance responsibility would possibly include sweeping the trail, removing debris and trash, pruning branches, reporting any dumping or damage to improvements along the river, monitoring the stream flow quality and quantity and assisting users of the trail system.

Recommendations:

A) Research existing models for such a program used by other cities.

B) Determine ongoing costs for repair and replacement of improvements. These costs, initially small, will need to be included in the capital budgets of affected departments.

C) Identify and coordinate maintenance activities with other agencies, districts and individuals.
Implementation

Successful implementation of the Santa Fe River Master Plan calls for addressing four general areas. These are:

- acquisition of right-of-way and permits;
- funding;
- effective project management and coordination; and
- realistic and expeditious phasing over a three to four year time frame.

Acquisition of Right-of-Way and Permits

This is a very critical step in the process. Some areas of the corridor are in private ownership. In addition, there are a number of non-trail uses occurring on public properties including ballfields, picnicking, swimming pools, etc. Therefore, coordination with users and park managers to assure compatibility and minimize conflicts is also a vital part of “right-of-way negotiation.”

Since securing of right-of-ways and permits can be a time consuming process, it is strongly recommended that work in this area begin immediately and proceed as expeditiously as possible. It is important that each individual property owner, as well as affected home owner groups, be contacted and the project carefully explained to them. Some discussions with individual property owners have already occurred and certain trail easement agreements are in place. Finally, there is the need to secure appropriate approvals and permits under local, regional, state and federal laws.
Funding

The estimated cost of the Santa Fe River Corridor project is $8 million. The City of Santa Fe has committed close to $2 million for 1996, leaving a remainder of $6 million dollars to be raised from 1997 to the end of 1999, approximately $2 million per year. By leveraging, as explained in this section, an annual commitment of $1 - 1.5 million from the City of Santa Fe (per year, for three years) would be enough to complete the Santa Fe River Corridor by the year 2000. Most federal and corporate sources require matching funds, therefore, local support is a requirement for the completion of this plan. The best source of local funds is the gross receipts tax which is scheduled for renewal in 1997. Action should be taken in 1996 to secure these funds. The remainder of this section details funding strategies and potential funding sources.

In the age of partnerships, "leveraging" is the rule for funding recreation and trail projects. Broad, intergovernmental and public-private partnerships can leverage more funding than single- or few-sponsor projects. The most successful projects begin with local support from government and private sources and use that support to leverage state, federal, foundation and corporate funds. Financing can be packaged in an endless number of combinations. In most cases, however, federal dollars cannot be matched with federal funds, nor state dollars with state funds.

Greenways present an extremely rich palette of resources and funding opportunities. With the spine trail as the connector, plans should reflect the maximum amount of natural, cultural and recreation resources that can be developed and interpreted in phases over a period of years. Demonstrating how they integrate can provide a basis for attracting a wide range of users, including recreationists, heritage and eco-tourists, and recipients of outdoor education. Projecting such a colorful array of amenities and uses, fires imaginations and generates more opportunities for enlisting partners, funders and user groups.

Keys to building successful funding packages:

Leverage the Resources - Begin by enlisting a maximum number of partners based on all the resources in or connecting to the project.

Organize the Home Team - Demonstrate broad local support backed first by commitments for dollars, and second by in-kind goods and services.
Organize the Home Team - Demonstrate broad local support backed first by commitments for dollars, and second by in-kind goods and services.

Work with Your Neighbors - Expand local support to a regional level to increase funding potential exponentially.

Think Long Term - Create a funding scheme that projects which partners and outside sources will be asked to fund any combination of resources in specific years.

Show a Return on Investment - Document in real terms the users and related returns on previous funding to support future requests.

Sources of funding and financing usually fall under eight broad categories of activity or improvement;

A) riverscape improvements and restoration (funding mechanisms identified under this broad category may also apply to specific facilities in other categories of improvement, listed below),

B) pedestrian and bicycle facilities,

C) parks,

D) river restoration (fish and wildlife habitats and improvements to water quality),

E) flood control,

F) land acquisition,

G) private development adjacent to the river and

H) maintenance and operation.

Funding and financing sources include grants and technical assistance from federal, state and local agencies, land transfer and assessments from benefiting property owners, and assistance from non-profit and volunteer entities. Funding for new, private, river-compatible projects may occur through the normal private development process, guided by appropriate governmental regulations and possible financial contributions by agencies. Funding and financing programs for which the project would be eligible are listed below.
State and Federal Funding

- The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
- National Recreation Trails Fund Act (The Symms Act)
- Community Development Block Grants (Department of Housing and Urban Development)
- New Mexico Lottery Funds
- U. S. Corps of Engineers
  - Section 14 Funds
  - Floodplain Management Services
  - Small Flood Control Projects
- Department of the Interior
  - Watershed Protection and Flood Prevention (Soil Conservation Service)
  - Federal Land and Water Conservation Funds (National Park Service)
  - Urban Park and Recreation Recovery Program (National Park Service)
  - Small Reclamation Projects (Bureau of Reclamation)

Local Funding

- Reallocations of Existing Resources
  - income from Santa Fe Estates
  - local government general funds and parks, public works, engineering, public utilities, and community development funds
  - land and trail acquisition through subdivision development approval process
  - land trades for City-owned land
  - recreational use easements
⇒ General Fund Revenues
⇒ Lodgers Tax

- Special Assessments and Taxes
  ⇒ special improvements districts, bond issues, and optional sales tax
  ⇒ developer land and trail dedications
  ⇒ adverse impact mitigation improvements
  ⇒ impact fees
  ⇒ park dedication requirements -- cash in lieu of land provisions
  ⇒ Gross Receipts Tax (1/4%) (Note: reapproval of 1/4% portion up for renewal under municipal purpose “and quality of life”).
  ⇒ tax increment financing

- Capital Improvement Programs
- Wetlands Mitigation Site
- Special events to benefit river projects

**Private Sources**
- donations of cash
- fund raising rides and similar events
- Rails to Trails Conservancy and other conservation groups
- corporate sponsors
- non-profit foundations (local, state, and national)
- volunteer and service organizations
- land acquisition through donations, conservation easements, and shared use agreements
Project Management

The Santa Fe River affects the interests of a number of agencies, groups and individuals. Given the multi-objective and multi-jurisdictional nature of the project and the desire to implement the plan within 3-4 years, an effective project management structure is essential to assure a coordinated, expeditious effort. The following are recommendations for managing the implementation effort.

Recommendations:

A) Have one project coordinator/contact person at the City who is responsible for all aspects of the plan. This person must oversee and coordinate the other affected city departments and staff, as well as act as overall contact person for the City. Other duties would include: managing the designers of individual projects, creating an annual coordinated work plan and budget, leveraging city funds with outside sources of funds, reporting to the City Council and the River Commission (refer to recommendation C) on progress and approval of individual projects, and keeping the overall plan on schedule. It is critical that this person be given adequate time to handle the job and not be given other conflicting duties.

B) Hire a multi-disciplinary design team to creatively plan and design each segment of the Santa Fe River Project. This team may be any combination of City staff or outside consultants that work together to create the most cost effective design incorporating the goals of the Santa Fe River Plan. This team could be hired on an annual or project-by-project basis and should report to the City project coordinator. This team should consist of qualified professionals in fields such as: riparian and aquatic biology, landscape architecture and design, trail design, civil and hydraulic engineering, art and others as appropriate.

C) Create a City Council appointed citizen River Commission of not more than six members who will coordinate with a watershed commission and help oversee the implementation of the Santa Fe River Corridor Master Plan and act as the public forum for the project approval. This commission would aide and direct the staff and design team as projects are designed. They should be used to
review and approve project designs and allow for public input. The purpose would be to allow for adequate public input and create an efficient process for project approval.
Project Phasing

The overall project (Frenchy’s Field to Patrick Smith Park) could be realistically completed within a four year timeframe if adequate resources are dedicated to the project, including staff time and construction funds. General Phasing is recommended as follows:

1. Complete Camino Alire, Section 14 project immediately, include all trail and greenway improvements by end of 1996.

2. Complete overall project between St. Francis and Camino Alire by end of 1996.


5. Plan and design projects upstream of St. Francis and downstream of Camino Alire and St. Francis underpass in 1997.

6. Construct St. Francis underpass in 1998 and major trail restoration and projects for Camino Alire to one half way to Frenchy’s Field.

7. Construct trail and flood improvements through town from St. Francis to Pasco de Peralta in 1999.

Appendix A - Design Guidelines
Prepared for the
City of Santa Fe

Prepared by
Recreation Engineering and Planning
Table of Contents

2 □ Introduction
  • Why Design Guidelines?
  • Using this Manual
  • Design Intent

7 □ The Design Process

10 □ Channel Design
  • Trickle Channel
  • Flood Channel
  • Bank Stabilization
  • Drop Structures

19 □ Paths
  • Active Paths
  • Passive Paths
  • Retaining Walls
  • Railing
  • Barriers

29 □ Intersections
  • Underpasses
  • Street Crossings

32 □ Bridges
  • Mixed-Use Bridges
  • Pedestrian Bridges
introduction
The Santa Fe River Corridor has the potential to be a monument to the community in its concern for the health of the environment and quality of life. It can provide the central element in a larger open space system with the potential to link the entire community through its tributaries. These tributary drainages can be creatively developed to function as storm drainage and flood channels, efficient pedestrian and bicycle transportation systems, open space and wildlife corridors, and attractive recreation areas.

**Why design guidelines?**

The guidelines presented in this manual are intended to ensure an overall harmony of appearance and function as individual projects are undertaken along the river corridor. While stressing continuity, the guidelines provide a good deal of latitude for individual projects. They are intended to direct and inspire good design, not to stagnate creativity. Most suggest minimum standards of performance while a few provide standard details for consistency and / or ease of maintenance, etc.
Using this manual

The river corridor guidelines begin with an introduction to the appropriate design process. They are then categorized primarily by landscape elements described in the Table of Contents. Within each category, the guidelines are organized in a descending order of detail as described here:

- design goals / concepts
  - considerations for good design
  - optional details
- design standards
  - mandatory design criteria
  - mandatory construction methods and materials

Although any given design may incorporate only a few of the elements, it is recommended that the user first skim the entire book to become familiar with the general policies and philosophies it presents. Finally, determine which sections are pertinent and study those in detail.

The City of Santa Fe will rely on these design guidelines and other applicable codes and standards as a basis for evaluation of stream corridor designs.
The following is a list of items not referenced in the design guidelines. However, it is recommended that they be included in the Santa Fe River Corridor as it develops. These include:

- **Signage:**
  - informational
  - regulatory
  - mileage markers
  - identification

- **Site Furniture:**
  - picnic tables
  - benches
  - trash barrels
  - dog “pooper-scoopers”

- **Lighting:**
  - restrooms
  - information kiosks
  - drinking fountains

These items should be designed to be:

- functional
- attractive
- vandal resistant
- cost effective

A coordinating theme should be used throughout the river corridor. The items listed previously can be purchased from suppliers or constructed locally.
Design Intent

The basic criteria for all elements of design include:

- appropriateness and excellence of design
- environmental fit
- functional quality
- aesthetic sensitivity
- consistency and continuity of design
- durability and strength of structures
- ease of maintenance
- resistance to vandalism
- availability / replaceability
- handicap access wherever reasonable
design process
unique features
- activity areas
- circulation patterns
- primary users / user conflicts
- major and minor views
- character of area
- environmental qualities
- adjacent uses
- site context

site and the users: Studying all the characteristics of the
Begin the design process by

- aesthetic amenities
- water quality improvement
- habitat improvement
- transportation
- recreation

landscape management
- Interaction of

presents. Consider the unique
maximize all the opportunities it
is to design for multiple uses to
designing the river corridor
The primary consideration in
Respect the type of land use stream encounters:

- residential neighborhoods require a design that is sensitive to the character, forms, materials, colors, etc., of the development and one that involves the residents in the design process. Consider carefully the character of the public/private interface.

- commercial areas can be lively, colorful places. Consider linking paths to commercial destinations and activities such as shopping, eating, and playing near the water's edge. Provide more structured amenities such as seating areas at natural focal points, water features, gathering places, etc.

- environmentally sensitive areas require a careful balance between the need for recreation and protection of natural resources. Determine the appropriate use level and site any path system carefully.

While designs which emphasize the unique character of an area are encouraged, the user travelling the length of the corridor perceives the river as one unified linear feature. Therefore, each design should respect the overall harmony, integrity, and identity of the entire river corridor as well.

Respect existing landforms in site planning, and to the greatest extent possible, utilize materials native to the area.
channel design
11

Design Goals / Concepts

- Ditch channel
- Maintenance of natural channel configuration and maintenance of natural channels and drainageways is to attempt to
- Ensure natural vegetation
- Minimize scour and deposition.
**design goals / concepts**

- All elements required for channel function, such as culverts, drops, bridges, edges, etc. shall be considered important landscape elements. They shall be designed as integral features in the overall recreation, transportation, visual and environmental scheme of the project.

- Utilize native boulders in channel design, or integrate sensitively with materials in adjacent development.

- Avoid visible concrete where possible. If concrete must be used, provide textures and forms with visual interest for the pedestrian, or screen with vegetation.

- Design a maintainable channel bed. If anchoring the bottom for maintainability, utilize natural appearing materials, i.e., round river boulders set 1/3 into concrete with no visible concrete.

- Minimize the use of angular riprap in channel beds. If used, consider burying.

- Seize the opportunity for more water features in stream.
**design concepts / goals**

- Drainage swales interrupted by site improvements shall be constructed of natural materials placed for proper function of the drainage system.

**NOT THIS**

- Avoid using exposed drain pipe or impervious man-made swale lining material.

**THIS**

- Use native rock or similar material to line swale, follow natural course of terrain.

\[\text{trickle channel}\]
**design goals / concepts**

1. The first priority in planning for a drainageway is to attempt to maintain natural channels and natural channel configurations.
2. Vary channel widths and side slopes if possible. Mowed side slopes must remain at 3:1 or shallower.
3. Consider special landscape treatments at area boundaries to emphasize a sense of entry.
4. In more urban areas, utilize mowing edges or other clear transition to natural vegetation in channel bottom.
5. Retain existing mature trees. If removal is required, replace with appropriate species.
Design Goals / Concepts

Bank Stabilization

- With grasses.
- Vegetation or berm and plant.
- turf, apron, screen and
- grass, gravel, rock, minimum
- natural, visual Impervious -
- vegetation.
- potential. Use minimum
- steep grades and erosion
- rock - use only in areas where

Slope

- vegetation to create a stable
- vegetation:
- maintain exiting
- grass - multi, perennial
- soil, turf, shrub-like

Design

- create an aesthetically pleasing
- example in stabilizing slopes and
- methods which follow nature's
- choose from and combine several
- vegetation tools. A designer can
- interaction of rock, soil, and
- banks are naturally stabilized by the
design goals / concepts

- drops required for flood control are also important aesthetic elements in the landscape. Designs should maximize their potential as 'people attractors' with the sights and sounds of falling water.
- Integrate drop structures with existing or proposed focal points where possible.
- Create natural appearing waterfalls or coordinate with surrounding architectural forms and materials.
- Meandering forms across the channel appear more natural than linear forms. Always avoid hazardous linear drops across channels used for water recreation.
- Utilize round river rock in a variety of sizes for a naturally appearing drop. Minimize grout exposure.
- Minimize the visible vertical and horizontal mass of the drop structure, i.e., terrace steep vertical drops, design creative energy dissipators, etc.
DROP STRUCTURE TYPICAL

SECTION A.A

No cut-off wall may be necessary in many locations.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.

High section elevation - 6'-12" Rock
Below between boulders w/ 3'-5" dia. rock.

Think upstream side of section.

Concrete wall or ground fill.

High section elevation - 20'
Low section elevation - 10'
Existing channel grade - S

Top of rock fill from entire section.
paths
design goals / concepts

The following detail is provided for your information. Use of this construction method is optional.

SAMPLE FLOOD RESISTANT PATH SECTION
TYPICAL CONCRETE PATH SECTION

CONCRETE JOINT DETAIL

Design Standards

Active Paths

The following details are standard for all active path construction:

1. Minimum width is 7.5 m

2. Maximum length is 60 m

3. A grading slope of 3% is required

4. A 200 mm wide asphalt pavement strip is placed on top of the concrete path

5. Concrete path is separated from the adjacent landscape by a 200 mm strip of crushed stone

The following details are standard for all pedestrian paths:

1. Minimum width is 1.5 m

2. Maximum length is 60 m

3. A grading slope of 3% is required

4. A 100 mm wide asphalt pavement strip is placed on top of the pedestrian path

5. Pedestrian path is separated from the adjacent landscape by a 100 mm strip of crushed stone
active paths

**Design Standards**

- Where the radius of curvature is less than 100 feet, it is advisable to widen the bikeway in order to increase the lateral space required by the cyclist as he leans to the inside of a turn. The first figure shows the methodology used in determining the necessary widening to compensate for lean. The amount of widening should be limited to a maximum of 4 feet.

- The amount of energy a cyclist expends in using a bikeway will affect the usage of the bikeway. The grades, therefore, should be kept to a minimum. A bikeway grade should not exceed 3%. The second figure shows the desirable gradients for various lengths of grade.

**Curve Widening**

When widening reaches 4 ft. ($\theta > 60^\circ$), that weight shall be carried on a radius of 4 ft. through the central portion of the curve ($\theta > 60^\circ$) as shown on the right.
The superelevation should never exceed 0.12 feet per foot of curve. The superelevation on a curve should not exceed that of the straight roadway. The curvature and superelevation are determined for determining the minimum radius of curvature of the superelevation. The following should be given to determine the superelevation of a roadway. For a given design, the superelevation of a roadway depends on the gradient, which in the case of a roadway, the superelevation of a curve is determined. The design of a roadway may be considered in more detail. The superelevation of a roadway should be 15 mph and on long design speeds for bicyclists.
design goals / concepts

- Materials should provide stable surface and remain relatively dry.
- Color should blend with the natural environment to minimize visual impact.
- Design for wheelchair accessibility wherever reasonable (min 36" width).
- Minimize erosion of surface material; i.e., provide concrete pans at side-drainage locations to limit washing.
- Gradients less than 3% are preferable.
- Create meanders with gentle curves which conform to the natural topography.
- Consider providing occasional viewing and seating areas along the path to accommodate passive recreation activities.
- Path layout establishes the relationship of the user to the water. Bring the path to the water at natural attractors, i.e., sound of falling water, important views, etc.

CRUSHED ROCK PATH SECTION

N.T.S.
design goals / concepts

railings shall be free of splinters and provide a smooth, clean surface to the touch

railings shall be sturdy, vandal-resistant, and easily maintained

ends of handrail shall be designed for maximum safety to the pedestrian and the bicyclist, i.e., angle ends to meet grade for a smooth transition to rail height

rail color should blend with the natural environment or tie into color scheme of adjacent development.

design railings which are harmonious with other elements throughout the corridor
1. Read plans.
2. Word walls.
3. Separation in grade.
5. Low vegetation mass.

Fert. TH:

Overall site design.

Aesthetic, integral part of the site. Where required, plan barriers as an extension of the site.

Defining the need for barriers.

Accessibility. The number of barriers necessary to separate vehicular and pedestrian traffic for safety.

A sensibly designed circulation that minimizes the need for barriers.

A graded design, not an abrupt transition. The interface between open space and adjacent development should be soft.

DEFINITIONS

Barriers

DESIGN GOALS / CONCEPTS

Reflected in metallic colors the most influential color in the environment. It is required. Design for visual and minimal catchmark landing. Where

TERRACE HILLS

With vegetation

Minimize scale.
design standards

- site crossings at intersections or nearest reasonable location
- all paths shall be perpendicular to road at intersection
- path crossings shall be clearly visible, i.e., stripe or alternative paving material in keeping with materials, colors, etc., of area
- to facilitate wheeled movement, curb cuts should be provided at all intersections and entries. Create a non-slip surface other than grooved, as grooves may fill with water, freeze and cause slipping.
- provide four signs at each intersection: two for bikes and pedestrians and two for automobiles
**Design Goals / Concepts**

1. Consider breakaway capability to minimize flood obstruction.
2. Design bridges that are sturdy, safe, vandal-resistant, and easily maintained.
   - Deck with good skid-resistance.
   - Stabilize deck to minimize vibrations.
   - Railings shall be free of splinters and provide a smooth, clean surface to the touch.
   - Railings should allow view to the river for all heights, yet prevent anyone falling through.
   - Scale of bridge should be in keeping with its surroundings.
3. Bridge color shall blend with the natural environment or tie into color scheme of adjacent development. Black is the least reflective and most invisible color in the landscape.
4. Integrate design with other elements throughout the corridor and preserve existing historical stone bridges.

**Typical Bridge**

- Max. opening - 9".
- 12' for Peds, Bridge.
- 18" for Bicycles.
- 2-4% Camber.
- Steel Handrail.
- Provide handrail extensions where possible.
- Center nailing strip to minimize vibrations.
- Curve extensions away from deck.
design goals / concepts

The following detail is provided for your information. Use of this construction method is optional.

1. Bridge Cross Section
   - Slope grade: 2'-0" to 6'-0" at 1%.
   - 6" x 10" laminated posts根据不同
   - 6" x 6" pressure treated rough sawn timbers.
   - 2 x 2" deck timber.

2. Bridge Bearing Detail
   - 1/2" x 2" concrete fill must be used.
   - Gravel below bridge.
   - Steel saddle with 1/2" x 24" thru bolt.
   - 1/4" x 2" concrete pier to gravel.

Notes:
- Tubular steel shall be ASTM A36 grade B.
- Install railing after concrete has been poured.
- Railings connections to posts are all welded.
- Fabricate closure plates at end of all angles. Weld all around and grind smooth.
- Structural steel shall be shop painted with rust-inhibitive or base primer, do not paint surfaces to contact concrete or to be field welded.
- Railings shall be painted "flat black" over primer.
- Paint test strip color shall be provided to the engineer and approved prior to its use.

TYPICAL PEDESTRIAN BRIDGE
Appendix B - Maps
Appendix C - Cost Estimate
## Santa Fe River Corridor Cost Estimate

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>St. Francis Drive Camino Alire</td>
<td>$1,848,234</td>
</tr>
<tr>
<td></td>
<td>Camino Alire - COE Project</td>
<td>Funding in place</td>
</tr>
<tr>
<td></td>
<td><strong>Total 1996</strong></td>
<td><strong>$1,848,234</strong></td>
</tr>
<tr>
<td>1997</td>
<td>St. Francis Drive Underpass</td>
<td>$50,000</td>
</tr>
<tr>
<td></td>
<td>Camino Alire to Ricardo Rd</td>
<td>$1,105,325</td>
</tr>
<tr>
<td></td>
<td><strong>Total 1997</strong></td>
<td><strong>$1,155,325</strong></td>
</tr>
<tr>
<td>1998</td>
<td>Paseo de Peralta Underpass</td>
<td>$85,933</td>
</tr>
<tr>
<td></td>
<td>Paseo de Peralta to Old Santa Fe Trail</td>
<td>$224,851</td>
</tr>
<tr>
<td></td>
<td>Santa Fe Trail Underpass</td>
<td>$92,267</td>
</tr>
<tr>
<td></td>
<td>Santa Fe Trail to Don Gaspar Ave</td>
<td>$400,448</td>
</tr>
<tr>
<td></td>
<td>Don Gaspar Underpass</td>
<td>$89,684</td>
</tr>
<tr>
<td></td>
<td>Don Gaspar to Galisteo St</td>
<td>$230,961</td>
</tr>
<tr>
<td></td>
<td>Galisteo St Underpass</td>
<td>89,684</td>
</tr>
<tr>
<td></td>
<td>Galisteo St to DeFour St</td>
<td>$626,962</td>
</tr>
<tr>
<td></td>
<td>DeFour St Underpass</td>
<td>$141,353</td>
</tr>
<tr>
<td></td>
<td>DeFour St to St. Francis Drive</td>
<td>$476,555</td>
</tr>
<tr>
<td></td>
<td>Ricardo Rd to Frenchy’s Field</td>
<td>$1,788,080</td>
</tr>
<tr>
<td></td>
<td><strong>Total 1998</strong></td>
<td><strong>$4,246,778</strong></td>
</tr>
<tr>
<td>1999</td>
<td>Camino Cabra Underpass</td>
<td>$81,530</td>
</tr>
<tr>
<td></td>
<td>Camino Cabra to E. Palace Ave</td>
<td>$164,121</td>
</tr>
<tr>
<td></td>
<td>E. Palace Ave Underpass</td>
<td>$82,952</td>
</tr>
<tr>
<td></td>
<td>E. Palace Ave to Delgado St</td>
<td>$402,698</td>
</tr>
<tr>
<td></td>
<td>Delgado St Underpass</td>
<td>$77,637</td>
</tr>
<tr>
<td></td>
<td>Delgado St to Paseo de Peralta</td>
<td>$54,400</td>
</tr>
<tr>
<td></td>
<td><strong>Total 1999</strong></td>
<td><strong>$863,338</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total 1996 -1999</strong></td>
<td><strong>$8,113,675</strong></td>
</tr>
</tbody>
</table>

Costs not included:
- Instream flow costs
- Major park construction (i.e. redevelopment of DeVargas Park and Alto Park)
- C.O.E. project at Camino Alire
- St. Francis Drive underpass cost assumes project to be done as part of a bridge replacement or flood control improvement project
Appendix D - Recommendations for Stormwater Master Plan
Dear Mayor Jaramillo and Council Members;

The following are comments related to the Storm Drainage Management Plan. These comments were generated after reviewing the proposed plan and meetings with City Staff and consultants to discuss the project as it relates to the Santa Fe River Plan.

1. We request that further analysis be conducted to determine if the peak discharge to the Santa Fe River can be lessened by using Nichols and McClure reservoirs for some storage.

2. We support the concept of constructing a multi-purpose reservoir at the old Two Mile site to provide some flood storage as well as storage to maintain a minimum instream flow for the Santa Fe River during dry weather. We request analysis of this concept.

3. We also request that additional investigation go into using numerous small detention facilities on the tributary arroyos to reduce peak discharges from 100 year and more frequent floods. Design of all pending drainage improvements including Cerrillos Road, the Rufina Drain and the Arroyo Chamiso drainage projects should incorporate upstream detention basins to lower peak flows.

4. Recognizing the extent and severity of a 100 year event, we suggest the City immediately develop an ordinance prohibiting new construction within the 100 year flood plain. The issues of existing development and uses within the floodplain need to be addressed. We question the City's responsibility to protect structures that have been built within the floodplain.

5. We support replacement of bridges and other structures which block the channel, particularly the bridge at the Santa Fe River and St. Francis Drive. Engineering for all bridge replacements should be coordinated with the recommendations of the General Plan and the Santa Fe River Plan, to provide trail underpasses and greenway improvements as a part of the projects.

6. We recommend that the Santa Fe River channel from the Alameda bridge to Guadalupe St., the area identified with potential flooding, be creatively designed to increase capacity while following the Design Guidelines of the Santa Fe River Plan. This additional capacity could possibly be achieved by methods such as:

   • channel widening and tailoring to allow room for trails and flood capacity,
• grading to add capacity as well as create attractive park areas, and
• selective acquisition of key parcels of flood prone land as they become available (pre-flood acquisition program).

In conclusion we would like to stress the need to coordinate the General Plan, the Santa Fe River Plan and the Storm Drainage Management Plan. All should mesh to provide cost effective and environmentally sound solutions to Santa Fe's drainage and flood problems.

We appreciate your listening to our input and request that the River Task Force be a part of the approval process for this plan.

Sincerely,

Santa Fe River Task Force

Anita Sanders, Chair